Lexical Borrowing (Tarib) in Arabic Computing Terminology: Issues and Strategies

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By

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Abstract

Computing technology is evolving rapidly, which requires immediate terminology creation in the Arabic language to cope with such an evolution. Technical loanwords form a big part of modern Arabic terminology and they are spreading rapidly within the language. This research investigates the extent to which the Arabic neologization mechanism of *taʿrīb* (lexical borrowing) is used in computing terminology creation in comparison with the mechanisms of *ishtiqāq* (derivation), *majāz* (semantic extension) and *tarkīb* (compounding). In addition, it assesses the impact and importance of *taʿrīb* as a computing terminology creation mechanism in Arabic. This research is based on a corpus of specialised dictionaries and specialised literature. The aforementioned mechanisms are used to various degrees in Arabic in the creation of computing terminology, and are used interchangeably to produce equivalents of single foreign terms, which has caused confusion in the use of the language. The extent of the use of *taʿrīb* in computing terminology creation, and its impact on, and importance to Arabic as a computing terminology creation mechanism is determined based on two criteria. First, a comparison of the extent of use of the aforementioned mechanisms based on three selected corpora of dictionaries and magazines of Arabic technical computing terminology is presented. Second, an assessment of the lexicographical treatments of the computing terms coined by the aforementioned mechanisms is offered, with special consideration of the terms coined by *taʿrīb* as the main mechanism under discussion. The findings show that *taʿrīb* is by far the most used Arabic word formation mechanism in terms of computing terminology creation, followed by *tarkīb*, *ishtiqāq* and *majāz*. In addition, it has been concluded that *taʿrīb* clearly has a major impact on, and is of great importance to Arabic in computing terminology creation.

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List of Abbreviations

ALECSO	Arab League Educational Cultural and Scientific Organization
C1	Corpus 1
C2	Corpus 2
C3	Corpus 3
CAT1	Category 1 (Hardware)
CAT2	Category 2 (Software)
CAT1	Category 3 (Units of Measurement)
F.	Feminine
M1	Mechanism 1 (*Taʿrīb*)
M2	Mechanism 2 (*Ishtiqāq*)
M3	Mechanism 3 (*Majāz*)
M4	Mechanism 4 (*Tarkīb*)
M.	Masculine
MMAA	*Majallat Majmaʿ al-Lugha al-ʿArabiyya*
NOW	National Organization of Women
PBA	The Permanent Bureau of Coordination of Arabization
S1	Sub-corpus 1 (*Muʿjam al-Ḥāsibāt*)
S2	Sub-corpus 2 (Mahmoud's Dictionary of Computer and Internet Terms)
S3	Sub-corpus 3 (The Al-Kilani Dictionary)
S4	Sub-corpus 4 (NetworkSet Magazine)
S5	Sub-corpus 5 (*Majallat Sūq al-ʿAṣr*)
S6	Sub-corpus 6 (*Majallat Wāḥat al-Ḥāsib*)
SL	Source language
TL	Target language
UNESCO	United Nations Educational, Scientific and Cultural Organization

List of Transliteration and Transcription Symbols

1. Consonants

Arabic Alphabet	Transliteration	IPA Transcription
ء	ʾ	ʔ
ب	b	B
ت	t	t
ث	th	θ
ج	j	ʤ
ح	ḥ	ħ
خ	kh	x
د	d	d
ذ	dh	ð
ر	r	r
ز	z	z
س	s	s
ش	sh	ʃ
ص	ṣ	sˤ
ض	ḍ	dˤ
ط	ṭ	tˤ
ظ	ẓ	ðˤ
ع	ʿ	ʕ
غ	gh	ʁ
ف	f	f
ق	q	q
ك	k	k
ل	l	l
م	m	m
ن	n	n
هـ	h	h
و	w	w
ي	y	j

2. Vowels

Short	Long
a	ā
i	ī
u	ū

3. Diphthongs

Diphthongs
aw
ay

Declaration

This is to attest that no material from this thesis has been included in any work submitted for examination at this or any other university.

بسم الله الرحمن الرحيم

In the name of Allah, the Entirely Merciful, the Especially Merciful

﴿وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٍ﴾ (يوسف:76)

"But over every possessor of knowledge is one [more] knowing"

The Qur'an XII.76

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Dedication

To My Parents and Lovely Wife

To the unique and beautiful language, Arabic

In the memory of

King Abdullah Bin Abdulaziz, the king of humanity

and

My dear friend Hasan Al-Blushi, who was like a brother to me; you will always be in my prayers and my heart

May their souls rest in peace. Amen

Chapter One: Introduction

1.1 Background

There are continuing rapid developments in many areas of life, particularly in the realm of science and technology, which are essential elements in the modern world. The rapid evolution of technology requires immediate linguistic terminology creation. Languages use various word formation/neologisation mechanisms to satisfy their needs for terminology. However, there can be differences in the word formation mechanisms used by each language and the extent to which they are relied upon. For example, Arabic is considered a language of derivation (*ishtiqāq*) as derivation is a very significant word formation mechanism in the language.

Most languages cannot exclusively depend on their internal structures to satisfy their needs for vocabulary. Therefore, they resort to lexical borrowing from other languages; this mechanism is used more by some languages than others. English, for example, relies heavily on the mechanism of lexical borrowing, as does Modern Arabic which relies strongly on *taʿrīb* (lexical borrowing), especially in the scientific and technical fields. One of the major fields of technology is computer technology which is a rapidly evolving modern field of study. Computer technology involves various types of technology, of which the main types are hardware and software technologies. Each of these types contains large volumes of technical terminology. As most if not all of the computer technology is introduced to the Arab world from foreign countries, mainly English-speaking ones, this involves huge volumes of new terminology to be intoroduced to the Arabic language through lexical borrowing. *Taʿrīb* appears to be an efficient word formation mechanism which can satisfy the huge volume of new technical terminology that is invading the Arabic language. It can also be useful due to its flexibility in dealing with such terminology.

Rapid advances in the areas of technology and communications in the 20th century have made huge volumes of new information and knowledge widely available to almost every country in the world (El-Khafaifi, 1985, p. 35). Traditionally, Arabic word formation mechanisms involved coining native Arabic terms. However, it was not possible to rely solely on such mechanisms to fulfil the linguistic needs for new terminology. This was due to many reasons, including the sheer volume of the new terminology involved, the lack of language planning agencies capable of dealing with such volumes of terminology, and the lack of use of the various Arabic word formation mechanisms to satisfy the language needs for new terminology.

Thus, Arabic language academies were established to try to solve this problem. These academies include the Cairo Academy, which is one of the most active in the Arab world. These academies have applied various Arabic word formation mechanisms to help develop the language. They have resorted to *taʿrīb* when other mechanisms failed to satisfy the language requirements.

It is essential to indicate that there has been almost no research on the borrowing of computing terminology into Arabic as it is a recent area of research. The differences between the neologisms produced by the Arabic language academies and the other language sources, in terms of computing loanwords, the conflict it is causing among the Arabic language users, and the standards they follow in using loanwords is something that needs to be carefully examined. Speakers in general do not wait until they are told by language authorities or academicians what terms they should use (Ali, 1987). Instead, they use any terms available to them, whether they are translated or borrowed. Technical loanwords form a big part of modern Arabic terminology and they are spreading rapidly within the language.

The focus of this research is on investigating the extent of usage of *taʿrīb* in computing terminology creation in Arabic, and to assess its impact on and importance to the language as a mechanism of computing terminology creation. The computing terminology analysed in the study is discussed in terms of four Arabic word formation mechanisms: lexical borrowing (*taʿrīb*), derivation (*ishtiqāq*), semantic extension (*majāz*) and compounding (*tarkīb*). These mechanisms are discussed in order to contextualize the extent of usage of *taʿrīb* in comparison with the other three mechanisms of computing terminology creation in Arabic, and to assess its impact on and importance to the language. The analysis is based on three selected corpora of dictionaries and magazines containing Arabic technical computing terminology.

Moreover, the research provides a general description of the Arabic word formation mechanism of *taʿrīb*, which is the main mechanism under discussion in this study, and provides some background information on the Arabic word formation mechanisms of *ishtiqāq*, *majāz*, *tarkīb* and *naḥt* (blending). In addition, the research assesses the differences between the corpus/sub-corpus of the Cairo Academy computer dictionary (an official source of computing terminology) and other computer dictionaries and magazines (unofficial sources of computing terminology) in terms of their use of the Arabic word formation mechanisms to produce computing terminology.

The terms discussed under the mechanism of *taʿrīb* are loanwords such as *kumbyūtir* (computer) and loan acronyms such as *sī dī* (CD). For the purposes of this study, the term ‘loanwords’ will refer to both loanwords and loan acronyms except for cases where the latter two terms are compared with each other, or are mentioned in the same sentence. The terms discussed under the mechanism of *ishtiqāq* are 'derived words' such as *taṭbīq* (application) derived from the Arabic root [ṭ-b-q], and Arabic relative adjectives such as *raqmī* (digital) derived from the Arabic root [r-q-m]. The terms discussed under the mechanism of *majāz* are old terms which have acquired new meanings in addition to their old ones such as *al-ʿatād* (old meaning 'equipment' and new technical meaning 'hardware'). These terms are referred to as 'semantically extended terms'. The terms discussed under the mechanism of *tarkīb* are those represented in four Arabic compounding forms. These forms are the *ʾiḍāfa* construction (genitive structure) such as *muḥarrik baḥth* (search engine), the *naʿt* construction (adjective structure) such as *māsiḥ marʾī* (visual scanner), hybrid compounds (half *ʾiḍāfa* and half *naʿt*) such as *taqsīm al-qurṣ al-ṣulb* (hard disk partitioning), and prefixed negative particle compounds such as *lā-silkī* (wireless) and *ghayr mubāshir* (off-line).

1.2 Objectives of the Study

As noted above, this research assesses the extent of use of the Arabic word formation mechanism of *taʿrīb* in computing terminology creation in comparison with the mechanisms of *ishtiqāq*, *majāz* and *tarkīb*. In addition, it assesses the impact and importance of *taʿrīb* as a computing terminology creation mechanism in Arabic. Accordingly, this study sets out to achieve the following objectives:

1- To assess the extent of use of the four Arabic word formation mechanisms in the production of computing terms in the corpora/sub-corpora of dictionaries and magazines in the study. The differences in the usage levels of the Arabic word formation mechanisms between the dictionaries and magazines will also be analysed. In addition, the study will examine the extent to which Arabic computing terms are classified into the three terminological categories of hardware, software and units of measurement in the corpora/sub-corpora.

2- To assess the computing terminology usage levels of the Arabic word formation mechanisms in the three categories.

3- To assess the prevalence levels of the overlapping computing terminology among the corpora/sub-corpora, mechanisms and categories.

4- To assess the competence of the computer dictionaries analysed in the study in terms of computing terminology creation. In addition, the level of consultation of the selected dictionaries by the magazines concerning computing terms will be evaluated, together with examining the level of agreement between the corpora/sub-corpora in the use of Arabic computing terminology.

5- To establish linguistic criteria for the identification of computing 'loanwords and loan acronyms', 'derived words', 'semantically extended words' and 'compounds' in Arabic.

6- To categorize the terms created through the mechanism of *taʿrīb* into loanwords and loan acronyms in order to discover the influence of acronym borrowing as a mechanism of *taʿrīb*.

7- To offer a recommended usage for loanword spellings as a guide for the production of unified loanword spellings for single donor words instead of having variant spellings.

8- To produce a model for computing terminology translation using the four Arabic word formation mechanisms.

1.3 Importance of the Study

The distinctive nature of this research is demonstrated in the following areas:

First, this study uses quantitative and qualitative analysis methods to examine the Arabic word formation mechanism of *taʿrīb* in computing terminology creation. The quantitative analysis involves a comparative analysis of the frequency of the computing terms produced by each of the four Arabic word formation mechanisms. This will demonstrate the extent to which each mechanism produces technical computing terminology, and will enable an assessment of the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in Arabic. In addition, a comparative analysis will show the frequency of computing terms in the related forms produced by the Arabic word formation mechanisms of *taʿrīb* (containing two borrowing types), *ishtiqāq* (containing two derivation types), and *tarkīb* (containing four compounding forms).

The qualitative analysis deals with the lexicographic treatments of the computing terms produced by these mechanisms in Arabic. Special consideration is given to the terms produced by *taʿrīb* as it is the main mechanism under discussion in this study.

Second, the study examines and discusses the differences between the Cairo Academy computer dictionary and the other computer dictionaries and magazines in the use of Arabic word formation mechanisms to produce computing terms. These sources are represented in three corpora in the study; the first corpus is made up of an English-Arabic computer dictionary produced by the Cairo Academy; the second corpus consists of two general English-Arabic computer dictionaries; and the third corpus consists of three different Arabic computer magazines. The research analyses the computing terms in each corpus according to the related Arabic word formation mechanisms. Accordingly, it establishes linguistic criteria for the identification of computing terms produced by each of the four word formation mechanisms. It also analyses these terms according to the three terminological categories of hardware, software and units of measurement.

Third, the three corpora in the study contain a total of 1,390 Arabic computing terms along with their English counterparts: 250 terms in the first corpus, 418 terms in the second corpus, and 722 terms in the third corpus. These corpora have been compiled by the researcher in order to analyse the Arabic computing terms produced by the related Arabic word formation mechanisms. The addition of the terms into the corpora for analysis was based on their technical computing relevance.

Fourth, the study presents a model for computing terminology translation based on the four Arabic word creation mechanisms. This model corresponds to the guidelines and the computing terminology produced by the Cairo Arabic Language Academy in the *Muʿjam al-Ḥāsibāt* corpus/sub-corpus. The model is proposed in order to produce standardized terminology, and more accurate and proper Arabic equivalents of the original terms. It also aims to enable the creation or use of native Arabic terms instead of borrowing terms from other languages. This will increase the dependability of the Arabic lexicon and limit the use of loanwords, in order to restore the purity of the language.

Finally, this study will be of interest to linguists concerned with language variation and change. It also may be of special interest to technical terminology lexicographers and translators, particularly those dealing with computing terminology in Arabic. Moreover, Arabic speakers learning or teaching computer sciences will also benefit from this study in terms of the computing vocabulary it presents. This is also true for Arab computer engineers, programmers, as well as general readers. As the discussion of ‘lexical borrowing’ reflects an interaction between language and culture, this study could also be helpful to historians, anthropologists, and various other social scientists.

1.4 Research Questions

In order to address the study objectives, the following research questions have been formulated:

1- To what extent is the Arabic word formation mechanism of *taʿrīb* used in computing terminology creation in comparison with the mechanisms of *ishtiqāq*, *majāz* and *tarkīb*, and what is the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in Arabic?

2- What are the percentage totals of computing terms produced by these mechanisms in the corpora/sub-corpora, and what percentage of the terms can be classified under the categories of hardware, software and units of measurement?

3- What are the differences between the dictionaries and magazines examined in the study in their use of the mechanisms to produce computing terms?

4- What are the percentage totals of computing terms of the corpora/sub-corpora corresponding to the three categories?

5- What are the percentage totals of computing terms of the mechanisms in the categories?

6- What are the percentage totals of overlapping computing terminology among the corpora/sub-corpora, mechanisms and categories?

7- How competent are the computer dictionaries examined in the study at computing terminology creation?

8- To what extent have the dictionaries been consulted by the magazines?

9- To what extent are the corpora/sub-corpora similar in their use of Arabic computing terminology?

The first and second questions are answered through a comparative analysis of the computing terminology formed by the different mechanisms and classified into the three categories. The analysis starts with an illustration of the percentage totals of computing terms produced by the mechanisms in the corpora/sub-corpora, and these terms are classified into the three categories; this is followed by a comparison of their usage levels. This analysis demonstrates the extent of use of the four Arabic word formation mechanisms in computing terminology creation, the usage levels of computing terms classified into the categories, and the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in the Arabic language.

The third and fourth questions are answered through a comparative analysis of the levels of computing terminology in the corpora/sub-corpora, represented by the dictionaries and magazines, in relation to the word formation mechanisms used, and the levels of computing terminology in the corpora/sub-corpora in relation to the terminological categories. This analysis illustrates the level of occurrence of computing terms in the dictionaries and magazines in relation to the mechanisms used, and the level of occurrence of computing terms in the corpora/sub-corpora in relation to the categories. The comparison also demonstrates the differences between the dictionaries and magazines in the use of the four Arabic word formation mechanisms to produce computing terms.

The fifth question is answered through a comparative analysis of the percentage totals of computing terms produced by the mechanisms in terms of the categories.

The sixth question is answered through a comparative analysis of the overlapping computing terminology found in the dictionaries and magazines. This analysis illustrates the levels of overlapping computing terminology among the corpora/sub-corpora, mechanisms and categories.

The seventh, eighth and ninth questions are answered by undertaking a statistical analysis of the computing terms in the dictionaries, the overlapping computing terminology in the dictionaries and magazines, and in the corpora/sub-corpora. This analysis illustrates the percentages of the computing terms extracted from the computer dictionaries in order to demonstrate their competence in terms of computing terminology creation. It also highlights the levels of overlapping computing terminology in the dictionaries and magazines in order to demonstrate the level of consultation of the dictionaries by the magazines. In addition, it illustrates the levels of agreement and similarities across, between and within the corpora, and across and between the sub-corpora in the use of Arabic computing terminology.

1.5 Structure

This dissertation consists of six chapters. Chapter one provides background information about the study and outlines the objectives, importance, research questions, and structure of the study.

Chapter two presents a general introduction to the phenomenon of ‘lexical borrowing’ and discusses the hierarchies and scales of borrowability. Also, it provides a detailed literature review of the Arabic word formation mechanism of *taʿrīb*, explores its history and importance, and highlights the debates on, the reasons for using and the methods of *taʿrīb*. In addition, it discusses the constraints and obstacles to *taʿrīb*, and the features of loanwords in Arabic. Moreover, it offers background information on the Arabic word formation mechanisms of *ishtiqāq*, *majāz*, *tarkīb* and *naḥt*, and on Arabic language academies.

Chapter three includes a description of the research methodology, which explains the motivations behind the choice of this particular research topic, presents general information on the sources of the data used, explains the reasons behind the choice of the corpora/sub-corpora used and gives a general description of them. In addition, it demonstrates the formula applied in the data collection and analysis, and gives an overview of the process of analysing the data, the results and findings of the study.

Chapter four provides a detailed description of the process of data analysis, and provides a detailed description and comparison of the results from the data in the corpora/sub-corpora. It demonstrates the usage levels of the Arabic word formation mechanisms and categories in relation to the computing terms in the study, and draws comparisons between the corpora/sub-corpora in relation to the mechanisms and categories. Also, it highlights two main comparisons; one is concerned with the frequency of overlapping terminology in each corpus/sub-corpus, mechanism and category; the other is concerned with all the overlapping terminology across, between and within the corpora, and across and between the sub-corpora. Finally, this chapter presents a summary of the results.

Chapter five provides a detailed discussion of the study results and findings. It contains a discussion of the four Arabic word formation mechanisms of *taʿrīb*, *ishtiqāq*, *majāz* and *tarkīb* in terms of computing terminology creation. It discusses various aspects of the mechanism of *taʿrīb* which apply to the computing terminology. This chapter also contains a discussion of the mechanism of *ishtiqāq* in terms of Arabic 'morphological patterns' (*ʾawzān*) of the derived computing words in the study. It also contains a discussion of the mechanism of *tarkīb* in terms of the four Arabic compounding forms of the Arabic computing compounds in the study.

This chapter also illustrates the extent of use of the four Arabic word formation mechanisms in computing terminology creation. It demonstrates the impact and importance of *taʿrīb* as a computing terminology creation mechanism in Arabic, the category usage levels in the study, and the usage levels of the mechanisms in each category and in the corpora/sub-corpora. In addition, it presents a model for computing terminology translation through the four Arabic word formation mechanisms. In addition, this chapter provides a discussion of the results of the comparisons made between the corpora/sub-corpora, mechanisms and categories in terms of the overlapping computing terminology. Moreover, this chapter gives concluding remarks on the study findings.

The final chapter presents the study findings as answers to the research questions. It discusses the contributions of this research to the field of study. Moreover, it presents the limitations of the research, and provides a summary of the results and conclusions. It also includes suggestions and recommendations for further research.

Chapter Two: Literature Review

2.1 Introduction

This chapter provides a general introduction to the phenomenon of ‘lexical borrowing’, together with a definition and history of the term. This is followed by an examination of hierarchies and scales of borrowability. Thereafter, the mechanism of lexical borrowing into the Arabic language (*taʿrīb*) is analysed in detail by giving an introduction to *taʿrīb*, its history and importance. Then, there is a discussion of the debate on the issue of *taʿrīb* in both classical and modern times. Next, there is a presentation of the reasons for the use of *taʿrīb*, together with its methods, and the constraints and obstacles it faces. This section is concluded with an outline of features used to identify loanwords in Arabic.

In the next section, a chronological discussion of the history of lexical borrowing in Arabic is provided. This is divided into two main periods, the Classical Period and the Modern Period. The first period includes three parts i.e. the pre-Islamic era, lexical borrowing in the Qur’an, and the first Translation Movement (9^{th} -11^{th} centuries). The second period is divided into two parts, the 19^{th} century, and from the 20^{th} century until the present time. The latter part includes a discussion of the six major Arabic language academies: the Damascus Academy, the Cairo Academy, the Baghdad Academy, the Permanent Bureau of Coordination (Rabat), the Union of Arab Academies, and the Amman Academy.

Next, there is a discussion of the Arabic word formation mechanisms of *ishtiqāq* (derivation), *majāz* (semantic extension), *tarkīb* (compounding) and *naḥt* (blending), along with brief comments on their use in technical and computing terminology creation in Arabic, illustrated with examples where available. Finally, there is a summary of the chapter.

2.2 Lexical Borrowing

Lexical borrowing is a natural phenomenon in languages. Individual words can be borrowed from any language, even if the learner's understanding of the originating language is limited (Ringbom, 1983). In addition, ʿAbd al-Qādir al-Maghribī (1867-1956) (cited in El-Khafaifi, 1985, p. 163) maintained that languages enrich and develop themselves and their capabilities by borrowing from other languages. This illustrates the importance of borrowing for all languages and the role it plays in developing them, particularly when considering the rapid developments in the modern world that result in an urgent need for large volumes of new terminology. Furthermore, El-Khafaifi (1985, p. 153) comments that borrowing an existing word from another language is easier than extending and modifying the use of existing lexical words to fulfil new communicative needs. In other words, it is easier to use the mechanism of 'lexical borrowing' to satisfy the needs of the language than to use the mechanism of 'semantic extension'.

The process of borrowing vocabulary from other languages into Arabic is referred to as *taʿrīb*. It can also be defined as the process of inserting a foreign word into the Arabic language even if it does not conform to Arabic phonology (Al-Jawharī, cited in ʿAbd al-ʿAzīz, 1990, p. 47). It should be noted that the term *taʿrīb* was historically used as an equivalent for the general process of translation into Arabic.

The process through which a particular language includes in its vocabulary words from another or other languages is technically named by such terms as ‘borrowing’, ‘loaning’ and ‘adoption’ (Ali, 1987, p. 87). Lexical borrowing can be defined as the integration of foreign terms into the language (Redouane, 2001, p. 26). The process of borrowing can be termed ‘adoption’, as speakers adopt elements from another language into their own (Haugen, 1950). Linguistic borrowing also refers to adapting loanwords into the linguistic system of a borrowing language. Additionally, it is a process through which a language obtains some structural property from another language (Moravcsik, 1978, p. 99). The language from which the property is obtained is known as the ‘source (or donor) language’, while the acquiring language is known as the ‘recipient (or borrowing) language’.

If a foreign term has been adapted morphologically and/or phonologically into another language, it can be regarded as a case of borrowing (Al-Khatib and Farghal, 1999, p. 1). According to Sa’id (1967, p. 31), the expression ‘borrowing’ refers to the process of linguistic interference which results in the spread of lexical expressions from one language and their use ‘in the context’ of another language. He also states that ‘linguistic borrowing’ has been described as “the speaker’s attempt to regenerate in one language patterns which he has learned in another”. Hope (1971, p. 617) indicates that ‘linguistic borrowing’ is a contradictory process as it involves, on the one hand, understanding and breaking down the material in contact, and on the other hand, reconstructing it in compliance with the formal features of the recipient language.

El-Khafaifi (1985, p. 165) points out that any language can be a borrowing language and also a donor language to several other languages. He also notes that it is possible that there is no language entirely free of lexical borrowing; the only difference is that languages vary drastically in the number of lexical units which they borrow (p. 153). Moreover, languages vary in their acceptance of lexical borrowing as an effective word formation mechanism. Some languages rely more on borrowing than others, which might depend on their flexibility at accepting new words from other languages. In addition, some languages are more flexible at using borrowing than others depending on the restrictions imposed by each language. It can also be noted that some languages give more words than they borrow and vice versa. A less developed civilisation in certain areas of life is likely to resort to lexical borrowing to satisfy its need for new vocabulary, which can be considered a reason for the differences in the volumes of loanwords between languages.

Nunnemann (n.d.) notes that at various periods in world history different civilisations have been outstanding in one field or another (e.g., sciences, medicine, military and trade). The superiority of any civilization in such fields leads to the borrowing of vocabulary from the language of this civilization by others. For example, the Islamic civilization during the Golden Age of Islam (8^{th} -11^{th} centuries) excelled in various sciences, which led to Arabic words being borrowed directly into other languages such as Spanish, and indirectly from Spanish to French to English (Nunnemann, n.d.). It should be noted, however, that during the Medieval Translation Movement (9^{th}-11^{th} centuries), a great number of loanwords entered Arabic in the first modest 'invasion' of Greek (Newman, 2002).

It can be suggested that different languages influence each other when they are in contact over some period of time. Contact between languages leads people to take words from other languages and adapt them to their own languages as loanwords (Nunnemann, n.d). In addition, Newman (2002) states that linguistic contact between different peoples inevitably leads to linguistic borrowing, which is also a result of the influence of communities upon each other. Moreover, El-Khafaifi (1985, p. 174) suggests that cultural interaction and contact between different peoples naturally leads to lexical borrowing. This leads to the conclusion that any linguistic contact or cultural interaction between different communities over some period of time inevitably results in the occurrence of lexical borrowing.

Sapir (1949, p. 192) argues that languages are rarely sufficient on their own and indicates that the speakers of one language are in contact with those of neighbouring or culturally dominant languages directly or indirectly as a result of the necessities of daily life. More dominant cultures are more likely to linguistically influence less dominant cultures, while less dominant cultures mostly have limited linguistic influence on more dominant cultures. For example, the French language in medieval Western Europe flooded the vocabularies of its neighbouring European languages, but did not receive much in return (Sapir, 1949, pp. 192-193). In modern times, the English language is playing this role as it has a huge influence on many languages around the world, including Arabic. However, it should be noted that English is also influenced by other languages. In the 21st century, Arabic is influenced by Western languages (mainly English) more than it influences other languages, especially in the scientific and technical areas, which indicates the underdevelopment of the Arab world in such fields.

According to Redouane (2001, p. 12), there are two types of lexical borrowing. The first is direct borrowing, which happens when a word is borrowed directly from another language. For example, the English word *omelette* was borrowed directly from French. The second is indirect borrowing, which happens when a word is passed indirectly from one language to another through undergoing phonological change. For example, the Turkish word *kahveh* was passed on to Arabic as *qahwa* and then it was passed on to Dutch as *koffie* and then it was borrowed into English as coffee.

Calque or (loan translation) is one of the translation procedures which were identified by Vinay and Darbelnet. It can be defined as "a special kind of borrowing where the SL expression or structure is transferred in a literal translation" (Vinay and Darbelnet, 1995, cited in Munday, 2008, p. 56). Haspelmath and Tadmor (2009, p. 14) define calque as "a complex form that was created on the model of a complex form in a donor language and whose constituents correspond semantically to the donor language constituents". According to El-Mouloudi (1986, pp. 278-9), French and English form an important source of an increasingly large number of borrowings which are easily integrated into the Arabic system as cases of calques or idiomatic expressions. Additionally, calque occurs when multi-word units are translated into Arabic and native speakers use them fluently (Alnaser, 2010, p. 131). For example, the expression 'he plays a role' was calqued into Arabic as '*yalʿabu dawran*'.

According to Jespersen (1912, p. 30) 'loanwords' are mostly technical terms belonging to one particular branch of knowledge or industry, and may be grouped in order to show what each nation has learned from other languages. It can be noted that Arabic has for centuries been flooding the vocabularies of Ottoman Turkish and Persian, but has not received much in return. Even though Arabic has borrowed terms from many languages in the past such as Greek and Persian, and adapted them, it has not been affected in terms of linguistic rules and structure (al-Hussini, 2009). Arabic is one of the richest Semitic languages in terms of vocabulary and derivations (al-Shihābī, 1965, p. 9). It has developed through old word formation mechanisms like *ishtiqāq* (derivation) and *taʿrīb* (borrowing), which are still used to satisfy the needs of the language in modern times.

Moreover, Cannon (1994, p. 2) states that Arabic is a universal language long known as a main supplier of vocabulary to Swahili, Spanish, Italian, French, Portuguese, Turkish, Persian, Indian languages like Urdu and Hindi, and English. A tabulation of such contact data worldwide would classify Arabic among the main word-suppliers. Arabic is classified as the seventh chief supplier of loanwords to English, with 225 verified items according to C.A.M. Fennell's *Stanford Dictionary of Anglicized Words and Phrases* (1892) (Cannon, 1994, p. 3). Walt Taylor (cited in Cannon, 1994, p. 4) collected around a thousand key terms of Arabic origin, along with thousands of unlisted derivatives. However, he considered around (66%) of these to be rare or obsolete, and the rest to be technical terms. The residue contained around 260 items supposedly in everyday use, a total generally confirmed by the fact that only 283 of his original thousand words were documented in the then current *Pocket Oxford Dictionary* (Cannon, 1994, p. 4). English is often considered a language that has borrowed considerably from other languages. Some statistics demonstrate that three quarters of the English lexicon is of foreign origin (Cannon, 1994, p. 5), which indicates the flexibility of the English language in using lexical borrowing. Some common examples of English words borrowed from Arabic are alchemy (1350-99), alcohol (1500-49), and algebra (1550-99) (Cannon, 1994, pp. 36-37).

Marian and Kaushanskaya (2007) highlight that speakers use lexical borrowing as they automatically switch into another language and actively use single words or whole phrases from that language. Furthermore, according to Thomason and Kaufman (1988, p. 14), "any linguistic feature can be transferred from any language to any other language". In agreement with this statement, Campbell (1999, p. 72) adds that not only can words be borrowed, but also syntactic constructions, morphology, sounds, phonological features, and in fact almost any aspect of language can be borrowed, given sufficient time and the suitable types of contact situations. Haugen (1950) also agrees that all linguistic features can be borrowed. This demonstrates the wide area of linguistic borrowing as it involves not only individual words, but it goes further to include nearly any aspect of language which can be borrowed from any language to another in the availability of the right conditions.

Seidel (2010, p. 2) states that the assimilation of loanwords from a donor language into the linguistic system of a borrowing language can influence the semantics, phonology, morphology, and/or other grammatical categories of the loanword under discussion. Borrowed items differ in their level of assimilation to recipient languages, which Hassaine (1984, p. 255) argues depends on the expressive power of loanwords. Thus, it can be noted that loanwords regularly adapt to the structural system of the recipient language according to their potential for penetration, which depends on their expressive power. Hassaine (1984, p. 256) further notes that some loanwords are probably perceived as linguistic elements that are more proficient at expressing an idea or determining an item, especially when equivalents are not provided to the borrowing language speakers.

El-Mouloudi (1986, p. 146) points out that according to the potential of loanforms for integration, they can be partially, wholly or not at all assimilated to the target system. Haugen (1950) also categorizes loanwords in relation to the degree of assimilation of their spelling within the borrowing language. Therefore, he defines three categories for the loan process, labelled as ‘partial importation’, ‘complete importation’, and ‘no importation’. The technical loanword *blūtūth* (Bluetooth) is an example of ‘complete importation’, while the technical loanword *brūksī* (proxy) is an example of ‘partial importation’ from English into Arabic. Haugen’s terminology refers to the differentiation between imported borrowings which have kept their original spelling even in the recipient language, and borrowings where only the concept has been borrowed into a recipient language, but not their spelling (Seidel, 2010, p. 17).

Structural elements are borrowed to various degrees. There have been a number of attempts by grammarians to produce hierarchies and scales of borrowability. This is discussed in the following section.

2.2.1 Hierarchies and Scales of Borrowability

It is clear that some types of linguistic patterns have a greater tendency to be borrowed than others (Haugen, 1950). In addition, Jinzhi (2008, pp. 68-69) states that linguists, who believe that morphosyntactic structures can be borrowed, regularly acknowledge that certain linguistic elements are more easily borrowed than others. Thus, Hassaine (1984, p. 267) argues that, theoretically, any linguistic element can be borrowed; practically, however, she comments that not all linguistic elements are entirely adaptable to another system. She also remarks that grammatical units in particular appear to be more difficult to transfer than lexical ones. Moreover, the transferability of language items is linked to the notion of grammaticality and lexicality. The more grammatical an item is, the less is its potential to be transferred; the more lexical it is, the more likely it is to be borrowed (El-Mouloudi, 1986, p. 127).

A number of grammarians have attempted to create scales or hierarchies of structural elements in accordance with their borrowability or the freedom with which they are transferred from one language to another (El-Mouloudi, 1986, p. 126). Various scales and hierarchies of borrowability started to appear from the late 19th century when William Whitney established his grammatical hierarchy in 1881. This hierarchy will be discussed, along with contemporary theories of borrowability. In total, five hierarchies and scales of borrowability are considered in this section:

Whitney (1881), Haugen (1950), Thomason and Kaufman (1988), Ross (1988), and Field (1988).

2.2.1.1 Whitney's Grammatical Hierarchy (1881)

William Dwight Whitney was the first linguist to note that certain linguistic elements are borrowed more freely than others (Field, 1998, p. 45). In 1881, Whitney established a grammatical hierarchy in which he arranged the different patterns in accordance with the freedom with which they are borrowed (Haugen, 1950). In this hierarchy, Whitney noted that nouns are the elements of language which are borrowed at the highest frequency, followed by the various other parts of speech, then suffixes, inflections and sounds (Haugen, 1950). Based on this ordering, Whitney’s hierarchy is as follows:

nouns > other parts of speech > suffixes > inflections > sounds

Although Whitney did not preclude the borrowing of inflectional morphology in his hierarchy, he suggested that it was extremely unlikely (Meakins, 2008, p. 115).

2.2.1.2 Haugen's Scale of Adoptability (1950)

Some seventy years later, Haugen (1950) proposed a scale of adoptability with a similar ordering to Whitney’s hierarchy, based on a synthesis of data from American Swedish and American Norwegian lists of loanwords. In this scale, nouns are the most frequently borrowed elements, followed by verbs, adjectives, and adverbs, prepositions and interjections. Based on this ranking, Haugen’s scale is as follows:

nouns > verbs > adjectives > adverbs, prepositions, interjections

Moreover, it appears in this scale that function words are more difficult to borrow than content words since the latter have a clear link with cultural content and the former do not (Appel and Muysken, 1987, cited in Aikhenvald and Dixon, 2006, p. 417). Haugen did not include morphology in his scale, but he concluded that the less structural a linguistic feature is, the more likely it is to be borrowed (1950).

Both of the previous orderings agree that nouns are the most frequently borrowed elements of language.

2.2.1.3 Thomason and Kaufman's Borrowing Scale (1988)

This borrowing scale is different from those of Whitney and Haugen as it is based on the degree of contact rather than structural features (Meakins, 2008, p. 120). In this scale, the factors of time and the level of bilingualism are two social factors which are essential for extensive borrowing (Thomason and Kaufman, 1988, p. 67). Thomason and Kaufman (1988, pp. 72-73) demonstrate that the notion of typological distance refers to a measure of structural similarity that applies to linguistic categories and their combinations, including the ordering relations. They presume that:

> “The more internal structure a grammatical subsystem has, the more intricately interconnected its categories will be (see Weinreich 1953:35); therefore, the less likely its elements will be to match closely, in the typological sense, the categories and combinations of a functionally analogous subsystem in another language. Conversely, less highly structured subsystems will have relatively independent elements, and the likelihood of a close typological fit with corresponding elements in another language will be greater”.

Thomason and Kaufman’s borrowing scale is proposed based on typological distance. They suggest that, in the absence of a close typological fit between certain source language and borrowing language structures, features lower on the scale will not be borrowed before features higher on the scale are borrowed (1988, pp. 73-74). This scale has five stages and the typological barriers grow as we move from the top to the bottom of the table (p. 74). Moreover, Meakins (2008, p. 121) notes that in this scale, the borrowing of inflectional morphology is associated with intense cultural pressure. It can be noted that Thomason and Kaufmann’s proposal rapidly became widely accepted as a general reference for the study of languages in contact (Rendón, 2008, p. 60). Thomason and Kaufman's borrowing scale is reproduced in Table 2.1.

Table 2.1: Thomason and Kaufman's Borrowing Scale (Meakins, 2008, p. 121)

Degree of contact	Borrowing type	Features borrowed
(a) Casual contact	Lexical	Non-basic vocabulary before basic vocabulary
(b) Slightly more intense contact	Lexical Syntactic	Functional vocabulary, e.g. conjunctions and adverbs Only new functions borrowed
(c) More intense contact	Lexical Syntactic	Pre/postpositions, derivational affixes, inflectional affixes (attached to stem), pronouns and low numerals Change in word order, borrowing postpositions in a prepositional language
(d) Strong cultural pressure	Syntactic	Extensive word order change, inflectional affixes (e.g. new cases)
(e) Very strong cultural pressure	Syntactic	Typological disruption, changes in word structure (e.g. adding prefixes in a suffixing language, or a change from flexional to agglutinative morphology)

2.2.1.4 Ross's Hierarchy of Linguistic Units (1988)

In this hierarchy, lexical items belonging to open sets are the elements of language which are borrowed at the highest frequency, followed by lexical items belonging to closed sets, the syntax of non-bound units and syntactic typology, non-bound function words, bound morphemes, and phonemes. Based on this ordering, Ross's hierarchy is as follows:

lexical items belonging to open sets > lexical items belonging to closed sets > syntax of non-bound units and syntactic typology > non-bound function words > bound morphemes > phonemes

2.2.1.5 Field's Borrowing Hierarchy (1998)

Field (1998, p. 49) points out that, of the elements of language, content items are borrowed at the highest frequency, followed by function words, agglutinating affixes, and fusional affixes. Based on this ordering, Field's hierarchy is as follows:

content items > function words > agglutinating affixes > fusional affixes

2.2.1.6 Summary

It is often argued that inflectional morphemes are more difficult to borrow than derivational morphemes (Aikhenvald and Dixon, 2006, p. 416). In general, all theories of borrowing, whether structural or social, recognize the possible but nonetheless empirical infrequency of borrowing inflectional morphology (Meakins, 2008, p. 121).

It can be concluded that all scales of borrowability agree that nouns form the class of content items which is borrowed at the highest frequency by languages (Rendón, 2008, p. 66). However, the position of loan verbs in the scales of borrowability is not stable. Verbs are considered to be the second largest lexical class by some hierarchies (cf. Haugen 1950; Thomason and Kaufmann 1988) but others consider verbs and adjectives either as coterminous (Field 2002) or else place verbs after adjectives (Whitney 1881) (Rendón, 2008, p. 68). Thus, students of language contact agree on positioning adjectives directly next to verbs but not on their relative position. Many put adjectives before verbs in hierarchies (cf. Whitney 1881; Field

2002) as they claim that adjectives are more borrowable than verbs (Rendón, 2008, p. 70). In the following section, the process of lexical borrowing into the Arabic language (*taʿrīb*) is discussed in detail by giving an introduction to *taʿrīb*, its history and importance.

2.3 Lexical Borrowing (*Taʿrīb*)

Lexical borrowing into the Arabic language is referred to as *taʿrīb*. The process of *taʿrīb* involves the transliteration of loanwords into Arabic script and occasionally the adjustment of their pronunciation to fit Arabic phonology. This is the definition of *taʿrīb* which was adopted for the investigation of loanwords in this study. *Taʿrīb* has had various definitions and determinations with reference to the time, place and the people using it. Medieval grammarians had a great interest in *taʿrīb*. The Arab philologist al-Jawharī[1] (1990, p. 179) defined *taʿrīb* as Arabs' usage of foreign words according to the style of their language. Moreover, Sībawayh[2] (1982, p. 303) stated that in the process of *taʿrīb*, Arabs change some of the foreign letters which are entirely incompatible with their own, sometimes assimilating them into the structure of their language, and sometimes not. Al-Suyūṭī[3] (1906, p. 159) defined 'Arabized terms' as terms used by Arabs to convey the meanings of terms from foreign languages.

In modern scholarship, al-Qazzāz (1981, p. 266) states that in modern linguistics, *taʿrīb* is called 'adoption' or 'borrowing', which is the process of adopting

[1] Abū al-ʿAbbās al-Jawharī (d. 1003 CE) was a linguist. He wrote a dictionary called *Tāj al-Lughah wa-ṣiḥāḥ al-ʿArabiyyah* (The Crown of Language and the Correct Arabic) (Marefa, 2010).
[2] Sībawayhi's name is usually given as Abū Bishr ʿAmr b. ʿUthmān b. Ḳanbar, *mawlā* of Banū Ḥārith b. Kaʿb Sībawayhi. He was born in al-Bayḍāʾ, Shīrāz, to Persian parents, and is said to have died aged between 32 and "40-odd" years old, probably in Fārs. An approximate death date of 796 can be inferred (Carter, 2010).
[3] Imām Jalāl al-Dīn al-Suyūṭī, is a famous Egyptian scholar, at present recognised as the most prolific author in the whole of Islamic literature. Al-Suyūṭī was born in October 1445 in Cairo and he studied the sciences of Hadith and the Arabic language. His books and treatises have been counted to number almost 500 works altogether. He died there in October 1505 (Geoffroy, 2010).

a word and using it in another language. He also notes that *taʿrīb* represents a phenomenon of convergence and interaction amongst languages. In other words, the contact of languages leads to linguistic interaction between them, which inevitably results in the occurrence of lexical borrowing. Moreover, al-Jazāʾirī (1918, p. 3) defines *taʿrīb* as simply transferring a term from a foreign language into Arabic. ʿAbd al-ʿAzīz (1990, p. 47) states that the 'Arabized term' is the foreign term inserted into the language, i.e. when it has been adopted and Arabized. It can also be noted that Arabized terms are usually printed in transliterated Latin letters.

As a linguistic phenomenon, *taʿrīb* may be traced back to pre-Islamic times. One of the reasons for the commencement of the process of *taʿrīb* is the contact that took place between Arab tribes and surrounding regions. In addition, Arabs used *taʿrīb* prior to Islam as a result of their need for names to signify things that did not exist in the Arabian Peninsula (al-Shihābī, 1965, p. 19). Foreign vocabulary entered into Arabic long before Islam. Some of the reasons accountable for this influx were foreign conquests (Roman, Persian, Abyssinian, etc.); Persian, Christian and Indian communities established within territories populated by Arab tribes; business journeys of the city-dwellers to neighbouring regions (Kopf, 1976, p. 247); and contact with other nations such as Persia, Greece, India and Ethiopia (Shīr, 1988, p. 3). Arabic has borrowed a large number of words from the languages of such nations, especially Persian.

As a next step it is important to highlight some of the languages that have influenced Arabic in ancient times through the means of borrowing. These include Aramaic, Hebrew and Persian (al-Yasūʿī, 1986, p. 170). For example, words such as *tijāra* (trade), *tīn* (fig) and *ḥikma* (wisdom) were taken from Aramaic. In addition, words such as *ʾumma* (people), *jahannam* (fire, hell) and *akhlada* (to lean on, resort to) were taken from Hebrew. Furthermore, Arabs borrowed heavily from Persian, e.g. *ʾibrīq* (jug), *ʾistabraq* (silk brocade) and *tannūr* (oven). Overall, ʿAbd al-ʿAzīz (1990, p. 64) states that, in ancient times, Arabs were more interested in what had been borrowed from Persian than other languages because it was a main source of borrowing into Arabic, popular among Arabs, and written in Arabic script.

According to Kopf (1976, p. 247), many foreign words penetrated into Arabic as a consequence of the Islamic conquests, which brought Arabs into close contact with nations speaking languages other than Arabic. Moreover, al-Yasūʿī (1986, p. 169) argues that Arabs learned the languages of those nations, and some of their modern sciences and arts. The inevitable result was the borrowing of hundreds of words from those languages into Arabic (al-Yasūʿī, 1986, p. 169).

In addition, Arabic has been a borrowing language as well as a donor language to other languages. There are many loanwords from English and French in Arabic, such as *binsilīn* (penicillin), *fītāmīn* (vitamin), *falsafa* (philosophy), *ʾutūbīs* (autobus) and *sinama* (cinema). Normally, a loanword undergoes modifications in morphology and phonology during the process of borrowing to comply with the patterns of the recipient language (al-Qahtani, 2000, p. 86). Examples of loanwords that have undergone phonological modification to comply with the phonological system of Arabic are: *tilfāz* (television), *fayrūs* (virus) and *brūtūkūl* (protocol). In a few cases, loanwords can penetrate into a language without change if the original morphology of the loanword corresponds to the morphology of the recipient language, e.g. the English word ‘fax’ has penetrated into Arabic without any change as *fāks* (al-Qahtani, 2000, p. 88). It can also be noted that Arabic is more open to borrowing from other languages in modern times than previously was the case, especially in terms of scientific and technical terminology.

In addition to loanwords, Modern Arabic has borrowed foreign acronyms. A definition of acronyms along with some examples, will be provided first to lead into the discussion of loan acronyms in Arabic. Acronyms (*ʾalfāẓ ʾawāʾiliyya*) are terms created from the initial letters of the terms of a phrase (El-Mouloudi, 1986, p. 202). El-Mouloudi also points out that various acronyms have been coined as abbreviated names of national and international organizations as in ALECSO (Arab League Educational, Cultural and Scientific Organization), UNESCO (United Nations Educational, Scientific and Cultural Organization) and NOW (National Organization of Women). Acronyms are introduced from foreign languages into Arabic mostly through borrowing by using the corresponding initial letters.

It can also be noted that acronyms have been most productive in the technical and scientific fields (El-Mouloudi, 1986, p. 202). The following loan acronyms in Arabic are examples of well-established lexemes in international communication: *rādār* (RADAR) (Radio Detection and Ranging); *līzar* (LASER) (Light Amplification by Stimulated Emission of Radiation); and *ʾīdz* (AIDS) (Acquired Immune Deficiency Syndrome). Furthermore, examples of technical computing loan acronyms in Arabic are: *bī sī* (PC) (Personal Computer); *sī dī* (CD) (Compact Disk); *rām* (RAM) (Random Access Memory); *dūs* (DOS) (Disk Operating System); and *wāb* (WAP) (Wireless Application Protocol). As can be noted from the above examples, in most cases, the loan acronyms in Arabic use the corresponding sounds to those of their English donor acronyms. The first two computing loan acronyms are written in two words unlike the other examples which are written in one word in compliance with the donor words.

One of the most powerful factors motivating the mechanism of lexical borrowing in modern times is the urgent demand for an enormous scientific and technical lexicon (El-Khafaifi, 1985, p. 150). Thus, Modern Arabic uses *taʿrīb* mainly in the fields of science and technology in order to cope with the rapid developments in the world. Moreover, it can be stated that the word formation mechanism of *taʿrīb* is one of the most used mechanisms in the Arabic language in terms of computing terminology creation. Table 2.2 lists some examples of English computing terminology borrowed into Arabic through this mechanism.

Table 2.2: English Computing Loanwords in Arabic

English	Loanword
icon	*ʾayqūna*
bluetooth	*blūtūth*
gadget	*jādjit*
zoom	*zūm*
font	*fūnṭ*
video	*fīdyū*
computer	*kumbyūtir*

The Arabic language academies in modern times adopted a restrictive policy, only permitting loans in scientific terminology. Most if not all the Arabic language academies, including the Cairo Academy, consider *taʿrīb* to be a method of last resort. One of the main worries of the scholars debating the issue of *taʿrīb* was its potential influence on the integrity and structure of the Arabic language (El-Khafaifi, 1985, p. 149). Even though *taʿrīb* is considered as having been one of the main word formation mechanisms in the Arabic language throughout history, it is a very controversial process. It was a subject of debate, argument and conflict among medieval linguists (El-Khafaifi, 1985, p. 148), and it continues to be a contentious issue for modern scholars. In the next section, a discussion of the debate on the issue of *taʿrīb* in classical and modern times is presented.

2.3.1 Debate on the Issue of *Taʿrīb*

Taʿrīb has attracted considerable attention from Arab linguists in classical times as well as modern times. However, it has been a source of division among Arab scholars, as well as among members of Arabic language academies. They have been divided into three groups regarding their views and attitudes towards the process of *taʿrīb*.

The first group refuses the insertion of foreign words into Arabic after the ages of eloquence during the Golden Age of Islam (8^{th}-11^{th} centuries), since they did not find a leading classical philologist who approved of the use of *taʿrīb* as a word formation mechanism (al-Qazzāz, 1981, p. 268). This group believes that the language could meet its need for vocabulary through other mechanisms, such as derivation, compounding, and substitution (al-Qazzāz, 1981, p. 268). Moreover, the Arab scholar Rashīd Baqdūnis (1875-1943) suggested translating foreign terms into Arabic as a way to avoid the use of *taʿrīb* (al-Qazzāz, 1981, p. 268). This method might prove useful if the foreign term has a concise, accurate and simple equivalent in the Arabic language. Another scholar that opposes the use of *taʿrīb* is Muṣṭafa Ṣādiq al-Rāfiʿī (1880-1937), who criticized those that adopted the new literature ideology for filling their writings with unaccepted foreign terms (al-Qazzāz, 1981, p. 268). Al-Rāfiʿī argued that language is considered a heritage which should be kept as it was inherited without the insertion of anything, and considered it unlikely for Arabs to resort to borrowing foreign terms unless they needed to do so (al-Qazzāz, 1981, p. 268). This means that Arabs should maintain their language by trying to avoid borrowing terms from other languages except in cases of necessity.

Aḥmad al-ʾIskandarī (1875-1938), a member of the Arabic Language Academy of Cairo, regarded *taʿrīb* as a non-analogical and non-productive mechanism as he followed the approach of the medieval Arab authors and grammarians (El-Khafaifi, 1985, p. 161). Moreover, al-ʾIskandarī stated that it is necessary to find equivalents in the Arabic language for the foreign terms instead of borrowing them (al-Qazzāz, 1981, p. 268), which suggests the use of other Arabic word formation mechanisms instead of *taʿrīb*. Moreover, this group considers the insertion of foreign terms into classical Arabic as a means of solecism (al-Qazzāz, 1981, p. 268). This group is most concerned with the disadvantages of *taʿrīb* and the ways it can be harmful to the Arabic language.

The second group is supportive of *taʿrīb* and finds it necessary to borrow foreign words and allow them to be inserted into Arabic. These scholars view it as an enrichment of the language, especially through the use of conventional terms that can be common across all languages (al-Qazzāz, 1981, p. 269). Abd al-Qādir al-Maghribī, a member of the Arabic Language Academy of Cairo, represents a more liberal view of *taʿrīb* as he believes that it should be permitted in modern times as it was in medieval times since lexical borrowing from foreign languages does not damage the Arabic language; rather, he argues that languages and their capabilities are enriched and developed as a result of the process of borrowing from other languages (El-Khafaifi, 1985, pp. 162-163). Moreover, al-Maghribī states that it is against the nature of languages to avoid using borrowing, or *taʿrīb* (El-Khafaifi, 1985, p. 163). In addition, *taʿrīb* is one of the word formation mechanisms adopted by the Arabic Language Academy of Cairo in order to enrich the language, and to expand its technical lexicon (El-Khafaifi, 1985, p. 148).

Al-Ḥamad (2005, p. 172) states that the mechanism of *taʿrīb* is necessary to cope with modernization, through which Arabic can be properly maintained, since giving up *taʿrīb* is a means of limiting language which may lead to the description of Arabic as a dead language. In addition, *taʿrīb* is considered to be a means of linguistic development that signifies the assimilation capacity of the Arabic language (al-Ḥamad, 2005, p. 172). Therefore, the mechanism of *taʿrīb* should be exploited to satisfy the development needs of the Arabic language. This group is most concerned with the advantages of *taʿrīb* and the benefits it can bring to the Arabic language.

The third group takes the middle ground as they permit the use of *taʿrīb* only when it is necessary in order to satisfy the need for vocabulary in the Arabic language in modern times, especially in terms of names and generic nouns, provided that the loanword does not manipulate the language system (al-Qazzāz, 1981, p. 270). Moreover, only when other word formation mechanisms fail to produce native equivalents should borrowing be used (El-Khafaifi, 1985, p. 165). This group believes that if there is a necessity for *taʿrīb*, it is better to allow it for specialists in sciences and arts, provided that the loanwords are referred to scientific institutions and language academies for approval, after a phase of investigation and agreement (al-Qazzāz, 1981, p. 270). Al-Qazzāz also argues that the negligence of *taʿrīb* in cases of necessity is as risky as permitting it without limitation. This group appears to be more reasonable than the other groups as it does not forbid nor permit *taʿrīb* completely, but allows it within logical limits and conditions.

There are many reasons that lead to linguistic borrowing from one language to another. Many of these reasons apply to borrowing from other languages into Arabic and are presented in the next section.

2.3.2 Reasons for *Taʿrīb*

Some of the main reasons leading to *taʿrīb* include: the need for equivalents of foreign nouns; the simplicity of the loanword; modernization and lack of terminology; social prestige; the attractiveness of loanwords; and euphemism. Some of these reasons are more evident in classical times, while others are more evident in modern times.

In classical times, a number of reasons for the lexical borrowing from other languages into Arabic were evident. One reason that may prompt linguistic borrowing from one language to another is the need for equivalents for foreign nouns, such as the nouns in non-Arabic languages (al-Ḥamad, 2005, p. 165). Here are several examples of foreign nouns borrowed from Persian: types of clothes (e.g. *al-dībāj* (silk garment)); types of utensils (e.g. *al-ʾibrīq* (jug)); types of perfumes (e.g. *al-misk* (musk)); and types of aromatic plants (e.g. *al-narjis* (narcissus)) (al-Thaʿālibī[4], 2000, pp. 339-340).

Another reason that may prompt linguistic borrowing from one language to another is that some scholars of non-Arabic origin, such as al-Rāzī,[5] al-Fārābī[6] and Ibn Sīnā,[7] frequently used foreign terms in their Arabic writings, in relation to botany, zoology and medicine, some of which already had an equivalent in the Arabic

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[4] Abū Manṣūr ʿAbd al-Malik ibn Muḥammad ibn Ismāʿīl al-Thaʿālibī (961-1038), prominent connoisseur and critic of Arabic literature and prolific author of anthologies and works of literary scholarship. Born in Nīshāpūr, he spent his entire life in the eastern Islamic world, participating in and above all documenting the extraordinary cultural efflorescence which in his generation was making the city and region a serious rival to Baghdād and ʿIrāḳ (Rowson, 2010).

[5] Abū Bakr Muḥammad ibn Zakariyyā Rāzī. He is also known by his Latinised name Rhazes or Rasis (*ca.* 854-925 or 935), physician, philosopher and alchemist. Al-Rāzī was born in Rayy, where he was well trained in the Greek sciences. His work in alchemy took a new, more empirical and naturalistic approach than that of the Greeks or the alchemist Jābir ibn Ḥayyān (721-815), and he brought the same empirical spirit to medicine (Goodman, 2010).

[6] Abū Naṣr Muḥammad al-Fārābī. Referred to as Alfarabius or Avennasar in medieval Latin texts. One of the most outstanding and renowned Muslim philosophers, he became known as the "second teacher", the first being Aristotle. Al-Fārābī was of Turkish origin. He was born in Turkestan at Wasīḏj in the district of the city of Fārāb [*q.v.*] and is said to have died at the age of eighty or more in 950 in Damascus (Walzer, 2010).

[7] Abū 'Alī al-Ḥusayn ibn 'Abd Allah ibn Sīnā, known as Abū ʿAlī Sīnā, or, more commonly, Ibn Sīnā. Known in the West as Avicenna, he followed the encyclopaedic conception of the sciences that had been traditional since the time of the Greek Sages in uniting philosophy with the study of nature and in seeing the perfection of man as lying in both knowledge and action. He was also as illustrious a physician as he was a philosopher. He was born in 980 in Afshana at his mother's home, near Bukhārā. His native language was Persian. His work was in medicine. His principal treatise on these sciences is included in the great *Kitāb al-Shifāʾ* (Book of Healing [of the Soul]), in the same way as that on Metaphysics, while the famous *Ḳānūn fi 'l-ṭibb* (Canon of Medicine) is a separate work. He died at Hamadān, during an expedition of the prince ʿAlāʾ al-Dawla, in 1037 (Goichon, 2010). The Canon is much better known in the West and was taught at universities in Europe until the 18th century.

language (al-Kārūrī, 1986, p. 59). This resulted in the insertion of foreign terms into Arabic.

In terms of usage, some loanwords are preferred to their native equivalent Arabic words as they are easier to pronounce, and they may be used as a result of people forgetting or abandoning their native Arabic equivalents; for example, the loanword *al-yāsamīn* (jasmine) is used instead of its native Arabic equivalent *al-samsaq* which was used in Classical Arabic (al-Ḥamad, 2005, pp. 166-167).

In contrast, in modern times, from the 19th century onwards, a number of factors have led to lexical borrowing into the Arabic language. Arabic, as is the case with most languages, resorts to the mechanism of borrowing when there is a lack of terminology to express certain things. Due to the rapid technological advancements taking place around the world, Arabic constantly finds itself in need of new vocabulary (al-Khatib and Farghal, 1999). A huge number of English words have entered Arabic due to continual invention (al-Khatib and Farghal, 1999). This normally occurs when Arabic cannot cope with the influx of technical terminology such as *kāmirā* (camera), *sūftwīr* (software), *ʾintarnit* (internet), and *rāwtar* (router) (al-Khatib and Farghal, 1999). Loans in technical areas of this kind frequently maintain their native pronunciation as they go through little, if any, phonological adaptation. In contrast, non-technical loans in areas of general interest frequently go through extensive phonological naturalization with the passage of time, e.g. *binṭāl* (pants) and *barlamān* (parliament) (al-Khatib and Farghal, 1999).

If one language is considered to be more learned, a bilingual speaker is expected to use recognisable loanwords from it as a way of showing elevated status, which knowledge of that language represents (Weinreich, 1970, pp. 59-60). "This can be observed both in learned borrowings, e.g. of Latin phrases in English, and in the intimate, "unnecessary" borrowing of everyday designations for things which have excellent names in the language being spoken" (Weinreich, 1970, p. 60). People sometimes have more admiration for a foreign culture than their own due to the feeling of its superiority, which tempts them to quote from its language (al-Kārūrī, 1986, p. 59). Some Arabic speakers believe that in certain situations they can be highly regarded if they insert English terms into their speech (al-Khatib and Farghal, 1999). As English enjoys a high status in the Arab world, it is the language that is mostly used by the highly educated people. It has also been noted that there is a strong relationship between the educational status of an individual and his/her linguistic behaviour; i.e. the more educated a person is, the more prestigious are the forms of language used in his/her speech (al-Khatib and Farghal, 1999).

Arabs use loanwords from English to introduce an air of attractiveness to various kinds of businesses, e.g. in TV commercials, newspaper advertisements, and the names of commodities and stores (al-Khatib and Farghal, 1999). It is also noted that advertisement writers tend to use English loans even in the availability of common native words, e.g. *kāsīt* (cassette recorder) instead of *musajjil*, and *ful ubshinz* (full options) instead of *jamīʿ al-ʾiḍāfāt* (al-Khatib and Farghal, 1999). This inclination to use loans can be explained by the fact that a commodity with an English loan may have a better chance of selling (al-Khatib and Farghal, 1999).

Loanwords from English can be used to replace offensive words in Arabic for euphemistic reasons, or as an attempt to avoid unpleasant or fearful topics (al-Khatib and Farghal, 1999). It is well known that all cultures impose taboos on the discussion of certain subjects by certain people in specific circumstances (Al-Khatib and Farghal, 1999). Thus, shifting from Arabic to English loans may permit Arabs to discuss offensive or taboo topics without awkwardness (al-Khatib and Farghal, 1999).

English loans like *twālīt* (toilet), *andarwīr* (underwear) and *būyfrīnd* (boyfriend) are examples of euphemisms in Arabic. As a result, it can be stated that using loans for euphemistic reasons may function as an essential factor that motivates Arabs to borrow more from other languages (al-Khatib and Farghal, 1999).

In classical times, scholars established methods of *taʿrīb* in order to use the mechanism of lexical borrowing into Arabic properly. Moreover, scholars in modern times still use these methods and apply them to Modern Standard Arabic. In the following section, a general discussion of methods of *taʿrīb* is presented.

2.3.3 Methods of *Taʿrīb*

The process of *taʿrīb* has been of interest to many Arab linguists in classical times as well as in modern times. *Taʿrīb* was used to satisfy the needs of Classical Arabic for new words and with the passage of time it became an indispensable word formation mechanism for Modern Arabic. Linguists throughout history have had their opinions on the methods of *taʿrīb* which are followed to Arabize or ‘borrow’ foreign words into Arabic. These methods of *taʿrīb* are discussed in this section.

Sībawayh (1982, pp. 303-307) highlights two methods of *taʿrīb*:

I. *Taʿrīb* with change: this requires changing the foreign term from its native form into Arabic. Sībawayh states that there were four kinds of change whereby the foreign term was borrowed into Arabic; these are as follows:

   1) Substitution of one consonant by another. For example, substituting the consonant ‘s’ in the Persian word *sard* (severe cold) with the consonant ‘ṣ’ in the loanword *ṣard*.

2) Substitution of one vowel by another. For example, substituting the long vowel ‘ā’ in the Persian word *kafjalāz* (ladle) with the long vowel ‘ī’ in the loanword *qafshalīl*.
3) Addition of one or more letters. For example, adding the letter ‘h’ and the vowel ‘a’ to the Persian word *qarmān* (steward) to become *qahramān* in Arabic.
4) Omission of one or more letters. For example, omitting the vowel ‘a’ and the letter ‘n’ from the Persian word *kardan* (neck) to become *kard* in Arabic.

II. *Taʿrīb* with no change: this does not require any change in the borrowed term, which is used in Arabic in its native form, whether it complies with the Arabic language system or not. Examples of this would be the plant *kurkum* (curcuma), and the region *khurāsān* (Khorasan). This type of *taʿrīb* has occurred less frequently than *taʿrīb* with change in the borrowed terms.

Abū Manṣūr al-Jawālīqī[8] agreed with Sībawayh in terms of the methods used for *taʿrīb*. Al-Jawālīqī is one of the main Arab scholars who has studied loanwords. He stated that one of the methods Arabs use to Arabize foreign proper nouns is to replace the foreign sounds with native ones which are closest to them in terms of pronunciation, so as not to insert into their utterances sounds which are not Arabic (al-Jawālīqī, 1995, p. 6).

In modern scholarship, El-Mouloudi (1986, pp. 139-140) notes that phonetic modification of loans involves either the substitution, deletion, or addition of consonants and vowels, and the vowelling or unvowelling of consonants. He also

[8] Abū Manṣūr Mawhūb al-Jawālīqī was born in Baghdad in 1073. He was a famous Arab grammarian. He studied philology in Baghdad. His chief work is the *Kitāb al-Muʿarrab*, or *Explanation of Foreign Words used in Arabic.* He died in 1145 (Al-Mawsūʿa al-Maʿrifiyya al-Shāmila, 2010).

states that the Arabic Language Academy of Cairo authorizes, in cases of necessity, the use of some foreign terms in accordance with the methods of *taʿrīb* (p. 141). Moreover, he comments that the native Arabic term is preferred over the old Arabized term, unless the Arabized term has come to be more common. In addition, the Arabized noun is pronounced with reference to the Arabic method of pronunciation (El-Mouloudi, 1986, p. 141).

Loanwords are identified in some languages depending on phonotactic constraints. In the next section, a description of the features of loanwords in Arabic is provided.

2.3.4 Features of Loanwords in Arabic

Languages are subject to phonotactic constraints, which allow for the differentiation between native words and loanwords. Al-Suyūṭī (1906, p. 160) put forward seven points to identify loanwords as follows:

1) A term Arabized by a leading classical Arab philologist is accepted as a loanword.
2) A noun deviating from the morphological patterns (*ʾawzān*) of Arabic nouns, e.g. the pattern of the Persian loanword *ʾibraysam* (silk) does not exist in the Arabic patterns. This means that it is a loanword.
3) A loanword starts with the letter *nūn* and followed by the letter *rāʾ*, e.g. the Persian loanword *narjis* (narcissus).
4) A loanword ends with the letter *dāl* followed by the letter *zāy*, e.g. the Persian loanword *muhandiz* (engineer), in which the letter *zāy* is substituted by the letter *sīn* in the loanword *muhandis*.

5) A loanword combines the letters *ṣād* and *jīm*, e.g. the Persian loanword *al-ṣawlajān* (sceptre).
6) A loanword combines the letters *jīm* and *qāf*, e.g. the Greek loanword *al-manjanīq* (mangonel).
7) A term being quinqueliteral or quadrilateral free from the lingual and bilabial sounds, which consist of the letters *bāʾ*, *rāʾ*, *fāʾ*, *lām*, *mīm* and *nūn*. When a term contains any of these letters, this means that it is a native Arabic term, e.g. the term *safarjal* (quince) is a native Arabic term for that reason.

Word formation mechanisms regularly face particular constrains which are generally established in order to protect languages. The mechanism of *taʿrīb* is no exception. In the following section, a presentation of the constraints and obstacles to *taʿrīb* is provided.

2.3.5 Constraints and Obstacles to *Taʿrīb*

Linguistic constraints are applied by organisations such as language academies, in order to maintain the integrity and purity of a language. Al-Ḥamad (2005, p. 172) comments that the Arabic Language Academy of Cairo, after a long period of study, authorized the process of *taʿrīb* but agreed unanimously on the Arabic term being superior to and preferred over the Arabized term. In addition, according to al-Ḥamad (2005, p. 172), it specified the following conditions for the use of *taʿrīb*:

1) The Arabized term should be of great necessity due to a lack of terminology for new objects in the language, which is to be determined by the language academy.
2) The Arabized term should be adapted in accordance with the Arabic phonological and morphological systems.

Abdel Rahman (1991) maintains that not all languages impose morphological restrictions on the forms of words. Arabic, for example, allows a maximum of five consonantal phonemes in a single word, e.g. *safarjal* (quince) and *zumurrud* (emerald); however, English permits words such as ‘antidisestablishmentarianism’. He also comments that *Lisān al-ʿarab* contains only 187 quinqueliteral roots. It should also be noted that the phonotactic constraints in Arabic are determined rigorously because it is a root-based language. Abdel Rahman (1991) states that the morphological restrictions imposed by the Arabic language on the forms of words hamper the process of incorporating borrowed words, especially the ones from languages that are not Semitic. This, nevertheless, does not mean that loanwords are completely rejected (Abdel Rahman, 1991).

According to al-Ḥamad (2005, p. 173) the process of *taʿrīb* has several advantages but there are obstacles to incorporating loanwords:

1) The fragmentation of efforts, such as having various language academies, with each academy producing its own terms. Moreover, terms may differ not only from one language academy to another, but from one scholar to another.
2) The lack of use of the loanwords agreed upon by the language academies, which are not applied in written work.
3) The delay in Arabizing terms by the language academies. This happens when there is a delay in Arabizing a term that was in common usage previously, such as *tāksī* (taxi) and *līmūzīn* (limousine), which should have been Arabized before they became popular in Arabic.
4) The inaccuracy when borrowing a new term into Arabic, as certain terms are Arabized by writers without considering their real meanings, which results in their spread with false connotations among people.

In the following section, a chronological discussion of the history of lexical borrowing in Arabic is offered.

2.4 History of Lexical Borrowing in Arabic

The history of lexical borrowing in Arabic can be divided into two main periods: the Classical Period (until the 19th century), and the Modern Period.

2.4.1 The Classical Period (until the 19th Century)

This period is composed of three parts: the pre-Islamic era, lexical borrowing in the Qur'an, and the first Translation Movement (9th-11th centuries).

2.4.1.1 The Pre-Islamic Era

In the pre-Islamic era, there were many factors that led to contact between Arabic and other languages that eventually resulted in the borrowing of foreign words into Arabic. The following factors are pointed out by Ali (1987, p. 89). One of the historical factors is that the people of Arabia, especially in the western region (known as the Hijaz), were active traders, who, as a natural consequence of their regular trips outside their homeland, developed strong economic, commercial, cultural and social ties with the people with whom they came into contact. These regular trips unintentionally aided the entry of words from other languages into Arabic.

Another factor leading to the contact between Arabic and other languages is the fact that the Holy Kaaba in Mecca was, and still is, a destination for pilgrims from all over the world (ʿAlī, 1993, p. 351). Among the traces those pilgrims left behind were terms belonging to their own languages, some of which later found their way into the most representative and most literary aspects of Arabic, namely, the Qur'an and classical poetry. Thus, when foreign pilgrims visited Mecca to perform their pilgrimages, they used their various languages, which resulted in the mix of their languages with Arabic, which eventually led to borrowing from these languages into Arabic and vice versa.

Geographical proximity between Arabic and other Semitic languages, Aramaic, Ethiopic and Hebrew, facilitated close contact. This resulted in the borrowing of words from these languages into Arabic. Linguistic research has revealed that Aramaic, for example, was the source from which Arabic derived much of its early metaphysical and philosophical vocabulary, as well as words relating to industry and other aspects of urban life, e.g. the term *charyono* (artery) is borrowed into Arabic as the term *shiryān*, and the term *sakino* (knife) is borrowed into Arabic as the term *sikkīn*.

Similarly, the ancient relations of Arabs with their neighbouring nations resulted in them borrowing a great many words from these nations (al-Shihābī, 1965, p. 21). Most of the loanwords that entered Arabic in pre-Islamic times came from Persian, Greek, Indian and Latin (al-Shihābī, 1965, p. 21). Moreover, in pre-Islamic times, Arabic borrowed from Hebrew, Syriac and Ethiopic, and at the same time, was a donor to these languages (al-Shihābī, 1965, pp. 21-22). Examples of Persian words borrowed into Arabic during this era include the term *ʾābrīz* (jug) borrowed as *ʾibrīq*; the term *ʾistabrak* (silk brocade) borrowed as *ʾistabraq*; and the term *tāk* (crown) borrowed as *tāj*. Examples of Greek words borrowed into Arabic during this period include the term *καντάρι* (quintal) borrowed as *qinṭār*; and the term *διάβολος* (devil) borrowed as *ʾiblīs*. Examples of Latin words borrowed into Arabic during this era include the term *starta* (street) borrowed as *ṣirāṭ*; the term *signum* (prison) borrowed as *sijn*; and the term *imperator* (emperor) borrowed as *ʾimbirāṭūr*. Examples of Aramaic words borrowed into Arabic at this time include the term *bāḇā* (door) borrowed as *bāb*; the term *sfi(n)tā* (chip) borrowed as *safīna*; and the term *ṣlūṭā* (religious service) borrowed as *ṣalāṭ* (prayer). Examples of Ethiopic words borrowed into Arabic during this period include the term *faṭāri* (creator) borrowed as *fāṭir*; the term *manbar* (chair, throne) borrowed as *minbar* (pulpit); and the term *ʾamāləkta gəbt* (new gods) borrowed as *al-jibt* (false god). Finally, examples of Hebrew words borrowed into Arabic in this era include the term *yad* (hand) borrowed as *yad*; the term *nahar* (river) borrowed as *nahr*; and the term *kelev* (dog) borrowed as *kalb*.

2.4.1.2 Lexical Borrowing in the Qur'an

The first significant turning point in the history of Arabic was the rise of Islam in the 7th century and, consequently, the categorization of the Qur'an and its exegeses (Sawaie, 2000). Scholars have long been in debate as to whether or not foreign vocabulary is used in the Holy Qur'an and it is clear that there are two debates, a linguistic one and a religious one. Scholars can be divided into three groups with regard to this matter. The first group believes that the Qur'an does not contain foreign vocabulary while the second group argues that it does. The third group reconciles and merges the two approaches.

The first perspective denies the existence of foreign vocabulary in the Qur'an. This perspective emphasizes the Arabism of the Qur'an and denies the existence of any foreign vocabulary within this religious text. Scholars who share this perspective such as Abū ʿUbayda,[9] Imam al-Shāfiʿī[10] and Ibn Fāris[11] argue that the Holy Qur'an is

[9] ʿĀmir ibn ʿAbdullah ibn al-Jarrāḥ (582–639), more commonly known as Abū ʿUbaydah ibn al-Jarrāḥ, Abū ʿUbayda was one of the most distinguished converts, among the ten to whom the Prophet allegedly promised Paradise, the so-called *al-ʿashara al-mubashshara* (Athamina, 2010).

[10] Muhammad ibn Idris al-Shafiʿi, the jurisprudent, was probably born in Asqalan (Ashkelon) in Palestine. He is said to have studied under Malik ibn Anas in Medina for as long as ten years and later debated with al-Shaybani in Baghdad. He emigrated to Old Cairo about six years before his death there. Writers of the later Shafiʿi school distinguish between Shafiʿi's early teaching (*al-qadim*), in Iraq, and his later (*aljadid*), in Egypt (Martin, 2004, pp. 616–617).

[11] Aḥmad Ibn Fāris al-Rāzī is a philologist. He was born in 940 and died in 1004.

presented in Arabic and its language is actually Arabic (cited in al-Suyūṭī, n.d., pp. 57-58). Thus, it is not possible for the Qur'an to contain any foreign vocabulary. Abū ʿUbayda added that: "the Qur'an is sent in a pure Arabic tongue and whoever claims that it includes any non-Arabic vocabulary is seriously mistaken, and if anyone claims that it is Nabataean, he is sinful" (cited in al-Suyūṭī, n.d., p. 58). Al-Shāfiʿī (cited in Kopf, 1976, p. 27) proposed the view that those Qur'anic terms which some consider being of foreign origin must be of good Arabic stock, as demonstrated by certain indications in the Qur'an itself, although they were not, or were no longer, known in general at the time of the rise of Islam. Al-Suyūṭī (n.d., p. 59) refers to certain classical Arab scholars who stated that Arabic is so copious and that all the Qur'anic words are purely Arabic.

Furthermore, al-Shāfiʿī (cited in al-Suyūṭī, n.d., p. 59) held the religious view that a prophet can only encompass the Arabic language, which indicates the religious significance of the Qur'an. It is stated in al-Suyūṭī (n.d., p. 59) that there are certain native Arabic words in the Qur'an that would be unknown to great Arab scholars (evidently those who were closely connected with the Qur'anic revelation and its earliest interpretation such as Ibn ʿAbbās),[12] and as a result of their unfamiliarity with such words, they considered them to be of foreign origin. In addition, Ibn Jarīr (cited in al-Suyūṭī, n.d., p. 58) stated that the interpretation of Ibn ʿAbbās of some Qur'anic vocabulary as being Persian, Ethiopian, Nabataean or the like, is based upon the linguistic convergence between these languages; thus Arabs, Persians and Ethiopians

[12] ʿAbdullah ibn ʿAbbās, Abu l-ʿAbbās, called *al-Ḥibr* 'the doctor' or *Baḥr* 'the sea', because of his doctrine, is considered one of the greatest scholars, if not the greatest, of the first generation of Muslims. He was the father of Qur'anic exegesis, at a time when it was necessary to bring the Qur'an into accord with the new demands of a society which had undergone a profound transformation; he appears to have been extremely skilful at accomplishing this task. He was born three years before the hij̲ra, when the Hāshimite family was living shut up in 'the Ravine' (*al-Shiʿb*); and, as his mother had become a Muslim before the hij̲ra, he also was regarded as a Muslim (Veccia Vaglieri, 2010).

used the same term. Abū al-Maʿālī Shīdla (cited in al-Suyūṭī, n.d., p. 59) noted that such terms exist in the Arabic language as it is a language of very rich vocabulary.

The second perspective states that the Qur'an contains foreign vocabulary. The fact that the Qur'an contains a number of originally non-Arabic elements was recognised and admitted by the earliest group of Qur'anic exegetes and companions of the Prophet (peace be upon him), among whom was the Prophet's cousin Ibn ʿAbbās, who declared the non-nativeness of such words as *sijjīl* (lumps of baked clay), *al-yam* (sea) and *ʾistabraq* (silk brocade) (Ali, 1987, p. 91). Ibn ʿAbbās founded a school of Qur'anic exegesis and among his pupils were Mujāhid, ʿIkrima, Saʿīd bin Jubayr and ʿAtāʾ bin Abī Rabāḥ, who were the proponents of this perspective (Jeffery, 1938, pp. 4-5). They stated that there are many loanwords in the Qur'an. Among the examples they highlighted are the following: the word *al-yam* (sea) from Syriac, *firdaws* (paradise) and *ṣirāṭ* (street) from Latin, and *mishkāt* (God's light) from Ethiopic (al-Ḥamad, 2005, p. 160). It is stated in al-Suyūṭī (n.d., p. 61) that "the Qur'an speaks all tongues", which refers to the variety of languages it uses. In addition, al-Thaʿālibī (cited in, al-Suyūṭī, n.d., p. 61) stated that "all the languages of the world are used in the Qur'an". This indicates that the wisdom behind the occurrence of loanwords in the Qur'an is to show that it encompasses the knowledge of the former and the later peoples, and the information about everything (al-Suyūṭī, n.d., p. 61). Moreover, the Qur'an referred to all kinds of languages in order to encompass everything, and picked the easiest and most common terms used by Arabs from each language (al-Suyūṭī, n.d., pp. 61-62).

This perspective agrees with the 'revelationist' theory, which states that God primarily revealed language to man, God not man being consequently the 'namer' of things (Weiss, 1974). This theory is one of the medieval Muslim views on the origin of language. The ‘revelationist’ theory has its origins in the interpretation of the Qur’anic verse: وعلم آدم الأسماء كلها *wa-ʿallama ʾādama al-ʾasmāʿa kullahā*, which the majority of early exegetes, including Ibn ʿAbbās, interpreted as meaning that “God taught Prophet Adam the names of all existent things” (Weiss’s translation) (Weiss, 1974). This interpretation obviously indicates that God taught Prophet Adam all languages (Weiss, 1974). This means that the ‘revelationist’ theory agrees with this perspective of the occurrence of foreign vocabulary in the Qur’an, as it was mentioned earlier that the Qur’an speaks all tongues, which God taught Prophet Adam, and later he revealed the Qur’an in Arabic containing foreign vocabulary.

According to the modern scholar Jeffery (1938, pp. 39-40), the foreign elements in the Qur’anic terminology are of three different kinds. First, there are certain words such as *ʾistabraq* (silk brocade), *zanjabīl* (ginger) and *firdaws* (paradise), which are entirely non-Arabic and are unable to be linguistically condensed to developments from an Arabic root, or words such as *jibt* (false god), which seems to be trilateral but has no verbal root in Arabic. Second, there are Semitic words whose trilateral root may be found in the Arabic language. These words are used in the Qur’an although not in the Arabic sense of the root, but in a sense which developed in another Semitic language; for example, words such as *fāṭir* (creator), *dars* (a lesson) and *ṣawāmiʿ* (cells) are superb illustrations. Once words of this class are adopted in Arabic they may and do advance verbal and nominal forms in a typical Arabic manner. Therefore, it is often difficult to spot the fact that these words were originally loanwords. Finally, there are genuine Arabic words, which are used regularly in the Arabic language. However, due to the fact that they have been used in the Qur’an, their meaning has been altered slightly by their use in the cognate languages. For instance, *nūr* meaning ‘light’ is a common Arabic word, but when used with the meaning of ‘religion’, as in ix, 32 “but Allah refuses but to perfect His religion, although the disbelievers dislike it” (translation by Saheeh International), it is certainly under the influence of Syriac.

The third perspective is the intermediate position, as it merges both the previously mentioned approaches. The famous philologist Abū ʿUbayd[13] (cited in Kopf, 1976, p. 27) tried to resolve the controversy through the claim that even though the foreign words in the Qur’an are of foreign origin, they had been used by Arabs long before Islam and so had become Arabic. Thus, both views about the nature of certain components in the Qur’anic vocabulary are basically correct (al-Ḥamad, 2005, pp. 160-161).

It has been argued that such a perspective might be the nearest to reality as it concurs with both of the previously mentioned perspectives on the occurrence of foreign words in the Qur’an (al-Ḥamad, 2005, p. 161). Those who argue that the word *surdāq* (marquee), for example, is borrowed from Persian are correct. At the same time, those who say that Arabs have been familiar with this word, and have used it before the Qur’an was revealed, are also correct (al-Ḥamad, 2005, p. 161). This example explains the logic used in this perspective to comprehend both the opposing views on the occurrence of foreign words in the Qur’an.

2.4.1.3 The First Translation Movement (9th-11th centuries)

The Abbasid caliphate (750-1258), which followed the Umayyad caliphate, was the third caliphate to rule the Islamic empire. The second significant turning point in the history of Arabic was the peak of Islamic sciences in the first Translation Movement (9^{th}-11^{th} centuries) during the Abbasid period (Sawaie, 2000). Newman (2002) states

[13] Abū ʿUbayd al-Qāsim Ibn Salām al-Harawī or al-Baghdādī (770–838) was an Arab philologist and the author of many standard works on lexicography, Qur’anic sciences, *ḥadīth*, and *fiqh* (Weipert, 2010).

that in the course of the history of Arabic, a great many borrowed terms entered Arabic in the first modest ‘invasion’ of Greek during the first Translation Movement. This was because of the translation movement of ancient sciences to Arabic, which happened during this period. Moreover, ʿAbd al-ʿAzīz (1990, p. 72) notes that *taʿrīb* remained limited until the time of Sībawayh in the latter half of the 8th century. He further notes that, at the beginning of the 11th century, the goal of the Arab grammarians and linguists was to protect the language and record the pure classical Arabic and refine it from loanwords.

Al-Qazzāz (1981, p. 266) states that Arabs resorted to *taʿrīb* during the Golden Age of Islam when their civilization expanded as they came into contact with neighbouring nations as well as foreign cultures. During this period, several foreign words were borrowed into Arabic from the Persian, Greek and Syriac languages through the translation of sciences (Sawaie, 2000); for example, *jawhar* (essence) (Persian), *mūsīqā* (music) (Greek), and *kiyān* (from *kiyūnū* ‘physis’) (Syriac). Such words were subjected to the rules of Arabic morphology and phonology and became part of Arabic scientific vocabulary (Sawaie, 2000).

The Bayt al-Hikma (The House of Wisdom) was the palace library in the early Abbasid years of the caliphs al-Manṣūr (r. 754-775), al-Rashīd (r. 786-809) and al-Maʾmūn (r. 812-833) in Baghdad, Iraq (Gutas, 1998, p. 58). Gutas and van Bladel (2011) argue that this library was more involved with the collection and preservation of books on pre-Islamic Iranian and early Arabic knowledge than with the transmission of Greek science. According to Gutas (1998, p. 59), it was neither a centre for the translation of Greek works into Arabic nor an ‘academy’ to teach the ‘ancient’ sciences as they were being translated. The golden era for the transference of classical sciences such as medicine, philosophy, mathematics, astronomy and chemistry occurred during the reign of the Abbasid caliph al-Maʾmūn (al-Shihābī, 1965, p. 24). As a result of that transference, many foreign scientific terms entered Arabic through lexical borrowing and were included in Arabic dictionaries (al-Shihābī, 1965, p. 24). Examples of the terms borrowed into Arabic during this period are: *al-bābūnaj* (chamomile), *al-khiyār* (cucumber), and *al-sawsan* (lily) (al-Shihābī, 1965, p. 25).

2.4.2 The Modern Period

This period is composed of two parts, the 19th century, and from the 20th century until the present time. This section includes a discussion of six major Arabic language academies. The development of the Arabic language through the mechanism of *taʿrīb* (borrowing into Arabic) in modern times started with the second Translation Movement in Egypt in the first half of the 19th century, under the leadership of Rifāʿa Rāfiʿ al-Ṭahṭāwī (1801/2-73), and it is still going strong.

2.4.2.1 The 19th Century

Sawaie (2000) states that the problems that faced Arab scholars in the 19th century concerning having a proper Arabic lexicon to convey newly arrived Western ideas and cultural objects, the introduction of specialized lexicon, and the resultant enrichment of the language, correlate in importance with the other two significant turning points in the history of Arabic.

The Ottoman Turks established schools in the second half of the 18th century, and when they realised in the 19th century the necessity of competing with the West in the area of education, they established schools to teach modern sciences (al-Shihābī, 1965, p. 41). An example of these types of schools is the high school called *Maktab Rushdiyya* founded by Sulṭān Maḥmūd II (1789-1839). Turkish scholars at that time had to borrow scientific terms into their language, and Arabic was the primary source (al-Shihābī, 1965, pp. 41-42).

In addition, Sawaie (2000) comments that Europe had a noticeable impact on the Arab East in the 19th century. He also notes that during this period, the West had close contact with Arabic-speaking countries through military intrusion and academic institutional penetration, which created political, cultural, military, and technological challenges for the Arabic language. Muḥammad ʿAlī, who ruled Egypt from 1805 until 1848, sent seven groups of students to Western countries such as France, Italy, Great Britain and Austria to study at their technical institutions and universities (al-Shayyāl, 1951, p. 34). He sent the first two groups of students to Italy in 1809 and 1813, respectively, and the last group to England in 1848 (al-Shayyāl, 1951, pp. 12 & 34). He sent them to study medicine, engineering, chemistry, translation, history, law, military and naval science (al-Shayyāl, 1951, p. 34). Moreover, he initially sponsored translations of scientific works into Turkish, and then into Arabic from French and Italian, consequently making available new disciplines such as the branches of military science, engineering, and agriculture (Sawaie, 2000). Sawaie also states that Arabized versions of European terms such as *jurnāl* (journal) and *al-buṣṭa* (the post) at that time announced the arrival of Western institutions and technology to Arabic-speaking states; such terms were used by authors in their works. Interest in language affairs was important for the Arab renaissance *(nahḍa)* of the 19th century.

According to Shīr (1988, p. 4), loanwords started to be collected at the end of the 19th century, in order to be able to distinguish between the native Arabic words and the loanwords. Furthermore, Ḥijāzī (1993, p. 148) states that, starting from the second half of the 19th century, Arab scholars paid more attention to the mechanism of *taʿrīb*. Aḥmad Fāris al-Shidyāq (1804-1887) was one of the opponents of *taʿrīb* as he thought that it was necessary to refine Arabic from loanwords (Ḥijāzī, 1993, p. 148). In contrast, ʿAbd al-Qādir al-Maghribī (1867-1956) was a proponent of *taʿrīb* and viewed it as a significant means for the growth of the Arabic language (Ḥijāzī, 1993, p. 148).

Arab intellectuals, translators, and writers like Nāṣīf al-Yāzijī (1800-71), Rifāʿa al-Ṭahṭāwī, Aḥmad Fāris al-Shidyāq, and Buṭrus al-Bustānī (1819-83), among others, discussed Arabic linguistic matters in terms of their own linguistic and literary heritage (Sawaie, 2000). Sawaie also notes that these and other writers debated the 'internal' needs of Arabic, not only the problem of translating the culture of the Western communities. They wrote grammars and compiled other literary textbooks to aid the teaching of Arabic and to surmount the complications of learning the language linked with older, traditional methods of language teaching, and aimed to increase knowledge of the literary tradition of Arabs. Moreover, he points out that these scholars also participated in the preparation of dictionaries and glossaries suitable for the needs of their communities.

Al-Ṭahṭāwī (cited in Sawaie, 2000) maintains that, over time, all foreign neologisms that have no counterparts or synonyms in the language of the Arabs would be borrowed, following the path of other loanwords from Greek and Persian that entered Arabic during the first Translation Movement. One approach al-Ṭahṭāwī used to coin lexical items in Arabic was through Arabizing French terms, by adapting them to the Arabic morphological and phonological systems (Sawaie, 2000). Al-Ṭahṭāwī stated in his work *Takhlīṣ al-ʾibrīz fī talkhīṣ bārīz* (The Extraction of Pure Gold in the Summary of Paris) that in dealing with terms for which Arabic equivalents were difficult to find, he kept their pronunciation and represented them in Arabic script as far as possible (Sawaie, 2000). A second approach involved the 'revival' of Arabic terms from the colloquial or classical language whose varieties of meaning were expanded by al-Ṭahṭāwī to represent the newly encountered objects and ideas (Sawaie, 2000). This approach refers to the word formation mechanism of *majāz* (semantic extension), which is dealt with in more detail later.

According to Sawaie (2000), examples of terms Arabized by al-Ṭahṭāwī include:

1) Single terms, which include items like *al-karantīna* (quarantine) from Italian *quarantina*, *al-ʾūbirā* (opera) and *al-biyānū* (piano).
2) Compounds, regularly one Arabic item and the other French. Examples of compounds are: ‘editors’ (*ahl al-jurnāl*; Ar. *ahl* + Fr. *journal*), ‘medical academy’ (*akadimat al-ḥikma*; Fr. *academie* + Ar. *al-ḥikma*), and ‘carnival days’ (*ayyām al-karnawāl*; Ar. *ayyām* + Fr. *carnival*).
3) Institutional or administrative expressions already in use in Arabic, which al-Ṭahṭāwī used to describe new organizations that he had become accustomed to in France. For example, the word *māristān* (hospital) is originally from Persian.

The efforts of al-Ṭahṭāwī and his students from the School of Languages (*madrasat al-alsun*), which was originally called the School of Translation (*madrasat al-tarjama*) when founded in 1935 (Khashaba cited in al-Ṭahṭāwī, 2011, p. 320), continued the work of creating new words in the 19th century, consequently enriching the Arabic dictionary (Sawaie, 2000). It should be noted that al-Ṭahṭāwī suggested to Muḥammad ʿAlī to establish the school, which lasted for around fifteen years (al-Shayyāl, 1951, pp. 39 & 43). 50 students were initially chosen by al-Ṭahṭāwī, who was head of the school, but the number later increased to 80 and then 150 (p. 138). The school taught Arabic, French, English, Turkish, mathematics, geography and history (al-Shayyāl, 1951, pp. 39-40). The two main goals of the school were the preparation of translators in various arts and sciences, and the preparation of teachers of the French language in the private preparatory schools (al-Shayyāl, 1951, p. 147). Furthermore, an institute called the Bureau of Translation (*qalam al-tarjama*), founded in 1841, was linked to *madrasat al-alsun*. Only competent graduates from this school were permitted to work in *qalam al-tarjama* as translators of books in the various sciences (pp. 42 & 138). The institute was classified into four sections: bureau of translation of science and sport books, bureau of translation of medical and natural sciences books, bureau of translation of arts, and bureau of translation of Turkish, but was later reclassified into two sections: bureau of Turkish translation and bureau of Arabic translation which was administered by al-Ṭahṭāwī (al-Shayyāl, 1951, pp. 43-44). The *madrasat al-alsun* was closed by ʾAbbās in 1849 (al-Shayyāl, 1951, p. 44; Khashaba, cited in al-Ṭahṭāwī, 2011, p. 321).

According to Newman (2002), there were four dominant donor languages which influenced Arabic in the 19th century. An analysis of the proportion of borrowings from each of these donor languages shows the overwhelming domination of French (70.4%), with (21.3%) of the words coming from Italian, (4.1%) from Spanish, and only (3.8%) from English. This reveals the leading position of France, which for most of the century was regarded as the main model of modernity by Muslim nations.

2.4.2.2 The 20th Century until the Present Time

The Arabic language has been evolving rapidly since the beginning of the 20th century with the pace of change increasing more rapidly recently due to the rapid developments in all areas of life across the world. The establishment of language academies in the Arab world has aided the development of the language, as well as maintaining it from corruption. In the following section, a presentation of the history, importance, publications, goals and achievements of these language academies is highlighted. In addition, there is a discussion of the six major Arabic language academies as they have played a major role in modern times in the development of Arabic. These academies are the Damascus Academy, the Cairo Academy, the Baghdad Academy, the Permanent Bureau of Coordination (Rabat), the Union of Arab Academies, and the Amman Academy. They will be discussed chronologically in terms of their date of establishment.

2.4.2.2.1 Arabic Language Academies

The remarkable increase in scientific knowledge created a lot of new vocabulary during the 19th century, but more so since the beginning of the 20th century (El-Khafaifi, 1985, p. 1). Furthermore, rapid developments in technology and communications in the 20th century have made remarkable amounts of new information and knowledge widely accessible to almost every person in the world (p. 35). These developments have resulted in certain languages borrowing from languages that are more dominant in the fields of technology. Organising the borrowing of words is one of the reasons for establishing language academies. Moreover, language academies are normally the organisations responsible for maintaining the integrity of a language. The French Language Academy (*l'Académie française*), founded in 1635, was the first language academy to be established (El-Khafaifi, 1985, p. 37). The French Academy adopted a very cautious and conservative approach towards language reform; it does not officially acknowledge a new term until it has been used for a minimum of ten years (pp. 37-38).

Towards the end of the 19th century, a number of Arab writers thought about establishing language academies whose basic objective was to coin words in relation to the sciences and new inventions (al-Shihābī, 1965, p. 61). El-Khafaifi (1985, p. 40) argues that establishing the Arabic language academies represented the first major and logical attempt by the Arab scholars and their several governments to deal with the problem of importing foreign words and ideas into Arabic. He also notes that *taʿrīb* is one of the word formation mechanisms adopted by the Arabic Language Academy of Cairo in order to enrich the Arabic language and expand the Arabic technical terminology (p. 148). However, the Cairo Academy decided that *taʿrīb* should be used exclusively for technical and scientific terms and only in cases of necessity, i.e. when no equivalent could be found in Arabic (p. 166). In terms of the languages influencing Arabic, Newman (2002) notes that, starting from the 20th century, English has gradually gained greater importance and has become the main donor language.

The Arabic language academies took one of the most prominent institutions of this type, the French Language Academy, as a model (El-Khafaifi, 1985, p. 40). The main goals of the Arabic language academies were similar to those of their French counterpart (p. 41). There are various goals shared by most of the Arabic language academies. These goals were set to aid Arabic in the modern world. The main goal of the academies was to renew Arabic so that it would become a feasible means of communication in the modern scientific and technological world (El-Khafaifi, 1985, p. 41). A chief goal of the academies was to maintain the purity of the language (p. 41). The academies were also charged with recording, collecting, editing, and restoring manuscripts of all types to maintain classical works, and to reprint and publish them for use in modern times (p. 42). Another essential goal of the academies was the conversion of the teaching methods, curricula and textbooks of Arab universities from foreign languages to Arabic, a process occasionally referred to as 'Arabization' (p. 43). Overall, the academies were established to enable Arabic to compete positively in the modern world and to protect it from corruption and deterioration by ill-considered, improvident and hasty changes, and excessive borrowing from foreign languages (p. 43).

The Damascus Academy

Although this is classed as the oldest academy regulating the Arabic language, it was not the first as in the 19th century there had been precursors which will be discussed in the section on the Cairo Academy. The Damascus Academy was established in June 1919 during the reign of Faisal I of Syria (El-Khafaifi, 1985, p. 43). It was called *al-Majmaʿ al-ʿIlmī al-ʿArabī* (The Arabic Academy of Science) but is now known as *Majmaʿ al-Lugha al-ʿArabiyya* (The Arabic Language Academy) (pp. 43-44). This academy was established by Muḥammad Kurd ʿAlī (1836-1953), who was a brilliant scholar and lexicologist (p. 44). In 1927, it acquired its independence from the Syrian Ministry of (Public) Education (Sawaie, 2011). It was modelled on the language academies of Europe and founded with the explicit reference to the example of the French Academy (Sawaie, 2011). The Academy had only eight members along with its chairman Kurd ʿAlī when it was first founded (Sawaie, 2011). It contained two main committees: *al-Lajna al-Lughawiyya al-ʾAdabiyya* (The Literary and Linguistic Committee), and *al-Lajna al-ʿIlmiyya al-Fanniyya* (The Scientific Committee) (El-Khafaifi, 1985, p. 44). The Literary and Linguistic Committee was appointed to preserve and promote the integrity of the Arabic language. It was also appointed to examine linguistic or literary issues within the language, in order to find solutions to these issues. The Scientific Committee was appointed to widen the range of sciences and arts and encourage greater endeavour in these fields on the part of scholars and artists.

In 1922, Kurd ʿAlī amended the goals of the Academy to include reforming Arabic, coining new vocabulary for modern technical creations, and supporting research, book translation and publishing, particularly in the sciences (Sawaie, 2011). The Academy began the publication of a journal originally called *Majallat al-Majmaʿ al-ʿIlmī al-ʿArabī* (Magazine of the Arabic Academy of Science) and later renamed *Majallat Majmaʿ al-Lugha al-ʿArabiyya* (Magazine of the Arabic Language Academy), which has been published since 1921 (El-Khafaifi, 1985, pp. 44-45). It was initially published monthly, then in 1931 it became bimonthly, and starting from Volume 24 it became a quarterly magazine (Sawaie, 2011). This journal welcomes contributions from both western and eastern scholars (El-Khafaifi, 1985, pp. 45). Moreover, it was used as a guide for the educational system, for the government, and for writers in Syria and in other countries (p. 45).

The Cairo Academy

There were some early attempts to establish an Arabic language academy in Cairo to aid the development of Arabic, but they were only briefly successful (El-Khafaifi, 1985, p. 12). In 1870, the initial conception of the language academy emerged in order to solve the problems facing Arabic (al-Ḥamzāwī, 1988, p. 23). At the end of the 19th century, a group of Egyptian writers and intellectuals started to meet in the house of Sayyid Muḥammad Tawfīq al-Bakrī (1870-1933) in Cairo to discuss how to maintain and develop the Arabic language (Ḍayf, 1984, p. 19). This group included important figures from the Arab world, such as Sheikh Muḥammad ʿAbduh[14] and the

[14] Muḥammad ʿAbduh (c. 1849–1905) was the principal representative of modern Muslim reformism in Egypt. In all his activities—as a journalist, university teacher, editor, author, judge, and Muftī of

linguist al-Shinqīṭī (1905-1974), who proposed establishing a language academy (p. 19). Al-Bakrī founded a language academy, which was named *al-Majmaʿ* (The Academy) in 1892 in Cairo, and he was its first and only chairman as it lasted for only seven meetings (El-Khafaifi, 1985, p. 12). The goal was to create vocabulary in response to the newly emergent Western cultural subjects (Sawaie, 2011). In 1908, the graduates of *Dār al-ʿUlūm*[15] (House of Science) established a club in Cairo, which was led by Ḥifnī Nāṣif (1856-1919) (MMAA[16], 1934). It was called *Nādī Dār al-ʿUlūm* (The House of Science Club), and its goals were to create new vocabulary and to deal with the problem of foreign words being inserted into Arabic. The club suggested thousands of coinages in its journal during its brief life (Sawaie, 2011). Nāṣif, as chairman of the club, held a conference to discuss several Arabic language issues (Ḍayf, 1984, p. 19). However, the opportunity did not present itself at the time to establish the desired language academy (p. 20).

However, in 1916 Aḥmad Luṭfī al-Sayyid (1872–1963) established a language academy called *Majmaʿ Dār al-Kutub* (The Academy of the Library), which lasted until 1919 (p. 20). This academy took the French Language Academy as a model, and its objective was to produce a comprehensive dictionary of terms in arts, crafts, and sciences (Sawaie, 2011). It included 28 members, among them 25 Arabs, one Persian, one Assyrian, and one Jew (Ḍayf, 1984, p. 20). In 1925, there was an attempt to revive the academy, but it only lasted for one session (p. 20). The lack of official

Egypt, in exile and at home—he promulgated Islam as a religion of reason and civilisation, and struggled to overcome the gap between East and West by improving the educational system (von Kügelgen, 2007).

[15] Dār al-ʿUlūm, "House of Knowledge" or "House of Science," is a term that refers to modern institutions of higher Islamic learning. Cairo's Dār al-ʿUlūm was founded in 1872 as a government-run school of higher education, training students recruited from religious schools to be teachers of both Arabic and primary-school subjects in the government's civil schools (Kalmbach, 2012).

[16] Majallat Majmaʿ al-Lugha al-ʿArabiyya.

government support for establishing an Arabic language academy was one of the main reasons behind the failure (Sawaie, 2011).

In December 1932 King Fārūq issued a decree ordering the establishment of a royal Arabic language academy in Cairo, which remains one of the most important language academies in the Arab world (al-Shihābī, 1965, pp. 62). It was called *Majmaʿ al-Lugha al-ʿArabiyya al-Malakī* (The Royal Arabic Language Academy) and after the Egyptian revolution of 1952, it was renamed *Majmaʿ al-Lugha al-ʿArabiyya* (The Arabic Language Academy) (El-Khafaifi, 1985, p. 53). It aimed to develop and regulate the Arabic language in Egypt (al-Shihābī, 1965, pp. 68). This academy was modelled on the French Academy in terms of organisation and objectives (Sawaie, 2011). The objectives set out by the Cairo Academy are as follows: maintenance of Arabic and its growth in ways expressive of modern arts, sciences, and society; investigating all media that could develop the language; editing Classical Arabic manuscripts and texts; compiling a historical dictionary; and publishing a journal (Sawaie, 2011). It issues a journal named *Majallat Majmaʿ al-Lugha al-ʿArabiyya* (Magazine of the Arabic Language Academy), which began publication in September 1935 (al-Ḥamzāwī, 1988, p. 155) and has been published annually for most of its time (Sawaie, 2011). This journal has been a forum for linguistic discussions and articles about every aspect of the language and is commonly used in the various Arab countries (El-Khafaifi, 1985, p. 54).

Membership of this academy is granted to intellectuals known for their knowledge of Arabic, whatever their nationality and political or sectarian affiliation, thus enabling the Academy to be an international organization (Sawaie, 2011). Membership depends on the qualifications and contributions of the members to Arabic studies (Sawaie, 2011). They are classified into three groups: *ʿāmilūn* (active members), *fakhriyyūn* (honorary members), and *murāsilūn* (correspondents) (Sawaie, 2011).

It is one of the most active language academies in the Arab world. This is illustrated by its significant efforts and publications aiming to develop the Arabic language. The Academy has published some remarkable dictionaries in the attempt to satisfy the needs of Arabic for vocabulary (El-Khafaifi, 1985, p. 61). It published general dictionaries such as: *al-Muʿjam al-Wasīṭ* (The Intermediate Dictionary), *al-Muʿjam al-Kabīr* (The Great Dictionary), *al-Muʿjam al-Wajīz* (The Concise Dictionary) and *Muʿjam Fishar* (Fisher Dictionary) (pp. 61-62). In addition, it produced specialised dictionaries such as: *Muʿjam alfāẓ al-Qur'ān al-Karīm* (a Dictionary of the Holy Qur'an), a dictionary of geography, a dictionary of geology, a dictionary of nuclear physics, and regularly published glossaries on subjects in the areas of science and technology (p. 62).

The Academy has contributed to various developments such as: facilitating Arabic grammar and writing style; supplying scientific and cultural vocabulary through various Arabic word formation mechanisms; refining Arabic language dictionaries; analysing Classical Arabic works; and compiling a comprehensive historical dictionary (Sawaie, 2011). Moreover, the Academy has been active in the scientific study of Egyptian colloquial Arabic, in addition to other dialects of Arab countries (El-Khafaifi, 1985, p. 54). This demonstrates the concern of the Academy for all Arabic dialects. Moreover, it works towards the modernization of the language and the growth of new scientific vocabulary, which helps the language cope with the changing world (El-Khafaifi, 1985, p. 54).

The Cairo Academy is divided into many committees (see Table 2.3) that support its wide range of interests. Each committee has its own tasks and includes two regular active members of the Academy along with a relevant number of associates with linked areas of expertise.

Table 2.3: The Cairo Academy Committees

General Language Committees
- The Committee on Antiquities, Arts and Architecture - The Standards Committee - The Committee for the State Prize Award - The Committee for Reviving the Legacy and Heritage of Arabic - The Literature Committee - The Committee for Cultural Vocabulary and Civilization - The Dialects Committee - The Committee for the Great Dictionary - The Intermediate Dictionary Committee - The Committee for the Dictionary of the Qur'an - The Committee for the Simplification of the Writing System - The Library Committee
Particular Subjects or Fields Committees
- The History Committee - The Geography Committee - The Committee for Education and Psychology - The Committee for Philosophy and Sociology - The Committee for Law, Economics and Statistics - The Geology Committee
Science and Technology Committees
- The Committee for Mathematics - The Engineering and Physics Committee - The Biology and Agriculture Committee - The Chemistry and Pharmacology Committee - The Medicine Committee

(El-Khafaifi, 1985, pp. 55-57)

These committees seek to coin the required terminology in order to satisfy the requirements of their relevant fields linguistically. They also endeavour to coordinate and standardize the terminology to ease exchanges within a given country and among

Arab countries (El-Khafaifi, 1985, p. 57). Moreover, the committees correspond with other language academies, research institutions, universities, experts and researchers in the field of science throughout the Arab world, in order to review all the evolving areas of science (pp. 57-58).

The Academy has coined many terms in different fields. A statistical report was submitted to the 64th conference of the Academy in 1997, which states that 135,076 terms had been created by the Cairo Academy until that date (al-Qahtani, 2000, p. 30). The terms are distributed between the fields highlighted in Table 2.4.

Table 2.4: Number of Terms Coined by the Cairo Academy to 1997

Field	No. of Terms	Field	No. of Terms	Field	No. of Terms
Biology	20,750	Social Science	1,969	Cinema	475
Medicine	20,031	Library and Information Science	1,732	Theatre and Acting	254
Physics	14,746	Sport	1,710	Administrative Sciences	221
Petrol	11,147	Economy	1,628	Mechanics	187
Geology	9,486	Music	1,584	Light and Optics	171
Law	9,113	History	1,062	Archaeology	152
Chemistry	7,773	Culture	1,002	Crafts and Drawing	144
Engineering	5,492	Electricity and Electronics	925	Tourism	142
Hydrology	4,944	Atom	821	Construction Style	139
Philosophy	4,903	Labour	680	Construction	68
Mathematics	4,120	Linguistics	597	Logic	40
Geography	3,437	Local Industries	526	Printing	17
Arts	2,391	Education	497		

(Al-Qahtani, 2000, pp. 30-31)

According to al-Qahtani (2000, pp. 33-35), the Academy has created some general regulations for translation, and especially for Arabizing English affixes. These rules are as follows:

1) Blending is permitted for Arabizing scientific terms only in cases of necessity. Thus, a term such as ‘electromagnetic’ is Arabized as *kahrūmaghnāṭīsī*, a

blend of *kahrubāʼī* (electro) and *maghnāṭīsī* (magnetic). However, it is necessary that such blends be easily understood by ordinary people.

2) The old Arabic forms are to be favoured over the borrowed ones whenever possible.
3) The Arabic alphabet must be used for the chemical symbols of elements.
4) The simplest pronunciation of the borrowed term must be used.
5) Terms which have been regularly used in certain forms must be maintained the way they are.
6) The English prefix ‘hyper’ must be translated as *farṭ* (excessive) at all times, and ‘hypo’ must be translated as *naqṣ* (lack) at all times.
7) When borrowing foreign terms ending in [logy] into Arabic, an Arabic suffix [yā] must be suffixed to make their pronunciation simpler. Hence, a term such as ‘sociology’ must be Arabized as *sūsyūlūjyā*.
8) The suffix [-um] is borrowed as [*yūm*] at all times such as in the term ‘aluminium’ *ʾalūminyūm*.
9) The suffix [-oid] must be translated at all times as *shibh* (similar to) plus the term that comes with it. For example, ‘metalloid’ is translated as *shibh filizz* (similar to metal).
10) The English letter [g] must be Arabized as [j] as in *al-jabr* (algebra), or [gh] as in *ghrām* (gram).
11) The Arabic [b] should correspond to the English [p].
12) Foreign terms, which were originally borrowed from Arabic, should not be used in their current modified forms, but rather in their old Arabic form. For example, the term ‘arsenal’ was originally borrowed from the Arabic term *dār aṣ-ṣināʿa* (literally, ‘the house of manufacturing’). Such a term should be used

in its old Arabic form *dār aṣ-ṣināʿa* rather than its current English form ‘arsenal’.

The Baghdad Academy

The Baghdad Academy is known as *al-Majmaʿ al-ʿIlmī al-ʿIrāqī* (The Iraqi Academy of Science). The Iraqi Ministry of Education established it in 1947 in Baghdad (El-Khafaifi, 1985, p. 46). It was founded to maintain the Arabic language in Iraq and the Arab World. It has two other committees: a committee for the Syriac language appointed to deal with all matters concerning the Syriac language, culture and heritage; and a committee for Kurdish that was appointed to deal with the Kurdish language, culture and heritage (Sawaie, 2011). These were founded in 1968 and merged with the Academy in 1978, which was modelled after the Damascus Academy with its focus on language, literature, history, sciences, etc. (Sawaie, 2011).

The objectives of the Academy have been amended over the years. Among the various goals of the Academy is to give careful consideration to the study of the history, culture and civilization of Iraq (El-Khafaifi, 1985, p. 48). Its main objective is, as with the other Arab academies, to maintain the integrity of Arabic and make it capable of satisfying the demands of sciences, arts and matters of modern life (El-Khafaifi, 1985, pp. 46-47). Also, among the goals of the Academy is publishing, in Arabic, literature, books on history (particularly Iraqi), sciences, languages, and civilization; preserving rare manuscripts and archival materials; encouraging translations of the modern arts and sciences; and promoting scientific exploration (Sawaie, 2011). Other goals include protecting Arabic from deterioration; reviving scientific exploration in Iraq in line with the development of science; investigating modern technology; supporting original research; and reviving Arabo-Islamic heritage in the arts and sciences (Sawaie, 2011). Moreover, the Academy is concerned with the preservation of Syriac and Kurdish (El-Khafaifi, 1985, p. 48).

In the latest guidelines set by the Academy in 1995, members were classified into three groups: *ʿāmilūn* (active members), consisting of residents in Baghdad who created the membership of the Academy Council; *murāsilūn* (correspondents), occasionally referred to as supporting, who were chosen from among Iraqi intellectuals as well as from a mixture of Islamic, Arab, and other foreign countries; and *fakhriyyūn* (honorary members), Iraqi nationals who live outside of Iraq for long periods of time (Sawaie, 2011).

The Academy started to issue an annual journal in 1950 called *Majallat al-Majmaʿ al-ʿIlmī al-ʿIrāqī* (Magazine of the Iraqi Academy of Science), but it was abolished in 1963 after publishing ten volumes in twelve parts (Sawaie, 2011). The Academy strengthens its relationships with the other Arabic language academies and cultural, scientific and literary organizations in Iraq and across the Arab world through meetings, communication and collaborative projects (El-Khafaifi, 1985, pp. 48-49).

The Permanent Bureau of Coordination (Rabat)

The PBA (the Permanent Bureau of Coordination of Arabization) in the Arab World, is based in Rabat and is also known as *al-Maktab al-Dāʾim li-Tansīq al-Taʿrīb fī al-Waṭan al-ʿArabī* (El-Khafaifi, 1985, p. 49). It was established in 1967 under the patronage of The Arab League Educational, Cultural and Scientific Organization (ALECSO) (El-Khafaifi, 1985, p. 49). It issues a journal called *al-Lisān al-ʿArabī* (The Arabic Language), which was first published in 1964 (El-Khafaifi, 1985, p. 51). The journal is dedicated to the many aspects of *taʿrīb* efforts in progress in the Arab countries (p. 51). The PBA contains two main sections: the administrative section and the technical section (al-Qahtani, 2000, p. 38). The administrative section contains two units: the financial unit and the administrative unit. The technical section contains six units: a studies and research unit, documentation and library unit, information networking unit, coordination unit, planning unit, and the journal unit.

This organization is different to other Arabic language academies in that its main task is the standardization of Modern Arabic, rather than the coinage of new terms (El-Khafaifi, 1985, p. 49). A chief task of the PBA is the collection, classification and arrangement of all the technical and scientific terms in Arabic, English and French created by the other Arabic language academies, as well as by intellectuals, literary figures, educators and scientists working outside the academies (p. 50). The PBA is involved in the collection and unification of all the dictionaries produced by various Arabic language academies, in order to eliminate contradictions or overlaps in terminology (al-Qahtani, 2000, p. 37). The output of the PBA has been achieved partly through a regular pattern of cooperation and communication with the educational ministries of all Arab countries, and with their universities and academies (El-Khafaifi, 1985, pp. 50-51).

The chief accomplishments of the PBA include the publication of over fifty technical glossaries (trilingual, in Arabic, English and French), designed to be utilized in technological and scientific research and teaching (El-Khafaifi, 1985, p. 50). The PBA has also produced comprehensive technical dictionaries in the fields of mathematics, physics, chemistry, zoology and botany, in order to further assist researchers and educators (p. 50). Other PBA works for use in general education include dictionaries of philosophy, history, geography, health, astronomy and statistics (p. 50). Trade and vocational publications include those covering mechanics, electronics, petroleum, accounting, commerce, typing, carpentry and architecture (p. 50). There is a series of 33 unified dictionaries among the various publications by the PBA, which are all trilingual, in Arabic, English and French; these are as follows:

- The Unified Dictionary for Terminologies of General and Nuclear Physics (1989)
- The Unified Dictionary of Mathematics and Astronomy Terms (1990)
- The Unified Dictionary of Musical Terms (1992)
- The Unified Dictionary of Archaeology and History Terms (1992)
- The Unified Dictionary of Hygienics and Human Body Terms (1992)
- The Unified Dictionary of Chemistry Terms (1992)
- The Unified Dictionary of Biology Terms (1993)
- The Unified Dictionary of Geographical Terms (1994)
- The Unified Dictionary of Commerce and Accounting Terms (1995)
- The Unified Dictionary of Renewable Energys Terms (1996)
- The Unified Dictionary of Vocational and Technical Terms, 2 vols (1996)
- The Unified Dictionary of Human Sciences Terms (1997)
- The Unified Dictionary of Pedagogical Techniques Terms (1999)
- The Unified Dictionary of Plastic Arts Terms (1999)
- The Unified Dictionary of Mechanical Engineering Terms (1999)
- The Unified Dictionary of Law Terms (1999)
- The Unified Dictionary of Tourism Terms (1999)
- The Unified Dictionary of Media Terms (1999)
- The Unified Dictionary of Seismological Terms (1999)
- The Unified Dictionary of Petroleum Terms (1999)
- The Unified Dictionary of Environment Terms (1999)
- The Unified Dictionary of Meteorological Terms (1999)
- The Unified Dictionary of Geological Terms (2000)
- The Unified Dictionary of Hydrologic Terms (2000)
- The Unified Dictionary of Oceanology Terms (2000)
- The Unified Dictionary of Economical Terms (2000)
- The Unified Dictionary of Information Terms (2000)
- The Unified Dictionary of Remote Sensing Terms (2000)
- The Unified Dictionary of Linguistic Terms, 2nd edn (2002)
- The Unified Dictionary of Electronic Warfare Terms (2004)
- The Unified Dictionary of Nutrition Technologies Terms (2004)
- The Unified Dictionary of Genetic Terms (2009)
- The Unified Dictionary of Pharmacy Terms (2009)

The Union of Arab Academies

This academy is known as *Ittiḥād al-Majāmiʿ al-ʿArabiyya* (The Union of Arab Academies) (El-Khafaifi, 1985, p. 65). It was established in Cairo in 1970 and includes members from the Damascus Academy, the Amman Academy, the Baghdad

Academy and the Cairo Academy, plus any language academy which may be founded in the future by any independent Arab country (pp. 65-66). The Union is administered by a chairman who is selected from among the members, as well as a secretary-general and two assistant secretary-generals. The council directing the Union consists of two members selected from each language academy as their representatives (p. 66). These members represent their academies for a period of four years, which is then subject to renewal (p. 66).

The execution of the decisions and resolutions of the Arabic language academies on a broad scale was a major problem facing them (El-Khafaifi, 1985, p. 64). There were significant differences in Arabic terminology and usage from one country to another, within any one country, and within universities and schools (p. 64). Finding solutions to these problems was one of the reasons for establishing this organization. It differs from other Arabic language academies in that its goals are to systemize the communication between all the Arabic language academies, coordinate their efforts in matters concerning the Arabic language and its scientific and linguistic heritage, and solve the problems they are facing (El-Khafaifi, 1985, p. 66). The Union has organized various conferences to coin scientific and technical terminology in various areas (Sawaie, 2011). It addresses the problem of unifying cultural, artistic and scientific terminology and distributing it across the Arab world (El-Khafaifi, 1985, p. 66).

Among the obstacles the Union has faced is the lack of moral and financial support; some Academies do not pay their annual membership costs; members fail to attend meetings and take them seriously; and there is a lack of support for the decisions of the Union (Sawaie, 2011). Growing tense political conditions in the Arab world dictated the termination of the majority of the Union’s activities in 1978 after the disruptive Camp David agreement (El-Khafaifi, 1985, pp. 66-67). The Union maintains its existence on paper and in the projects of interested members, while waiting for the restoration of political cooperation to resume operations (p. 67).

The Amman Academy

The Amman Academy is known as *Majmaʿ al-Lugha al-ʿArabiyya al-ʾUrdunī* (The Jordanian Arabic Language Academy) and is based in Amman, Jordan, following its foundation in 1976 (El-Khafaifi, 1985, p. 51). The Academy has established six permanent committees: The Committee for Arabization, Dictionaries and Terminology, which is dedicated to the coinage of necessary new terminology and its distribution; The Translation Committee, which works on numerous translation projects from foreign languages; The Standards Committee, which is responsible for maintaining consistently high standards in using the Arabic language; The Heritage Committee, which is concerned with the culture and history of the Arabic language and of Jordan; The Committee for *al-Majalla* (the magazine), which is responsible for printing and managing the publication of the Academy's journal and of other works; and The Committee for the Library, which administers the Academy's library and associated communications with libraries in other academies, universities, etc. (El-Khafaifi, 1985, pp. 51-52). The Academy is administered by a president and vice president (Sawaie, 2011). Members are classified into three groups: active Jordanian members, honorary Jordanian and non-Jordanian members, and supporting Arab and foreign members, as stated in the first annual decision by the Academy in 1977 (Sawaie, 2011).

The Academy issues a biannual magazine titled *Majallat Majmaʿ al-Lugha al-ʿArabiyya al-ʾUrdunī* (Magazine of the Jordanian Arabic Language Academy), which began publication in 1978 (al-Zarrkān, 1998, pp. 195-196). Moreover, many dictionaries and occasional publications have been produced by the Academy as part of its interest in the *taʿrīb* of technical and professional terms, facilitating the use of Arabic in tertiary education, and regulating Arabic language and literature.

The goals set by the Academy are as follows: protecting the Arabic language and facilitating it to express modern arts, sciences and technology; standardizing the vocabulary of arts and sciences; and compiling a dictionary to express the needs of the modern age (Sawaie, 2011). Among the Academy's achievements are: translation of scientific books, including books in geology, biology, physics, chemistry and mathematics; editing of books on Arabic and Classical Arabic; cataloguing of manuscripts; cultural conferences; and coining terminology in relation to the economy, commerce, agriculture, metrology and the military (Sawaie, 2011). The Academy supports Arabizing university-level instruction and provided a massive translation project to convert all teaching materials used in universities into Arabic as quickly as possible (El-Khafaifi, 1985, p. 52). Moreover, the Academy has demanded all the institutions and ministries of education in Jordan to provide it with all foreign vocabulary presently in use in order for the Academy to be able to produce or provide proper Arabic equivalents (p. 52). This illustrates the Academy's desire to attain maximum Arabization throughout the education system of the country. The Academy organizes such efforts with two of Jordan's universities, al-Yarmūk University and the University of Amman, in an attempt to standardize and fully Arabize the curricula (El-Khafaifi, 1985, p. 53). Although the Academy has been generally successful, it has faced several obstacles, such as the lack of financial support and lack of harmonization among language academies, especially in terms of the standardization of neologisms (Sawaie, 2011).

In the next section, a discussion of the main Arabic word formation mechanisms is provided.

2.5 Arabic Terminology Formation Mechanisms

Arabic is a derivation language, which means that it relies mainly on the derivation word formation mechanism. Also, Arabic uses other word formation mechanisms to enable it to cope linguistically with the rapid developments in all areas of modern life. In addition to the mechanism of *taʿrīb* which was discussed earlier, there are four main Arabic word formation mechanisms which are discussed below: *ishtiqāq*, *majāz*, *tarkīb* and *naḥt*.

2.5.1 Derivation *(Ishtiqāq)*

Ishtiqāq is a technical term in Arabic grammar that is translated into English as 'derivation'. *Ishtiqāq* in its general sense means extracting one word from another, under specific defined conditions (Fleisch, 2012). Arabic has been called the language of *ishtiqāq*, and deriving words from available Arabic roots has always been regarded as the most natural method of development for the language (Abderrahman, 1981, p. 104). Furthermore, *ishtiqāq* has played the most important role in the process of creating new terminology (p. 104). The original example of derivation is the simple declension, as shown in the following: *faʿala* - *yafʿalu* - *fāʿilun* - *mafʿūlun*.

There is a strong relationship between *ishtiqāq* and *qiyās* (analogy) as *ishtiqāq* involves deriving one word from another while *qiyās* is the basis upon which this process is built for the derived words to achieve recognition and acceptance from philologists, linguists and other native speakers (al-Qazzāz, 1981, p. 240; El-Khafaifi, 1985, p. 76). Thus, *qiyās* is the theory and *ishtiqāq* is its application (al-Qazzāz, 1981, p. 240). El-Khafaifi (1985, p. 75) also states that new words are created in accordance with those patterns already recognized in the language through the method of *qiyās*. The use of derivation in Arabic, in accordance with the principle of analogy, has continued throughout the history of the language. Stetkevych (1970, p. 3) notes that *qiyās* has played a key role in the configuration of the Arabic language. He also states that it achieved its highest expression in the works of Abū ʿAlī al-Fārisī[17] (d. 900) and his follower, ʿUthmān Ibn Jinnī[18] (d. 1002). The Egyptian Aḥmad Amīn suggests that philologists who are familiar with the principle of *qiyās*, such as al-Fārisī and Ibn Jinnī, take a position in respect to the language which is analogous to that taken by Abū Ḥanīfa[19] (d. 767) in respect to *fiqh* (jurisprudence) (Stetkevych, 1970, p. 4). Stetkevych also comments that ʿAbd al-Qādir al-Maghribī is probably one of the most dedicated scholars to the cause of the modernisation of the language and one of the most consistent exponents of the analogical principle in modern times (p. 6).

Throughout the history of the Arabic language, the mechanism of *ishtiqāq* has contributed significantly to the lexical expansion, and the development and growth of the language (El-Khafaifi, 1985, p. 68). Therefore, *ishtiqāq* is regarded as the most natural mechanism for lexical expansion and innovation in Arabic. In addition, *ishtiqāq* is essential to Arabic grammatical morphology. Moreover, Redouane (2001, p. 13) notes that one of the features of Semitic languages in general, and of Arabic in particular, is having multiple derivations from one root. Every root in the Arabic

[17] Abū ʿAlī al-Fārisī is one of the outstanding grammarians of the 10th century. Born in 900 at Fasā, he studied at Bag̲h̲dād under Ibn al-Sarrād̲j̲, al-Zadid̲j̲ād̲j̲, and others. He died in Bag̲h̲dād in 987 (Rabin, 2010).

[18] Ibn Jinnī , Abū 'l-Fatḥ ʿUthmān was born in Mosul before 913. His teacher was the Baṣran Abū ʿAlī al-Fārisī. He devoted himself especially to grammar and is celebrated as the most learned authority on *taṣrīf*; he occupied a position midway between the Kūfa and the Baṣra schools. He founded the science of etymology (*ishtiḳāḳ al-akbar*). His most important works are *kitāb Sirr al-ṣināʿa wa-asrār al-balāg̲h̲a* (on Arabic vowels and consonants) and *kitāb al-K̲h̲aṣāʾiṣ fī ʿilm uṣūl ʿarabiyya.* He died in Bag̲h̲dād in 1002 (Pedersen, 2010).

[19] Abū Ḥanīfa al- Nuʿmān b. Thābit was a theologian and religious lawyer, the eponym of the school of the Ḥanafīs. He was born approximately in the year 699. Very little is known of his life, except that he lived in Kūfa as a manufacturer and merchant of a kind of silk material (*khazz*). Abū Ḥanīfa became the foremost authority on questions of religious law in Kūfa and was the main representative of the Kūfian school of law. He collected a great number of private disciples to whom he taught his doctrine, but he was never a judge. He died in prison in Baghdad in 767 at the age of 70 (Schacht, 2010).

language naturally has a similar capability for derivation. The root is constituted of consonants referred to as radicals (*ḥurūf ʾaṣliyya*), which signify a general meaning. Shifting the position of any of the radicals leads to a total change in the meaning. Vowels and affixes are introduced to a root to derive actual words (Chekayri, 2011). Chekayri also notes that the Arabic grammatical tradition uses the three consonants (*f*, *ʿ*, and *l*) to illustrate forms according to certain patterns, called *wazn* and *ṣīgha* (grammatical pattern). The pattern represents an abstract notion for formal representation, and it signifies the morphological representation that substitutes for a given lexical form. Every pattern conveys a grammatical meaning that is combined with the basic meaning of the root (Chekayri, 2011). Moreover, Modern Arabic uses *ishtiqāq* as a primary method to adapt itself to modern usage and needs (El-Khafaifi, 1985, p. 68). Derivation plays an important role in the creation of new scientific terminology for Arabic (El-Khafaifi, 1985, p. 69).

Arabic grammarians distinguish between three types of *ishtiqāq*: *al-Ishtiqāq al-ʿĀmm* (the common derivation), *al-Ishtiqāq al-Kabīr* (the great derivation), and *al-Ishtiqāq al-ʾAkbar* (the greater derivation). A brief background about each type as well as Arabic adjectives follows.

2.5.1.1 The Common Derivation

Al-Ishtiqāq al-ʿĀmm was also named *al-Ishtiqāq aṣ-Ṣaghīr* (the small derivation) by Ibn Jinnī, which is its usual name (al-Ḥudaiythī, 1965, p. 248). This is the most frequent method used in the Arabic language to increase its lexicon in relation to the growing flow of foreign terms and ideas (El-Khafaifi, 1985, p. 73). Moreover, it can be argued that 'the common derivation' or 'the small derivation' plays a leading role in the process of creating new terminology in Arabic as it is the most common and productive word formation mechanism in Arabic (Redouane, 2001, p. 14). As a result, this type of derivation is the only type used by the Arabic language academies in terms of terminology creation in current times (al-Qahtani, 2000, p. 75). For the purpose of this study, *al-Ishtiqāq al-ʿĀmm* will be referred to as derivation, which is the commonly accepted English equivalent of *ishtiqāq*.

The vast majority of Arabic roots consist of three radicals or consonants (El-Khafaifi, 1985, p. 74). Arabic words are regularly created from a root involving three radical consonants and a group of vowels that interchange with the root consonants. Vowels in this case act like an affix. For example, this type of derivation involves deriving the past, present and imperative tense verbs, present and passive participles, adjectives, elatives, nouns of time, place and instruments from one term. According to Abderrahman (1981, p. 20), *al-Ishtiqāq aṣ-Ṣaghīr* is marked by the original order of the radicals. He also states that in this type of derivation, the radical consonants are not altered in any way; however, they are built upon and derived from. Consequently, from the root [q-t-l], we can derive *qatl* (to kill); *qātil* (killer); *qātal* (battled); *qatīl* (is killed); *qattal* (overkilled); *taqātal* (battled); *ʾistaqtal* (surrendered to be killed); *ʾistiqtāl* (surrendering to be killed); *qitlah* (death by killing); *qatlah* (killers); *taqātul* (battling); *ʾaqtal* (expose him/her to be killed); *ʾiqtitāl* (battling); *ʾiqtatal* (battled); *taqtīl* (overkilling); *muqātalah* (battling) etc. without changing the order of the radicals (Abderrahman, 1981, pp. 20-21). The triconsonantal principle can also be demonstrated through another common and highly productive root, [ʾ-m-n]: *ʾamina* (to become secured); *ʾamn* (safety, security); *ʾamān* (safety, security); *ʾamāna* (trust); *ʾāmin* (assured, peaceful); *ʾiʾtimān* (trust, confidence); *ʾamīn* (trustworthy); *yuʾammin* (to insure); *ʾammana* (he insured); *muʾmmin* (insurer); *muʾmman* (ensured); and *taʾmīn* (insurance).

These lists of derived words from one root are only two of many examples that can be found in Arabic. The relationship between the derived forms in the first list is that they share the meaning of ‘killing, battling’, and in the latter list they share the meaning of ‘safety, trust, insurance’. Every Arabic root has a similar capability for derivation, and thus for the creation of new terminology (El-Khafaifi, 1985, p. 75). El-Khafaifi also comments that it is this virtually limitless ability for growth which has enabled Arabic to develop and adapt itself throughout its history to the changing conditions.

2.5.1.2 The Great Derivation

Al-Ishtiqāq al-Kabīr is also known as *al-qalb* (permutation) and this type of derivation was identified by Ibn Jinnī. The theoretical interrelation between sounds and their meanings in Arabic is the basic principle of this type of derivation. It assumes that roots which are created from three identical consonants have similar connotations, without considering the order of the radicals contained in the root (El-Khafaifi, 1985, p.70). For example, the root [j-b-r] expresses in its form the concept of ‘strength or power’. According to this theory, the connotation of strength in this root is always preserved, in spite of placing any of the radicals at the end, middle or beginning. Therefore, [j-b-r] indicates a relationship to [r-j-b, j-r-b, b-r-j, b-j-r, and r-b-j], all of which indicate ‘strength’. It must be pointed out that combining any three radicals can create six possible roots (Abderrahman, 1981, pp. 21-22). However, Arab grammarians discovered that, in practice, it is not always true that having identical roots gives words with a similar meaning. Therefore, this type of derivation is not dependable and is unproductive as a medium of lexical enrichment (El-Khafaifi, 1985, pp. 70-71).

2.5.1.3 The Greater Derivation

Al-Ishtiqāq al-ʾAkbar is also called *al-ʾibdāl* (substitution). This type of derivation was identified by Ibn Sikkīt (d. 857), along with other linguists. It is based on the assumption that different lexical units, which possess two identical radicals, must share a semantic relationship despite the difference of the third radical (Abderrahman, 1981, p. 23). An example is root that contains the sequence [f-1], which has the meaning 'to break, split', *falaj* (cut it into two) and *falaq* (split it into two identical halves). This type of derivation is relatively practical in the creation of new terminology, and arguably is not actually a proper form of derivation (El-Khafaifi, 1985, p. 72).

It can be concluded that *al-Ishtiqāq al-Kabīr* and *al-Ishtiqāq al-ʾAkbar* are regarded as 'marginal methods', and not as proper forms of derivation (Redouane, 2001, p. 14). Moreover, they do not play any significant role in terms of terminology creation in Arabic at the present time (El-Khafaifi, 1985, p. 73). As a result, these types of derivation are not used by the Arabic language academies in terms of terminology creation (al-Qahtani, 2000, p. 75).

Moreover, it can be stated that the mechanism of *ishtiqāq* is commonly used in technical and computing terminology creation in Arabic. Examples of Arabic computing terminology produced by this mechanism are shown in Table 2.5.

Table 2.5: Arabic Computing Derivatives

English	Arabic	Derived from
mail	*barīd*	[b-r-d]
application	*taṭbīq*	[ṭ-b-q]
computer	*ḥāsūb*	[ḥ-s-b]
tape	*sharīṭ*	[sh-r-ṭ]
printer	*ṭābiʿa*	[ṭ-b-ʿ]

2.5.1.4 Adjectives *(Ṣifa)*

Ryding (2005, pp. 253-254) states that "Arabic adjectives are structured in two ways: through derivation from a lexical root by means of the root-and-pattern system, or by means of attaching the *nisba* suffix -ī (m.) or -iyya (f.) to create an adjective from another word (usually a noun)". Abu-Chacra (2007, p. 181) suggests that there are numerous adjectival forms in Arabic and the most common patterns for forming adjectives from verbs are highlighted in Table 2.6.

Table 2.6: Common Arabic Adjective Patterns

Pattern	Singular	Plural
a) *fāʿil*	*rāʾiʿ, wonderfull*	*rawāʾiʿ*
b) *faʿīl*	*ʿarīḍ*, broad	*ʿirāḍ*
c) *faʿal*	*baṭal*, hero	*ʾabṭāl*
d) *faʿlān*	*ʿaṭshān*, thirsty	*ʿiṭsāsh*
e) *faʿūl*	*ḥaqūd*, spiteful	*ḥaqada*
f) *mafʿūl*	*maḥmūl*, portable	*maḥāmīl*

Another Arabic adjective structure form is the 'relative adjective' (*nisba*), which is discussed in the following section.

2.5.1.4.1 Relative Adjective *(Nisba)*

This is a common adjective form in the Arabic language. Converting a word into a relative adjective by attaching the *nisba* suffix is a significant derivational method in Modern Standard Arabic and is effectively used to create new words (Ryding, 2005, p. 261). Abu-Chacra (2007, p. 182) demonstrates that in Arabic, the relative adjective is referred to as *nisba*, meaning 'relation'. A relative adjective is derived from a noun by attaching the *nisba* suffix. Therefore, the *nisba* suffix turns a noun into an adjective (which frequently can be used as a noun as well), expressing the meaning linked to or concerning the entity or thing designated by the noun. It can be compared to English derivational morphemes (such as -ish, -ese, -(i)an, -i, ic(al), -ly, -al), e.g. as in Spanish, Japanese, Jamaican, Indian, Saudi, Aramaic, normal, weekly, physical, etc. Relative adjectives regularly refer to names of occupations or national, geographical, or ethnic names, and they can frequently be reused as independent nouns (see Table 2.7).

Table 2.7: Relative Adjectives

Noun	Masculine	Feminine
miṣr, Egypt	*miṣrī*, Egyptian	*miṣriyya*, Egyptian
raqm, digit	*raqmī*, digital	*raqmiyya*, digital
mādda, material	*māddī*, materialist	*māddiyya*, materialism (abstract noun)
markaz, centre	*markazī*, central	*markaziyya*, centralism (abstract noun)
ʿālam, universe	*ʿālamī*, universal	*ʿālamiyya*, universality (abstract noun)

2.5.2 Semantic Extension *(Majāz)*

Semantic extension is one of the word formation mechanisms used by the Arabic language, as well as other languages. *Majāz* or *taʿmīm ad-dalāla* refers to "the process of adding an extra meaning to an existing word" (al-Qahtani, 2000, p. 84). Abderrahman (1981, p. 96) maintains that most of the modern lexicon of languages consists of semantically extended pre-existing lexical units. This means that languages use the existing words to refer to modern concepts, usually related to their old ones (Redouane, 2001, p. 27). In addition, El-Mouloudi (1986, p. 172) states that in a semantic extension, a native word attains a new meaning and refers to more than one concept without losing its original semantic value. Moreover, a lexical unit can be allocated to more than just one concept, with the old and new existing simultaneously (Abderrahman, 1981, p. 96). The semantic extension of an existing word by giving it a modern meaning is considered to be the most highly regarded method for increasing the Arabic lexicon, but not the most successful one (Versteegh, 1997, p. 181).

Examples of semantic extension follow. As a consequence of the interference of English, the native Arabic word *tayyār* (water, air current) came to refer to *tayyār dīnī, siyāsī, madhabī* (religious, political or ideological movement, tendency) and *tayyār kahrabāʾī* (electric current). Similarly, the Arabic word *mawja* (sea wave) came to denote other types of waves such as *mawja qaṣīra*, *ṭawīla* (short, long wave radio), *mawjat ʿunf* (a wave of violence) and *mawjat ḥarāra* (heat wave). Another example of semantic extension is the verb root *fataḥa* (to open) which has evolved to mean 'to begin', 'to conquer' and so on.

In addition, Arabic language academies attempt to benefit from archaic Arabic terms which are not used anymore through expanding their semantic connotations to include new meanings (al-Qahtani, 2000, pp. 84-85). Table 2.8 includes additional examples of semantic extension in Arabic.

Table 2.8: Semantically Extended Terms

Word	Old Meaning	New Meaning
ʾiṭār	circled frame	tyre
sayyāra	travellers	car
qiṭār	caravan of camels	train
waqūd	fire logs	fuel

Moreover, it can be stated that the mechanism of *majāz* is used in technical and computing terminology creation in Arabic. Examples of computing terminology produced by this mechanism are highlighted in Table 2.9.

Table 2.9: Semantically Extended Computing Terms

Word	Old Meaning	New Meaning
al-ʿatād	equipment	hardware
lawḥa	painting	board
māsiḥa	wiper	scanner
manfadh	path	port

2.5.3 Compounding *(Tarkīb)*

A compound is formed of two or more words linked together to create another word (Hayes, 2003, p. 6). According to Emery (1988), a compound word can be defined as "a linguistic UNIT which is composed of ELEMENTS that function independently in other circumstances". Similarly, a compound word can be defined as "one that incorporates two words or more into a new syntagmatic unit with a new meaning independent of the constituent components" (Al-Kharabsheh, 2003, p. 59), while El-Mouloudi (1986, p. 204) defines a compound as the joining of two lexemes or more into one morphological unit. Compounds regularly maintain the full form of their constituent elements (Abderrahman, 1981, p. 94).

The classical Arab linguists used the term *al-tarkīb al-mazjī* (compounding) to designate "the combination of the juxtaposition of one lexical unit out of two words that would otherwise be used independently in the language" (El-Khafaifi, 1985, p. 135). Moreover, El-Mouloudi (1986, p. 243) comments that the Arabic Language Academy of Cairo defined *tarkīb*, or *tarkīb mazjī* (compounding) as:

> "the combining of two words into one word of the same structure and inflection, whether the original words were Arabic or arabized. This type of combining covers proper names, generic and concrete nouns, adverbs, state and descriptive nouns, sounds and numerals. The coining of the *murakkab mazjī* is allowed in scientific terminology in cases of necessity, with the condition that only what the *Majma*ʿ sanctions will be acceptable."

The term *naḥt* (blending) has been confused with *tarkīb* as they were both used by certain Arabic scholars to describe the process of compounding (Al-Kharabsheh, 2003, p. 131). Thus, some grammarians insist on using them distinctly, while others use them interchangeably. For purposes of clarification in this study, the term *naḥt* will refer to 'blending' and the term *tarkīb* will refer to 'compounding'. A discussion of compounding in English and Arabic, and the translation of compounds is essential in order to understand how English compounds are treated in Arabic.

2.5.3.1 Compounding in English

Compounding is a word formation process which is used in many languages, but to varying degrees. For instance, Old English used it more liberally, which is also the case in modern German; it was frequent in Greek, but unusual in classical Latin (Abderrahman, 1981, p. 92). Moreover, Al-Kharabsheh (2003, p. 59) notes that compounding was historically a trademark of the Germanic languages, including English, and it occurs commonly in them, particularly in German. English compounds can be classified into primary and secondary compounds, which are discussed below.

2.5.3.1.1 Primary Compounds

There is no derivational affix involved in a primary compound or base-compound; it is formed of two bases (derivationally bound forms) joined together (with or without some meaningless connecting element) (Amer and Menacere, 2013). Amer and Menacere also note that the majority of examples of primary compounds occurring in English are originally Greco-Latin vocabulary. There are a large number of Greek and Latin bases which are used to form English primary compounds. Examples of Greek and Latin prefixes include: *anti*-, *extra*-, *inter*-, *intra*-, *multi*-, *pro*-, *re*-, *trans*- and *ultra*-. Examples of Greek and Latin bases (roots) include: *auto*-, *graph*-, *crypto*-, *mega*-, *micro*-, *photo*-, -*scope* and *mille*. Examples of English primary compounds include: extranet, intranet, internet, multimedia, ultrafiche, automatic, megabyte and microphone.

A primary compound is semantically referred to as an endocentric compound as its meaning can usually be comprehended from the meaning of its parts (Amer and Menacere, 2013).

2.5.3.1.2 Secondary Compounds

There is no derivational affix involved in a secondary compound or stem-compound; the elements of a derived stem are simply put together and both or all the compound elements are formed of stems (Amer and Menacere, 2013). Amer and Menacere (2013) also note that a secondary compound is semantically referred to as an exocentric compound as its meaning cannot usually be comprehended from the meaning of its parts. According to the word order principle of the compound, compounds can be classified into two types: head-final compounds in which the main word is preceded by a modifying noun; and head-initial compounds in which the main word is followed by a modifying noun (Redouane, 2001, p. 10).

Redouane states that English is considered as a language of head-final compounds. According to Redouane (2001, p. 9), in English, the word class of the last constituent of the compound normally defines the class of the compound. English possesses various types of compound constructions, the most notable of which are: noun compounds (N+N, V+N, Adj+N, Adv+N and Ptcl+N); verb compounds (N+V, V+V, Adj+V, and Adv+V); adjective compounds (N+Adj, Adj+Adj, and Adv+Adj); and adverb compounds (N+Adv, V+Adv, Adj+Adv, and Adv+Adv) (Redouane, 2001, p. 9; Amer and Menacere, 2013). It should be noted that compound nouns are the most common type in English, while compound verbs are not very common (Amer and Menacere, 2013).

Examples of English secondary compounds are: N+N: keyboard, mailbox, database; V+N: password; Adj+N: hardware, broadband; Adv+N: online, offline; N+V: download, upload; N+Adj: backup; and V+Adv: log-in, sign-out.

In terms of the orthography of English compounds, Amer and Menacere (2013) note that they can be classified into three types with regard to the way in which they are written:

1) Solid or closed compounds in which two commonly fairly short terms appear together as a single unit; for example, laptop, touchpad, software, and background.
2) Hyphenated compounds where two words or more are linked by a hyphen; for example, read-only memory, full-screen, plug-in, and log-off.
3) Open or spaced compounds which consist of newer combinations of commonly longer terms; for example, personal computer, floppy disk, and flash memory.

It should be pointed out that certain compounds can be written in more than way; for example, ‘toolbox, tool-box, and tool box’, which can be written in all three ways. Hence, there is a great degree of inconsistency, even among linguists themselves, in the orthographic representation of compounds (Al-Kharabsheh, 2003, p. 72).

2.5.3.2 Compounding in Arabic

Compounding did not aid the process of lexical expansion in the historical period of the Arabic language; however, it has received great interest among Arab linguists in modern times (Abderrahman, 1981, pp. 93-94). In contrast to English, compounding is not an efficient word formation mechanism in Arabic (Kharma and Hjjaj, 1997, p. 50). In Modern Arabic linguistics, the originality of *tarkīb* and its applicability to Modern Standard Arabic is much debated (Redouane, 2001, p. 22). Redouane notes that some scholars regard it as an undependable word formation mechanism in

Arabic, and consider it to be a marginal feature of the Arabic language as they believe Arabic is essentially a derivational language.

In contrast, others strongly advocate the use of *tarkīb* as a means of expanding Arabic vocabulary to meet modern needs (Redouane, 2001, p. 22). Al-Husari maintains that it is necessary to resort to *tarkīb* to coin new words and concepts in technology and science since the derivational system of Arabic is bound to a limited number of paradigms and patterns, and since it lacks the ability to develop, on its own, the new terminology that is required to express the ever-broadening area of human thought (cited in Redouane, 2001, pp. 22-23).

Redouane also comments that *tarkīb* has proven to be a general word formation mechanism in the current usage of Arabic as it has been useful in areas other than merely science and technology (p. 23). Among the various number of compound constructions found in the modern usage of Arabic are the two general compound constructions, i.e. the *ʾiḍāfa* construction (genitive structure) and the *naʿt* construction (adjective structure). A general discussion of these forms and other compounding forms related to this study is provided below.

2.5.3.2.1 *ʾIḍāfa* (Genitive Structure)

ʾIḍāfa is a common grammatical feature in Arabic and a very common compounding form in the language. In addition, *ʾiḍāfa* can be considered as one of the most significant tools for Arabic compounding as it has, to a large extent, a similar structure to English compounding (Al-Kharabsheh, 2003, p. 134). The *ʾiḍāfa* structure is a perfect vehicle for compounds because it has a structure that is indigenous to Arabic, and because of the semantic and syntactic features that it exhibits (Emery, 1988). Emery also states that *ʾiḍāfa* is mainly a structure in which a couple of nouns or nominals are joined together in a head/modifier relation. He notes that there is a strong link between the *muḍāf* (head) and the *muḍāf ʾilayhi* (modifier), which are the two terms in the *ʾiḍāfa*. According to Ryding (2005, p. 205), in *ʾiḍāfa*, "two nouns may be linked together in a relationship where the second noun determines the first by identifying, limiting, or defining it, and thus the two nouns function as one phrase or syntactic unit".

The Arabic term *ʾiḍāfa* means 'addition', 'attachment', or 'annexation'. According to Abu-Chacra (2007, p. 61), this annexation happens when two nouns (or an adjective and a noun) are joined together and directly follow each other. It is similar to an attributive or genitive construction, in which the first noun (or adjective) is the head component and the second noun is the attribute. In the *ʾiḍāfa* construction, the first noun (or adjective) is called *al-muḍāf*, meaning 'attached' or 'annexed', and the second noun is called *al-muḍāf ʾilay-hi*, meaning 'attacher' or 'annexer'.

Abdur-Rasheed (2008, p. 92) and Abu-Chacra (2007, p. 64) classified *ʾiḍāfa* into two variants. The first is *maʿnawiyya* (related to the meaning), which is also referred to as *al-ʾiḍāfa al-ḥaqīqiyya* (genuine annexation). It is a fact that the *muḍāf* is not an adjective attached to a word it governs. The *ʾiḍāfa* occurs in the meaning of the preposition *al-lām* (of), as in: *ḥāsib* Ahmad (the computer <u>of</u> Ahmad), or in the meaning of the preposition *min* (of), as in: *lawḥat al-mafātīḥ* literally 'the board <u>of</u> keys' (keyboard), or in the meaning of the preposition *fī* (in), as in: *qahwat al-ṣabāḥ* (the morning coffee). The benefit of this *ʾiḍāfa* is to define the *muḍāf*, if it is attached to a definite noun. The benefit is specification, if the *muḍāf* is attached to an indefinite noun, as in *mudīr sharika* (a manager of a company).

The second variant is *lafẓiyya* (literal) and can also be called *al-ʾiḍāfa ghayr al-ḥaqīqiyya* (improper annexation) or adjective *ʾiḍāfa* since an adjective is joined to a definite noun in the genitive case. The noun in that case expresses something with respect or regard to the quality the adjective attains. Moreover, Ryding (2005, pp. 221-222) comments that in the adjective *ʾiḍāfa*, the first term is an adjective which acts as a modifier of a noun, and the second term refers to a specific property of the modified noun; for example, *ḥasan al-khuluq* (well-mannered). Ryding (2005, p. 222) also notes that the adjective *ʾiḍāfa* is relatively frequent in Modern Standard Arabic as it is a construction that can be used to express newly coined, complex modifying terms such as *baʿīd al-madā* (long-range), or *mutaʿadid al-jawānib* (multilateral).

In the *ʾiḍāfa* construction, the first term, the *muḍāf*, is always indefinite and without the nunation since it is in an 'annexed' case, determined by the second term, while the second term, the *muḍāf ʾilayhi*, could be either definite or indefinite, which determines whether the *ʾiḍāfa* construction is definite or indefinite (Al-Kharabsheh, 2003, p. 136; Ryding, 2005, p. 205). Ryding also adds that the second term of the *ʾiḍāfa* construction is always in the genitive case. Examples of definite and indefinite cases of *ʾiḍāfa* are: definite *ʾiḍāfa*, *shāshat al-ʿarḍ* (the display screen) and *muḥarrik al-baḥth* (the search engine); and indefinite *ʾiḍāfa*, *shāshat ʿarḍ* (a display screen) and *muḥarrik baḥth* (a search engine).

It is worth noting that *ʾiḍāfa* is a noun structure that is usually made up of two nouns or more (Al-Kharabsheh, 2003, p. 135). Amer and Menacere (2013) highlight some compound nouns which are complex forms of *ʾiḍāfa* such as N + appositive N + appositive N, e.g. *niẓām tashghīl al-ʾaqrāṣ* (disk operating system).

Al-Kharabsheh (2003, p. 142) points out that not every *ʾiḍāfa* structure is considered to be a compound. He notes that the *ʾiḍāfa* structure should meet two main conditions to qualify as a compound. The first condition is if the constituent elements of the structure together produce an inseparable meaning, i.e. if the elements form a new independent semantic reference that cannot be achieved had the structure been broken down. The second condition is that this new semantic construct must be lexicalised.

In addition to *ʾiḍāfa*, *naʿt* is considered to be another possibility to correspond to English compounds (Al-Kharabsheh, 2003, p. 144). The process of *naʿt* is discussed in the following section.

2.5.3.2.2 *Naʿt* (Adjective Structure)

Naʿt is also a common compounding form in Arabic. *Naʿt* can be considered as another form of Arabic compounding alongside *ʾiḍāfa* which supposedly corresponds to various English compounds (Al-Kharabsheh, 2003, p. 144). Al-Kharabsheh also notes that, syntactically, an adjective structure is basically a noun followed by an adjective(s) or adjective phrase (p. 145).

According to Abu-Chacra (2007, pp. 33-34), an adjective usually comes after the noun it qualifies and agrees with it in case, gender and number apart from when the noun refers to non-humans, specifically animals and inanimate objects. He also comments that the adjective is always indefinite when it serves as a predicate in a nominal sentence (predicative construction), even when the subject is definite; for example, *al-ṭābiʿa sarīʿa* (the printer is fast) and *al-ḥāsib qadīm* (the computer is old).

Abu-Chacra also points out that the adjective agrees with the head noun in terms of definiteness when it serves as a modifier of a noun (attributive construction). In other words, the adjective takes the definite article if the head noun is definite, whereas the adjective is indefinite if the head noun is indefinite; for example, *al-shāsha al-musaṭṭaḥa* (the flat screen) (definite), and *shāsha musaṭṭaḥa* (a flat screen or a screen is flat) (indefinite). As can be seen from the translations of the second sentence, there is no formal difference between the attributive and predicative construction of an adjective when the head noun is in the indefinite case.

Al-Kharabsheh (2003, p. 145) points out that in English, attributive adjectives (or attributive epithets) precede the noun as in ‘hard disk’ and ‘personal computer’, whereas in Arabic, attributive adjectives follow the noun as in *al-ḥawsaba al-saḥābiyya* (cloud computing) and *al-qurṣ al-ṣulb* (hard disk). Al-Kharabsheh (2003, pp. 148-149) also indicates that the adjective unit can be one or more lexical items, a prepositional or adverbial phrase, or a verbal or nominal sentence, as can be seen from the following examples:

1) Lexical adjective (one adjective or more):
    a. one adjective, *māsiḥ marʾī* (visual scanner)
    b. two adjectives, *shāsha musaṭṭaḥa rafīʿa* (thin flat screen)
2) Phrasal adjective (adverbial or prepositional):
    a. adverbial phrasal adjective, *al-ʾttiṣāl bayn al-ḥāsib wal-ṭābiʿa* (computer-printer connection)
    b. prepositional phrasal adjective, *taḥakkum bil-ḥāsib al-ʾālī* (automatic computer control)
3) Sentential adjective (verbal or nominal):
    a. verbal sentential adjective, *ṭābiʿa taʿmal bi al-baṭṭāriyya* (battery-operated printer)
    b. nominal sentential adjective, *dhākira fāʾiqat al-surʿa* (high-speed memory)

Similarly to *ʾiḍāfa*, not every *naʿt* structure is regarded as a compound unless it meets the two conditions discussed earlier for the *ʾiḍāfa* structure (Al-Kharabsheh, 2003, p. 150).

In addition, there can be an interaction of *ʾiḍāfa* and *naʿt* to create hybrid compounds (half *ʾiḍāfa* and half *naʿt*). In this interaction, a single adjective or even a whole adjective structure can follow an *ʾiḍāfa* structure, and this can produce potential compounds if it meets the same conditions used earlier with *ʾiḍāfa* and *naʿt* (Al-Kharabsheh, 2003, p. 151). Examples include when a single adjective follows *ʾiḍāfa*: *taqsīm al-qurṣ al-ṣulb* (hard disk partitioning); and an adjective prepositional or adverbial unit following *ʾiḍāfa*: *zir al-taḥkkum bi-kathāfat al-ṭibāʿa* (print density control knob). It should also be noted that the *ʾiḍāfa* and *naʿt* structures can correspond to various types of compounds in English (Al-Kharabsheh, 2003, p. 151).

Moreover, Redouane (2001, p. 25) notes that there is a prefixed negative particle compound in which the particle is combined with a nominal or adjectival form of another word. Negative particles that can be used in such compounds are *lā* (not, non), and *ghayr*, *ʿadam* (not, off). Examples of these compounds are *lā-silkī* (wireless) and *ghayr mubāshir* (off-line).

2.5.3.3 Compounds and Translation

It can be stated that the structure of Arabic compounding can correspond to various types of English compounds through the Arabic compounding forms of *ʾiḍāfa*, *naʿt*, and the hybrid of *ʾiḍāfa* and *naʿt*. As mentioned earlier, there are various types of English compounds: compound nouns, compound adjectives, and compound verbs. Kharma and Hjjaj (1997, pp. 52-54) examined how these types of compounds are handled in Arabic. They outline a number of strategies that Arabic may apply to render the various types of English compounds.

2.5.3.3.1 Compound Nouns

English compound nouns can be rendered into Arabic in various ways.

1) Several English compound nouns are translated either by nouns that already exist in the Arabic language, such as 'son-in-law' (*ṣihr*) and 'he-goat' (*tays*),

or by one-word nouns (or participles/adjectives acting as nouns) conventionally assumed to be derivatives from the triliteral verb form or one of its derived forms, such as ‘goldsmith’ (*ṣāʾigh*, from the verb *ṣāgha*), and ‘onlooker’ (*mutafarrij*, from the verb *tafarraja*).

2) Some are translated into Arabic by the structure: N+Adj (+Adj) (the regular order in Arabic) as in ‘fall-out’ (*ghubār dharrī*) and ‘the Red Sea’ (*al-baḥr al-ʾaḥmar*).
3) Some are translated by a different syntactic structure from the previous point, e.g. ‘part of speech’ (*qism min aqsām al-kalām*), which back-translates as ‘one part from the parts of speech’.
4) By far, most English compounds are rendered by the Arabic possessive or genitive structure *ʾiḍāfa*, e.g. ‘passer-by’ (*ʿābir sabīl*), ‘day-break’ (*ṭulūʿ an-nahār*), and ‘self-respect’ (*ʾiḥtirām al-dhāt*).

Most types of English compound nouns can be easily rendered into the Arabic possessive since the possessive in both languages can indicate various types of semantic relations between the constituents. Examples are as follows: possessive (John’s hat); description (men’s coats); origin (Shakespeare’s plays); measure (an hour’s wait); subject of act (John’s flight); and object of act (the boy's punishment). Many of these relations are seen to hold between the constituents of English compound nouns. In addition, the names of the days of the week in English also take the form of the Arabic possessive, with ‘day’ (*yawm*) as the first component (regularly regarded as an adverb of time in Arabic). For example, ‘Saturday’ (*yawm al-sabt*) back-translates as ‘the day of sabt’.

2.5.3.3.2 Compound Adjectives

English compound adjectives can also be translated into Arabic in various ways:

1) Single-word adjectives, e.g. ‘trustworthy’ (*mawthūq*) and ‘up-to-date’ (*ḥadīth*).
2) The Adj+Adj type in which the relation is that of co-ordination regularly takes the same form in Arabic, as in ‘bitter-sweet’ (*murr ḥulw*), and in some cases in which the relation is that of qualification, as in ‘dark blue’ (*ʾazraq ghāmiq*).
3) It comes in the form of a simile with ‘as … as’ (*ka*), as does the N+Adj type in which the relation is that of resemblance, as in ‘red-hot’ (*ḥārr kal jamr*), which back-translates as ‘as hot as live coal’, ‘snow-white’ (*ʾabyaḍ kal thalj*) as ‘as white as snow’, and ‘blood-red’ (*ʾaḥmar kal dam*) as ‘as red as blood’.

   Nevertheless, it is to be noted that in the case of the resemblance relation similar expressions are orientated by culture and usually there are many different ones in each language. Therefore, for example, ‘stone-cold’ would hardly ever be used by Arabs who are used to their own expression ‘ice-cold’ or more accurately, ‘as cold as ice’ (*bārid kal thalj*) or ‘colder than ice’ (*ʾabrad min al-thalj*).
4) The majority of the other relations in the types N+Adj or Adj+Adj are frequently translated by an Arabic syntactic structure, regularly employing a preposition, as in ‘sea-sick’ (*muṣāb bi duwār il baḥr*), which back-translates as ‘afflicted with sickness of the sea’, and ‘bloodthirsty’ (*mutaʿaṭṭish li-d dimāʾ*) as ‘thirsty for blood’.
5) The majority of the Adv+Adj compound adjectives are regularly translated in Arabic either by means of the possessive, as in ‘evergreen’ (*dāʾim ul-khuḍra*), which back-translates as ‘permanent of greenness’, and ‘over-

ripe' (*zāʾid ul-nuḍj*) as 'excessive of ripeness'; or with the assistance of an intensifier, as in 'all-important' (*muhim jiddan*), which back-translates as 'very important'.

2.5.3.3.3 Compound Verbs

The Adj+V type (the verb not being a participle) is very uncommon and strange for Arabs. It does not exist in Arabic, and its meaning is normally expressed by a verb, basic or derived, as in 'uphold' (*sanada*) (support: basic) and 'undergo' (*taḥammala*) (suffer: derived). The compounds in which the verb comes in the form of the past or present participle are regularly treated as compound adjectives in Arabic (as well as in English) and are formed in the same ways as illustrated in the compound adjectives section above.

The self pronoun is one more type of compound that should be mentioned here. This type of compound is very similar to its Arabic counterpart; even the relation between the two is the same (i.e. the possessive relation), as in 'myself' (*dhātī* or *nafsī*), 'yourself' (*dhātuk* or *nafsuk*), and 'ourselves' (*dhawātunā* or *anfusunā*). These are used as reflexives and for emphasis in both languages. The examples used above in the translation of compounds are taken from Kharma and Hjjaj (1997, pp. 52-54).

Overall, the mechanism of *tarkīb* is commonly used in technical and computing terminology creation in Arabic. Examples of computing terminology produced by this mechanism are seen in Table 2.10.

Table 2.10: Arabic Computing Compounds

English	Arabic
login	*tasjīl dukhūl*
firewall	*ḥājiz ḥimāya*
laptop	*ḥāsūb maḥmūl*
hard disk	*qurṣ ṣulb*
touchpad	*lawḥat lams*

2.5.4 Blending *(Naḥt)*

Blending is a common word formation mechanism in many languages. However, *naḥt* is not very common in Arabic as it is not a productive word formation mechanism. *Naḥt* is derived from the triliteral root [n-ḥ-t], which literally means 'to carve' or 'to chisel' in a hard material like stone or wood. This term was used by the early Arab philologists as a morphological term to refer to the creation of one word from two words or more through joining one consonant or more from each of the 'donor' words (El-Khafaifi, 1985, p. 114). According to Al-Kharabsheh (2003, p. 158), "*Naḥt* involves the creation of a word out of two or more words expressing an aggregate and condensed meaning. The resultant product is normally high semantically-loaded and thus *Naḥt* is deemed to be a form of abbreviation".

A blend word can be called *manḥūt*, which is derived from the word *naḥt*. For example, the mixed genre between 'theatre' (*masraḥ*) and 'novel' (*riwāya*) may be termed as *al-masriwāya* (Al-Kharabsheh, 2003, p. 158). Among the old advocates of the principle of *naḥt*, the most often mentioned by modern philologists is Aḥmad Ibn Fāris[20] (d. 1004), author of the *Al-Ṣāḥibī*. In Modern Arabic philology, among the linguistic issues, the principle of *naḥt* has earned the most attention. However, the acceptance of *naḥt* is not unanimous among modern Arab philologists (Stetkevych,

[20] Ibn Fāris, Abu ʾl-Ḥusayn Aḥmad b. Fāris b. Zakariyyā b. Muḥammad. b. Ḥabīb al-Shāfiʿī, later (in Rayy) al-Mālikī, al-Lughawī. He was an Arab philologist. He studied in Baghdād, and in Mecca when making the pilgrimage. His major work is the book *al-Ṣāḥibī*. He died in Rayy in 1004 (Fleisch, 2010).

1970, pp. 48-49), with some supporting it while others oppose it. Moreover, it can be stated that ‘blending’ is not a competent word formation mechanism in Arabic, especially in comparison with English, for example. Arabic can be considered a blending resistant language.

There are four recognised categories of *naḥt* in Arabic according to *al-Maghribī* (1908 pp. 21-24). These are: *An-Naḥt al-Fiʿlī* (verbal *naḥt)*; *An-Naḥt al-Waṣfī* (adjectival *naḥt*); *An-Naḥt al-ʾIsmī* (nominal *naḥt*); and *An-Naḥt an-Nisbī* (relational *naḥt). An-Naḥt al-Fiʿlī* involves the formation of a verb, regularly consisting of more than three radicals from components taken from words in a short sentence or a phrase; for example, *sabḥala* ‘(to say) *subḥāna Allah*’ (Glory to God). *An-Naḥt al-Waṣfī* involves merging two words with commonly similar connotations to form an adjective expressing a combination of the two ideas; for example, *ṣahṣaliq* (strong voiced) is created from *ṣahala* (to whinny) and *ṣalaqa* (to shout loudly). *An-Naḥt al-ʾIsmī* is the creation of a noun from two words of a related nature; for example, *julmūd* (a large rock) is created from *jaluda* (to become hard or strong) and *jamuda* (to congeal or solidify). *An-Naḥt an-Nisbī* indicates the relationship of somebody or something to a tribe, place, school of thought, etc.; for example, *ʿabshamī* (someone who is affiliated to the tribe *ʿabd shams*) is created from *ʿabd* (a servant) and *shams* (sun), and the letter [ī] was added at the end of the word to give the meaning ‘belongs to the tribe’.

However, it can be argued that the mechanism of *naḥt* is almost never used in computing terminology creation in Arabic as it can be considered to be a blending resistant language.

2.6 Summary

Lexical borrowing is a common process in many languages as it is used to enrich, develop, and satisfy the needs for new vocabulary, and it can be more flexible in terminology creation than other word formation mechanisms. In this chapter, five hierarchies and scales of borrowability of linguistic elements were discussed. Each of the scales of borrowability agree that nouns are the class of content items which are borrowed with the highest frequency by languages, but the positions of verbs and adjectives in these scales are not stable (Rendón, 2008, p. 66).

The process of borrowing foreign vocabulary into the Arabic language is called *taʿrīb*. This chapter demonstrated reasons for the commencement of the process of *taʿrīb* in pre-Islamic times, and noted that Arabic is more open to borrowing from other languages in modern times, especially in terms of scientific and technical terminology. It provided an illustration of the importance of the mechanism of *taʿrīb* in scientific and technical terminology creation in modern times, together with an illustration of its limitations and the debates associated with its use in classical and modern times.

Moreover, this chapter discussed some of the main factors leading to the use of *taʿrīb*, including the need for equivalents of foreign nouns, the simplicity of the loanwords, modernization and lack of terminology, social prestige, the attractiveness of loanwords, and euphemism. The chapter presented the methods used for *taʿrīb* in classical and modern times, together with demonstrating identifying features of loanwords. It also presented conditions for the process of *taʿrīb*, as well as its constraints and the obstacles it faces.

This chapter presented a chronological discussion of the history of lexical borrowing in Arabic, which was divided into two main periods, i.e. the Classical

Period (until the 19th century) and the Modern Period. The Classical Period included three parts, i.e. the pre-Islamic era, lexical borrowing in the Qur'an, and the first Translation Movement (9th-11th centuries). The modern period included two main periods, the 19th century, and the 20th century until the present time.

The chapter also discussed the rapid evolution of the Arabic language from the 20th century onwards. It presented the benefits of the establishment of language academies in the Arab world and provided a general background to six major Arabic language academies, discussing the extent to which the language academies have applied the mechanism of *taʿrīb*.

The chapter provided a background to the main word formation mechanisms in Arabic, i.e. *taʿrīb* (lexical borrowing), *ishtiqāq* (derivation), *majāz* (semantic extension), *tarkīb* (compounding) and *naḥt* (blending). It commented on the use and importance of these mechanisms in terms of technical and computing terminology creation in Arabic. It was concluded that *ishtiqāq*, *majāz*, *taʿrīb* and *tarkīb* are of major importance to Arabic as they have helped in its development throughout history. However, this does not apply to *naḥt*, which is rarely used in the language.

In the next chapter, there is a discussion of the methodology used in this study.

Chapter Three: Methodology

3.1 Introduction

This chapter contains general information on the sources of the data used. It also explains the reasons behind the selection of the corpora/sub-corpora used and gives a general description of them. Furthermore, this chapter demonstrates the criteria used in the data collection and analysis. Finally, it provides an overview of the process of analysing the data, and gives information on how the results and the findings of the study will be presented.

It can be suggested that the corpus methodology has become a significant tool in linguistic investigations. A corpus-based study can depend on different corpora. For example, the corpora can be specialised websites such as the British National Corpus, or books, newspapers, magazines and dictionaries, etc. The present study is a corpus-based study used to analyse Arabic computing terminology. This type of study is the most suitable to deal with terminology obtained from various corpora.

Using corpora allows various types of comparisons to be made between particular variables (mechanisms and categories). Moreover, corpora provide a large collection of specialised terms which makes it quick and easy to obtain a large amount of data. However, the quality of data may differ depending on the corpora used as some corpora can be more professional and specialised than others.

There are various useful frameworks to study the process of lexical borrowing. Araj’s (1993) framework mainly focused on the qualitative part of the borrowing process. It was a corpus-based study that compiled a descriptive list of loanwords, loan translations, and other forms of borrowings. The focus was on analysing the borrowing process with its phonological, morphological, and etymological background, and to account for the degree of foreign borrowings (frequency) in the corpus. The loanwords were classified according to their semantic categories, and borrowings were listed within these categories and their frequency of occurrence was determined. Similarly, Sa'id’s study (1967) on lexical borrowing in Arabic concentrated on the phonological and grammatical integration of loan forms into Arabic.

While these approaches are generally helpful, they do not offer the appropriate quantitative framework to measure the extent of use of the four Arabic word formation mechanisms of *taʿrīb* (lexical borrowing), *ishtiqāq* (derivation), *majāz* (semantic extension) and *tarkīb* (compounding) in computing terminology creation. This can be achieved through a comparative analysis of the percentage of terms produced by the mechanisms in the corpora.

This study examines the Arabic word formation mechanisms involved in computing terminology creation using data from three corpora: two dictionary corpora and one magazine corpus. These corpora are based on specialised Arabic computer dictionaries and magazines as a result of the wide range of terms they contain on various computer-related subjects. However, the study does not contain corpora which are not considered as reliable computer terminology sources such as computer websites and manuals.

3.2 Choice of the Corpora

The three corpora in this study were chosen due to the Arabic computer-related terminology used in them. The first corpus is produced by an official authority of the language as represented by the Arabic Language Academy of Cairo. This corpus contains data from an English-Arabic computer dictionary produced by the Cairo

Academy in 2012. This academy has succeeded in utilising the mechanism of *taʿrīb* to aid the development of the language. In addition, it is a source of outstanding publications on scientific and technical terminology. Moreover, almost none of the other Arabic language academies have produced any significant publications available on Arabic computing terminology. Therefore, the Arabic Language Academy of Cairo was deemed to be the best choice to use as an official authority of the language.

The second and third corpora can be considered to be unofficial sources of the Arabic language for the purposes of this study. The second corpus contains data from two English-Arabic computer dictionaries produced by lexicographers specialising in computing terminology. These dictionaries were selected due to their specialism in Arabic computing terminology.

The third corpus contains data from three different Arabic magazines specialising in computer technology. These three magazines represent three different Arab countries: Egypt, Syria and Saudi Arabia. The twelve most recent issues were selected from each magazine. As the Saudi magazine publishes four to five issues a year, the selected issues cover the period from 2008 until 2011. The selected issues of the Syrian magazine cover the year 2011 as the magazine is issued on a monthly basis. The selected issues of the Egyptian magazine cover the period from September 2010 until February 2011. As this magazine is issued on a weekly basis, only two issues were selected from each month in order for the corpus to cover a longer period of time.

The magazines in this study were selected from these three countries as they are big consumers of technology within the Arab world. Choosing magazines from various Arab countries enables the study to cover a wider range of terms as it can illustrate the differences between countries in terms of borrowing computing terminology. Furthermore, in practical terms, other countries did not have accessible data specializing in the subject of study. The magazines were also selected because of their popularity and their broad readership within the Arab world. Moreover, they are the best magazines available, in terms of their coverage of computer technology, their presentation and their language proficiency. This is evident from the various areas they cover, including hardware, software, networks and communications. Moreover, they are properly organized in terms of the topics they cover and the use of images to facilitate the understanding of new technology. They are also written by professionals, and are properly revised and edited to attain language proficiency. This enables the magazines to attract a wider audience.

The target readership is an audience who have some background in computer technology, and those who rely on technology usage. The magazines were also selected as a result of their good availability to the public in comparison with other sources of computing terminology, and their use of simple and popular terminology. They are also issued frequently to cover new areas of technology.

However, the magazines are repetitive in terms of the topics and computing terminology they include. The magazines are not issued at the same frequency: one is issued weekly, one monthly, and the other four to five times a year. Two of the magazines are published and the other is only issued electronically.

3.3 Description of the Data

The data from specialised dictionaries and magazines from Arab countries on Arabic computing terminology was collected in the period between 2011 and 2013.

The first corpus comprises a computer dictionary produced by the Arabic Language Academy of Cairo:

- *Muʿjam al-Ḥāsibāt (Dictionary of Computers) English-Arabic* (2012). 4th ed., Cairo: The Academy of Arabic Language, 590 pp. (http://www.arabicacademy.org.eg/FrontEnd/PrintDetails.aspx?PKPrintingTypeID=25, accessed on 16-02-2013).

The second corpus contains two computer dictionaries:

- Al-Kilani, T. (2004). *The Al-Kilani Dictionary of Computer and Internet Terminology English-English-Arabic*. Beirut: Librairie du Liban Publishers, 868 pp.
- Mahmoud, M. (2010). *Dictionary of Computer and Internet English-Arabic*. Cairo: al-Dār al-Maṣriyyah lil-Kitāb, 318 pp.

The third corpus contains three computer magazines:

- *Majallat Sūq al-ʿAṣr (ICT Market Magazine)* (2010-2011). Sussex: Specialized Arbic Co (SAPC) Limited, 225 pp. (http://www.sokelasrmagazine.com/Issue/index.1.html and http://issuu.com/search?q=%D8%B3%D9%88%D9%82%20%D8%A7%D9%84%D8%B9%D8%B5%D8%B1, accessed on 01-01-2012).

  This is a weekly Egyptian magazine. The details of the selected issues can be seen in Table 3.1 and form a total of 225 pages.

Table 3.1: Details of the Issues of *Majallat Sūq al-ʿAṣr*

Issue Date	Sep 2010		Oct 2010		Nov 2010		Dec 2010		Jan 2011		Feb 2011	
Issue No.	92	93	96	97	101	102	105	106	109	110	113	114
No. of Pages	15	15	15	17	17	17	27	19	19	23	20	21

- *NetworkSet Magazine* (2011), 485 pp. (http://www.networkset.net/magazine/, accessed on 01-01-2012).

This is a monthly Syrian magazine; the founder of the magazine who is also the editor-in-chief is from Syria. It is an online magazine issued by http://www.networkset.net. The selected issues are the complete issues from 2011 and form a total of 485 pages (see Table 3.2).

Table 3.2: Details of the Issues of NetworkSet Magazine

Issue Date: 2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Issue No.	10	11	12	13	14	15	16	17	18	19	20	21
No. of Pages	35	31	39	29	33	38	48	48	45	50	46	43

- *Majallat Wāḥat al-Ḥāsib* (2008-2011). Riyadh: Nādī al-Ḥāsib alʾĀlī, 692 pp.

This is a Saudi-published magazine. It publishes issues four to five times a year. The selected issues cover the period from 2008 until 2011[21] and form a total of 692 pages (see Table 3.3).

Table 3.3: Details of the Issues of *Majallat Wāḥat al-Ḥāsib*

Issue Date	2008		2009				2010					2011
Issue No.	56	57	58	59	60	61	62	63	64	65	66	67
No. of Pages	58	56	56	58	58	58	58	58	58	58	58	58

3.4 Data Collection and Analysis

All of the computing terminology in all three corpora were identified and listed in tables. In order to identify the terms in the corpora, I went through both the dictionaries and magazines page by page, line by line, and entry by entry, in order to find all of the Arabic computing terminology available in them. The extracted computing terminology in the study is mainly related to hardware, software and units

[21] The dates of the issues were converted from the Lunar calendar to the Gregorian calendar in order to ensure consistency. The dates of the issues on the Lunar calendar range from 1429 AH until 1432 AH.

of measurement. I classified the computing terminology into the four Arabic word formation mechanisms: *taʿrīb*, *ishtiqāq*, *majāz* and *tarkīb*. I also classified the computing terminology into the three terminological categories of hardware, software and units of measurement in order to demonstrate the number of terms produced by each mechanism within each category and to discuss the mechanisms in more detail.

In terms of the rationale behind the choice of script, I allowed three major word classes: nouns, adjectives and verbs. However, I disregarded proper nouns, trade names, and the like. Moreover, I disregarded irrelevant or non-computing terms such as *khaliyya* (cell) and *ḥarf* (character) because they are not computing terms.

In relation to the terms produced through *taʿrīb*, I allowed loanwords as well as loan acronyms to be added to the corpora. I did not categorize terms that can be considered calques (loan translations) under the mechanism of *taʿrīb*; however, I categorized them under the relevant mechanisms of *ishtiqāq*, *majāz* and *tarkīb*. Semantic borrowing (the transfer of the meaning without the transfer of the word) was not the focus of this study, which dealt strictly with lexical borrowing (which must involve the transfer of forms together with the meanings). This was done in order to compare the mechanism producing loanwords with the mechanisms producing native Arabic terms, and to avoid confusing calques with terms produced by the other mechanisms. For example, I classified the term *mutaṣaffiḥ* (browser) as a case of *ishtiqāq*, the term *muʿālij* (processor) as a case of *majāz*, and the compound of *ʾiḍāfa*, *muʿālajat al-bayānāt* (data processing) as a case of *tarkīb*; these terms can also be considered as calques.

In contrast, I allowed Arabic compounds such as the *ʾiḍāfa* construction *kalimat al-murūr* (password) to be added to the corpora. Each Arabic compound is counted as one entry in the study. However, I disregarded Arabized compounds or phrases, but allowed their individual components if relevant. The rationale behind this was to ensure that the terms were accurately classified under the four Arabic word formation mechanisms. For example, I disregarded the Arabized compound *barmaja daynāmiyya* (dynamic programming), but allowed its individual components which are: the loanwords *barmaja* (programming) and *daynāmiyya* (dynamic).

Moreover, in order to accurately classify the terms according to the specified mechanisms and categories, I disregarded 'hybrid compounds or phrases' (half native Arabic/half borrowings), but allowed their individual components if relevant. For example, I disregarded the hybrid compound *barāmij al-ḥāsūb* (computer programs) but allowed its individual components: the loanword *barāmij* (programs) and the native Arabic term *al-ḥāsūb* (computer).

In addition, I allowed compounds borrowed from English into Arabic such as the compound 'laptop' whether they are borrowed as two units and spelt with a space between them as in *lāb tūb*, or borrowed as a single unit and spelt without a space as in *lābtūb*. Each of these cases is counted as a single entry since the meaning of such compounds normally refers to one single thing and separating these compounds into two individual units will not deliver the same meaning and can mean that they are considered as non-computing terms; this is evident in the two individual units in the example above. In view of this, the individual units can be disregarded from the study due to their irrelevance.

The total number of entries in the dictionaries in the corpora, and the number of entries and terms extracted from the dictionaries and magazines will now be illustrated. Only 250 entries were extracted from the total number of 3,171 entries in *Muʿjam al-Ḥāsibāt* (the Cairo Academy Dictionary), while only 212 entries were taken from almost 12,000 entries in Mahmoud's Dictionary, and 206 entries were extracted from over 25,000 entries in the Al-Kilani Dictionary. It is clear that a relatively small number of computing terminology entries were extracted from these specialised computer dictionaries that are relevant to the study. This is because many terms were irrelevant or were non-computing terms, proper nouns, trade names, and the like. However, I listed all relevant computing terms and counted their frequencies. Furthermore, the computer magazines also contained a relatively small number of computing terminology for similar reasons. The numbers of computing terms extracted from *Majallat Sūq al-ʿAṣr*, *NetworkSet* magazine and *Majallat Wāḥat al-Ḥāsib* were 172, 243, and 307 terms, respectively, despite the large number of pages (225, 485, and 692 pages, respectively). I listed all relevant computing terms and counted their frequencies.

As mentioned earlier, there are three corpora containing six sub-corpora. This resulted in the construction of six tables, one table for each sub-corpus containing the relevant computing terminology. The tables of the first two corpora contain seven columns, while the tables of the third corpus contain an additional column giving a total of eight columns. The first column contains a list of the English terms, while the second column contains a list of their Arabic equivalents. The third column contains the number of repetitions (tokens) of each term. The fourth, fifth, sixth and seventh columns represent the four Arabic word formation mechanisms *taʿrīb*, *ishtiqāq*, *majāz* and *tarkīb*, respectively. A cross (X) is used to identify under which column each term falls. The eighth column in the magazine tables represents the Latin script terms. An asterisk (*) is used to identify the computing terms appearing in the magazines in Latin script only, while two asterisks (**) are used to identify the computing terms appearing in both Arabic and Latin scripts. These tables are available in Appendix A.

Moreover, the terms in the tables are classified into the three categories: hardware, software and units of measurement. The listed terms in each category are arranged in Arabic alphabetical order unless they are English terms listed on their own, in which case they are arranged according to the English alphabetical order. All of the tables place the plural terms after their corresponding singular terms where available. Terms in the Arabic list which share the same English equivalent are grouped together, whether they are Arabic sound or broken plural, whether they are native Arabic words, loanwords or both, or whether they are loanwords with variant spellings. Moreover, English terms which share the same Arabic equivalent are grouped together in the English list. I translated the Arabic terms identified from the magazines to English and listed them against their counterparts in the tables. Arabic loanwords which were imported into Arabic from languages other than English before they were used as technical computing words are marked with two letter language codes to demonstrate their etymology.

At the end of each table, there is a calculation of the total number of computing words in the sub-corpus, along with the number of words and the percentage totals of each mechanism. In addition, as the words classified under *taʿrīb* are either loanwords or loan acronyms, the total number of terms for both are calculated separately along with their percentages. Moreover, there is a calculation of the total number of terms in the three categories of hardware, software and units of measurement for each mechanism and for the mechanisms as a whole, along with their percentages. Also, in the magazine tables, there is a calculation of the number of computing terms appearing in Latin script only, and the computing terms appearing in both Arabic and Latin scripts in each magazine sub-corpus.

These results are described, compared and discussed in the study. This is done in order to achieve the following points:

- To compare and discuss the percentage totals of computing terms produced by the mechanisms within each and all the sub-corpora.
- To compare and discuss the percentage totals of computing loanwords and loan acronyms in and among the sub-corpora, and to demonstrate the influence of acronym borrowing as a mechanism of *taʿrīb*.
- To demonstrate the percentage totals of computing terms in the three categories within the sub-corpora.
- To compare the percentage totals of computing terms produced by the four mechanisms that use Latin script in the magazine sub-corpora.

Overall, the results from these comparisons demonstrate which variables are more prevalent in the data, and form the basis for discussing the trends that can be observed.

It must be noted that some percentage totals in this study may not add up to 100% because of rounding. As a result of the large number of variable comparisons, rounding to the nearest percent was used in order to obtain values that are easier to present and discuss, as well as to avoid misinterpreting the results.

Every Arabic computing term analysed in the study underwent a process of classification in order to determine under which Arabic word formation mechanism it falls. A term is determined to be a case of *ishtiqāq* when it is derived from a root of a native Arabic word. For example, the term *ḥāsūb* (computer) is derived from the Arabic root [ḥ-s-b]. A term is determined to be a case of *majāz* when it is semantically extended (used to give a new meaning to an old native Arabic term). For example, the term *māsiḥah* used to refer to a wiper, whereas its current concept in computing refers to a scanner. A term is determined to be a case of *taʿrīb* (lexical borrowing) when it is borrowed from a foreign language into the Arabic language. For example, the term *rāwtar* (router) was borrowed from English into Arabic. An Arabic compound is determined to be as a case of *tarkīb*. For example, the Arabic compound of *ʾiḍāfa*, *lawḥat lams,* corresponds to the English compound, 'touchpad'.

Some terms (mostly adjective loanwords) were not easy to classify; therefore, they were classified on the basis of the context in which they are regularly used. For instance, if they regularly appear with words denoting hardware, I placed them in the hardware category, and if they regularly appear with words denoting software, I put them in the software category. Thus, for example, in the hybrid *ʾibṭāʾ ʾūtūmātī* (automatic fallback), the loanword *ʾūtūmātī* (automatic) comes with a word denoting software in the native Arabic word *ʾibṭāʾ* (fallback), which led to classifying the loanword *ʾūtūmātī* in the software category.

The way in which the six tables are organised allows easy access to the desired terms. It also makes the discussion of each group of words more efficient. In addition, it presents the results of the analysed data clearly. This organisation also allows a proper discussion of the results of each mechanism and the extent of its usage in computing terminology creation. Moreover, it facilitates the process of comparing the results of the mechanisms within and across the corpora/sub-corpora. In addition, it allows a proper discussion of the results of the three categories with reference to the mechanisms.

3.5 Results

A table was constructed to display the overall results of the analysed data. This table is termed the 'Overview Table' and demonstrates the results from the corpora/sub-corpora in general, in terms of the four Arabic word formation mechanisms of *taʿrīb*, *ishtiqāq*, *majāz* and *tarkīb*, and the three categories of hardware, software and units of measurement.

The Overview Table displays the results of the corpora/sub-corpora in general, in terms of the four Arabic word formation mechanisms, and the three categories. The table highlights the number of terms in each corpus/sub-corpus, and the total number of terms in the corpora/sub-corpora as a whole. Also, it displays the average number of terms in each corpus, and the total average number of terms in the corpora. It provides the number of terms produced by each mechanism in each sub-corpus along with the percentage totals, and the total for the sub-corpora as a whole. Moreover, the table presents the average number of terms produced by each mechanism in each corpus along with the percentage totals, and the total for the corpora as a whole. It displays the number of terms produced by each mechanism within each category in each sub-corpus, and the total for the sub-corpora as a whole, along with the percentage totals. Also, the table presents the average number of terms produced by each mechanism within each category in each corpus, along with the percentage totals, and the total for the corpora as a whole. It shows the total number of terms within each category in each sub-corpus along with the percentage totals, and the total for the sub-corpora as a whole. Finally, it presents the average number of terms within each category in each corpus along with the percentage totals, and the total for the corpora as a whole.

In order to make corpora-related comparisons, I used the average number of terms instead of the total number in order to ensure accuracy and balance in comparing the results of the three corpora, which contain different numbers of sub-corpora as mentioned earlier.

The Overview Table is used to describe, compare and discuss the results of the computing terminology in the corpora/sub-corpora in general, and in terms of the total number of terms produced by the mechanisms and within the categories. This is done to achieve the following points:

- To compare and discuss the number of computing terms in and among the corpora/sub-corpora. This is used to assess the competence of the selected computer dictionaries in terms of computing terminology creation.
- To compare and discuss the extent of usage of the four mechanisms in terms of computing terminology creation in order to demonstrate which mechanisms are more commonly applied in this field, and to assess the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in the Arabic language.
- To compare and discuss the percentage totals of computing terms produced by the mechanisms among the corpora/sub-corpora, and within each and all the corpora.
- To compare the percentage totals of computing terms in the three categories within and among the corpora/sub-corpora.
- To compare the percentage totals of computing terms in the three categories within the mechanisms within the sub-corpora and among the corpora/sub-corpora.

- To compare the percentage totals of the three categories in terms of the computing terminology they comprise.
- To compare and discuss the percentage totals of computing terms of the three categories within each and all the mechanisms.

Overall, the results from these comparisons demonstrate which variables are more prevalent in the data, and form the basis for discussing the trends that can be observed.

The description and comparison of all the results of the tables are listed from most to least frequent whenever comparisons are conducted. Based on the percentage totals of the number of terms in the sub-corpora and the percentage totals of the average number of terms in the corpora, the mechanisms are listed from most to least frequent; the same is the case for the category data.

As mentioned previously, the extent of usage of the four Arabic word formation mechanisms in terms of computing terminology creation, and the impact and importance of *taʿrīb* as a computing terminology creation mechanism in the Arabic language are discussed. In addition, the various aspects of the mechanism of *taʿrīb* which apply to the computing terminology are analysed. This involves a discussion of loanword etymology in order to demonstrate the main languages from which Arabic borrows computing terminology. It also involves a discussion of which word classes are more common in Arabic computing loanwords in general, and in terms of the sub-corpora and the three categories. In addition, the discussion demonstrates the percentage totals of naturalized loanwords and inflectionally-active loanwords among the Arabic computing loanwords, and in terms of the sub-corpora and within the three categories. This is done to demonstrate the tendencies of the naturalized and inflectionally-active loanwords in Arabic computing terminology.

Moreover, there is a discussion of variant loanword spellings. This is done in order to demonstrate cases and reasons for using variant loanword spellings in the study, to discuss the effects of using variant loanword spellings, to compare and discuss the results of the variant loanword spellings among and within the sub-corpora, and to demonstrate which sub-corpora are more subject to variant loanword spellings. There is also an analysis of the Arabic treatment of English phonemes with regard to the computing loanwords in the study, in order to demonstrate the differences between the languages used. Furthermore, there is a discussion of the differences between using proper Arabic loanword pronunciations and spellings and those used by colloquial varieties of Arabic. This is done to show the effect of colloquial varieties of Arabic on Arabic loanword pronunciations and spellings. A recommended usage for loanword spellings is also presented in accordance with an official source of the Arabic language, the Cairo Academy dictionary. This is done as a guide for the production of unified loanword spellings for single donor words instead of variant loanword spellings being produced.

In terms of the mechanism of *ishtiqāq*, there is a discussion of the Arabic 'morphological patterns' (*ʾawzān*) of the derived computing words in the study. This is done to demonstrate the Arabic patterns used in the sub-corpora for the derived words, and the number of derived words in which Arabic patterns are applicable. Moreover, it highlights frequency data on the number of Arabic patterns applied to the derived words in general and with regard to the categories of hardware and software.

In terms of the mechanism of *tarkīb*, there is a discussion of the four Arabic compounding forms of the Arabic computing compounds in the study. The results of the four forms are compared and discussed in terms of each sub-corpus and the sub-corpora as a whole, in order to demonstrate which compounding forms are more commonly used for creating Arabic computing compounds, and to discuss the trends that can be observed.

There is a discussion of the terms appearing in the study either in Latin script only, or in both Arabic and Latin scripts. This includes a comparison of the terms appearing in both Arabic and Latin scripts in relation to the four Arabic word formation mechanisms, in order to demonstrate which mechanisms are more subject to using this type of terms. This is also done to demonstrate possible reasons for the occurrence of these terms.

There is a discussion of the Arabic plural forms of the computing terminology. This includes the results of the two Arabic plural forms (sound and broken) in the sub-corpora terms, with regard to the four Arabic word formation mechanisms, in order to show which plural form is used more frequently by each mechanism, and in the computing terminology in general.

There is a discussion of *nisba* (relative adjectives) in the computing terminology with regard to the Arabic word formation mechanisms, in order to demonstrate which of these mechanisms are more subject to *nisba*, and its importance to the applicable mechanisms.

There is a presentation of a model for computing terminology translation through the four Arabic word formation mechanisms, based on the guidelines and the computing terminology produced by the Arabic Language Academy of Cairo in the corpus/sub-corpus of *Muʿjam al-Ḥāsibāt*.

In terms of the overlapping computing terminology in the corpora/sub-corpora, two main comparisons are conducted. The first comparison focuses on the frequencies of the overlapping terminology. There is an overview table presenting the results of this comparison. This table presents the number of overlaps in each sub-corpus, the average number of overlaps in each corpus, the number of overlaps for each mechanism, the number of overlaps for each category, and the total number of overlaps for each overlap group, along with the percentage totals of the total number of overlaps.

The second comparison focuses on the overlapping terminology in the corpora/sub-corpora in general. This comparison is classified into two main sections; one is concerned with the overlaps across, between and within the corpora. The other is concerned with the overlaps across and between the sub-corpora. The main results of this comparison are presented in an overview table which contains the percentage totals of the overlapping terminology in the corpora/sub-corpora, mechanisms and categories.

In terms of corpora-related comparisons, I used the average number of overlaps instead of the total number in order to ensure accuracy and balance in comparing the results of the three corpora, which contain different numbers of sub-corpora as mentioned earlier.

The results of the overlapping computing terminology in the study are used to achieve the following points:

- To compare and discuss the number of overlapping terms among the corpora/sub-corpora.
- To compare and discuss the number of overlapping terms among the mechanisms and categories.
- To compare and discuss the number of overlapping terms across and between the corpora in terms of the mechanisms and categories.
- To compare between the number of overlapping terms in the overlap groups.

- To compare the main overlap percentages for the overlap groups in terms of the sub-corpora, mechanisms and categories.

The results and discussion show which variables are more prone to overlaps in these comparisons, and the trends that can be observed are discussed. Moreover, similarities across, between and within the corpora, and across and between the sub-corpora are demonstrated, and the trends observed are discussed. This is also done in order to indicate the level of consultation of the selected dictionaries by the magazines.

In the next chapter, there is a detailed presentation of the analysed data and the results of the study, in order to allow an in-depth discussion of the study findings.

Chapter Four: Data Analysis

4.1 Introduction

This chapter contains a detailed description of the process of data analysis, as well as a detailed description and comparison of the results from the data in the corpora/sub-corpora. It demonstrates the extent of usage of the four Arabic word formation mechanisms in computing terminology creation in the study. The chapter also highlights the usage levels of the three terminological categories used to classify the analysed terms. Furthermore, it draws comparisons among the corpora/sub-corpora in terms of the mechanisms and categories. Moreover, this chapter draws two main comparisons; one is concerned with the frequency of the overlapping terminology in the corpora/sub-corpora, and the overlaps between the mechanisms, categories and the overlap groups in the study; and the other is concerned with all the overlapping terminology across, between and within the corpora, and across and between the sub-corpora. Additionally, it draws comparisons across and between the corpora regarding the overlapping terminology results, according to the mechanisms and categories. It also offers concluding remarks on the study results. Finally, this chapter presents a summary and conclusion of the detailed results discussed in the chapter.

All of the relevant computing terminology in all three corpora were identified and listed in tables which can be found in Appendix A. As discussed in the methodology chapter, there are three corpora containing six sub-corpora. The first corpus/sub-corpus is made up of *Muʿjam al-Ḥāsibāt* (Dictionary of Computers). The second corpus contains the following two sub-corpora: Mahmoud’s Dictionary of Computer and Internet Terms, and The Al-Kilani Dictionary of Computer and Internet Terminology. The third corpus contains the three magazine sub-corpora:

NetworkSet Magazine, *Majallat Sūq al-ʿAṣr*, and *Majallat Wāḥat al-Ḥāsib*. This resulted in six tables being constructed, with one table for each sub-corpus containing the relevant computing terminology. The computing terminology in the tables is classified into the four Arabic word formation mechanisms of *taʿrīb* (lexical borrowing), *ishtiqāq* (derivation), *majāz* (semantic extension) and *tarkīb* (compounding). The terms are also classified into the three terminological categories of hardware, software and units of measurement. In the following section, there is a description and analysis of the computing terminology in each sub-corpus according to the mechanisms and categories.

4.2 Description of the Sub-corpora

4.2.1 Sub-corpora Results

4.2.1.1 *Muʿjam al-Ḥāsibāt* (Dictionary of Computers)

Table 4.1: S1 (*Muʿjam al-Ḥāsibāt*) Results

Mechanism	M1	M2	M3	M4	Total
No. of Terms	146	24	30	50	250
%	58%	10%	12%	20%	100%
No. of Loan Acronym Terms	44				
%	30%				
No. of Loanword Terms	102				
%	70%				
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	46	8	15	23	92
%	32%	33%	50%	46%	37%
No. of CAT2 Terms	75	16	15	27	133
%	51%	67%	50%	54%	53%
No. of CAT3 Terms	25	0	0	0	25
%	17%	0%	0%	0%	10%

S1 contains a total of 250 main entries (terms) extracted from a total of 3,171 entries in the dictionary. The terms are divided according to the four word formation mechanisms that produce them. M1 (*taʿrīb*) accounts for the highest number of terms, with 146 terms (58% of the S1 total). The M1 terms are divided between CAT2 (software), CAT1 (hardware), and CAT3 (units of measurement), which include 75 terms (51%), 46 terms (32%), and 25 terms (17%), respectively. None of the terms produced by any of the other mechanisms are classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 102 M1 terms (70%), while loan acronyms form 44 terms (30%).

M4 (*tarkīb*) accounts for the second highest number of terms, with 50 terms (20% of the S1 total). The M4 terms are divided between CAT2 and CAT1, which include 27 terms (54%) and 23 terms (46%), respectively.

M3 (*majāz*) accounts for the third highest number of terms, with 30 terms (12% of the S1 total). The M3 terms are divided equally between CAT1 and CAT2, which each include 15 terms (accounting for 50% of the M3 total).

M2 (*ishtiqāq*) has the lowest number of terms, with 24 terms (10% of the S1 total). The number of M2 terms are divided between CAT2 and CAT1, which include 16 terms (67%) and 8 terms (33%), respectively.

Regarding the distribution of terms in S1 according to category, CAT2 has the highest number with 133 terms (53%), followed by CAT1 with 92 terms (37%), and finally CAT3 with 25 terms (10%). It can be concluded that M1 is by far the most dominant mechanism in this corpus/sub-corpus, and that CAT2 is the most dominant category.

4.2.1.2 Dictionary of Computer and Internet Terms

Table 4.2: S2 (Dictionary of Computer and Internet Terms) Results

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of Terms	80	40	29	63	212
%	38%	19%	14%	30%	100%
No. of Loan Acronym Terms	3				
%	4%				
No. of Loanword Terms	77				

%	96%				
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	24	12	16	23	75
%	30%	30%	55%	37%	35%
No. of CAT2 Terms	37	28	13	40	118
%	46%	70%	45%	63%	56%
No. of CAT3 Terms	19	0	0	0	19
%	24%	0%	0%	0%	9%

S2 contains a total of 212 main entries (terms) extracted from around 12,000 entries in the dictionary. The terms are divided among the four word formation mechanisms. M1 accounts for the highest number of terms, with 80 terms (38% of the S2 total). The M1 terms are divided between CAT2, CAT1 and CAT3, which include 37 terms (46%), 24 terms (30%), and 19 terms (24%), respectively. None of the terms produced by any of the other mechanisms are classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 77 M1 terms (96%), while loan acronyms form a minority of three terms (4%).

M4 accounts for the second highest number of terms, with 63 terms (30% of the S2 total). The M4 terms are divided between CAT2 and CAT1, which include 40 terms (63%) and 23 terms (37%), respectively.

M2 accounts for the third highest number of terms, with 40 terms (19% of the S2 total). The M2 terms are divided between CAT2 and CAT1, which account for 28 terms (70%) and 12 terms (30%), respectively.

M3 accounts for the lowest number of terms, with 29 terms (14% of the S2 total). The M3 terms are divided between CAT1 and CAT2, which account for 16 terms (55%) and 13 terms (45%), respectively.

Regarding the distribution of terms in S2 according to category, CAT2 has the highest number with 118 terms (56%), followed by CAT1 with 75 terms (35%), and finally CAT3 with 19 terms (9%). It can be concluded that M1 is the most dominant mechanism in this sub-corpus, and that CAT2 is the most dominant category.

4.2.1.3 The Al-Kilani Dictionary of Computer and Internet Terminology

Table 4.3: S3 (The Al-Kilani Dictionary of Computer and Internet Terminology) Results

Mechanism	M1	M2	M3	M4	Total
No. of Terms	64	28	29	85	206
%	31%	14%	14%	41%	100%
No. of Loan Acronym Terms	6				
%	9%				
No. of Loanword Terms	58				
%	91%				
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	17	13	16	34	80
%	27%	46%	55%	40%	39%
No. of CAT2 Terms	29	15	13	51	108
%	45%	54%	45%	60%	52%
No. of CAT3 Terms	18	0	0	0	18
%	28%	0%	0%	0%	9%

S3 contains a total of 206 main entries (terms) extracted from over 25,000 entries in the dictionary. The terms are divided between the four word formation mechanisms. M4 accounts for the highest number of terms, with 85 terms (41% of the S3 total). The M4 terms are divided between CAT2 and CAT1, which include 51 terms (60%) and 34 terms (40%), respectively. There are no occurrences of M4 terms in CAT3.

M1 accounts for the second highest number of terms, with 64 terms (31% of the S3 total). The M1 terms are divided between CAT2, CAT3 and CAT1, which include 29 terms (45%), 18 terms (28%) and 17 terms (27%), respectively. None of the terms produced by any of the other mechanisms can be classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 58 M1 terms (91%), while loan acronyms form a minority of six terms (9%).

M3 has the third highest number of terms, with 29 terms (14% of the S3 total). The M3 terms are divided between CAT1 and CAT2, which include 16 terms (55%) and 13 terms (45%), respectively.

M2 has the lowest number of terms, with 28 terms (14% of the S3 total). The M2 terms are divided between CAT2 and CAT1, which include 15 terms (54%) and 13 terms (46%), respectively.

Regarding the distribution of terms in S3 by category, CAT2 has the highest number with 108 terms (52%), followed by CAT1 with 80 terms (39%), and then CAT3 with 18 terms (9%). It can be concluded that M4 is the most dominant mechanism in this sub-corpus, and that CAT2 is the most dominant category.

4.2.1.4 NetworkSet Magazine

Table 4.4: S4 (NetworkSet Magazine) Results

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of Terms	179	23	23	18	243
%	74%	9%	9%	7%	100%
No. of Loan Acronym Terms	9				
%	5%				
No. of Loanword Terms	170				
%	95%				
No. of Arabic and Latin Scripts Terms	0	2	5	7	14
%	0%	14%	36%	50%	6%
No. of only Latin Script Terms					125
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	54	13	12	4	83
%	30%	57%	52%	22%	34%
No. of CAT2 Terms	102	10	11	14	137
%	57%	43%	48%	78%	56%
No. of CAT3 Terms	23	0	0	0	23
%	13%	0%	0%	0%	9%

S4 contains a total of 243 terms extracted from the magazine. The terms are divided between the four word formation mechanisms. M1 accounts for the highest number of terms, with 179 terms (74% of the S4 total). The M1 terms are divided between CAT2, CAT1 and CAT3, which include 102 terms (57%), 54 terms (30%) and 23 terms (13%), respectively. None of the terms produced by any of the other mechanisms can be classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 170 M1 terms (95%), while loan acronyms form a minority of nine terms (5%).

M2 and M3 share equal place in accounting for the second highest number of terms, each with 23 terms (9% of the S4 total). The M2 terms are divided between CAT1 and CAT2, which include 13 terms (57%) and 10 terms (43%), respectively. The M3 terms are divided between CAT1 and CAT2, which include 12 terms (52%) and 11 terms (48%), respectively.

M4 accounts for the lowest number of terms, with only 18 terms (7% of the S4 total). The M4 terms are divided between CAT2 and CAT1, which include 14 terms (78%) and four terms (22%), respectively.

125 terms appear in Latin script only, while 14 terms appear in both Arabic and Latin scripts, which accounts for (6% of the S4 total). The terms appearing in both scripts are divided between three of the word formation mechanisms. M4 accounts for the highest number with seven terms (50%), followed by M3 with five terms (36%), and M2 with two terms (14%), whereas there are no occurrences of M1 terms.

Regarding the distribution of terms in S4 by category, CAT2 has the largest number with 137 terms (56%), followed by CAT1 with 83 terms (34%), and then CAT3 with 23 terms (9%). It can be concluded that M1 is by far the most dominant mechanism in this sub-corpus, and that CAT2 is the most dominant category.

4.2.1.5 *Majallat Sūq al-ʿAṣr*

Table 4.5: S5 (*Majallat Sūq al-ʿAṣr*) Results

Mechanism	M1	M2	M3	M4	Total
No. of Terms	117	22	19	14	172
%	68%	13%	11%	8%	100%
No. of Loan Acronym Terms	13				
%	11%				

No. of Loanword Terms	104				
%	89%				
No. of Arabic and Latin Scripts Terms	0	1	0	1	2
%	0%	50%	0%	50%	1%
No. of only Latin Script Terms					15
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	34	13	10	8	65
%	29%	59%	53%	57%	38%
No. of CAT2 Terms	53	9	9	6	77
%	45%	41%	47%	43%	45%
No. of CAT3 Terms	30	0	0	0	30
%	26%	0%	0%	0%	17%

S5 contains a total of 172 terms extracted from the magazine. The terms are divided between the four word formation mechanisms. M1 accounts for the highest number of terms, with 117 terms (68% of the S5 total). The M1 terms are divided between CAT2, CAT1 and CAT3, which include 53 terms (45%), 34 terms (29%) and 30 terms (26%), respectively. None of the terms produced by any of the other mechanisms are classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 104 M1 terms (89%), while loan acronyms form a minority of 13 terms (11%).

M2 accounts for the second highest number of terms, with 22 terms (13% of the S5 total). The M2 terms are divided between CAT1 and CAT2, which include 13 terms (59%) and 9 terms (41%), respectively.

M3 accounts for the third highest number of terms, with 19 terms (11% of the S5 total). The M3 terms are divided between CAT1 and CAT2, which include 10 terms (53%) and 9 terms (47%), respectively.

M4 accounts for the lowest number of terms, with 14 terms (8% of the S5 total). The M4 terms are divided between CAT1 and CAT2, which include 8 terms (57%) and 6 terms (43%), respectively.

15 terms appear in Latin script only, while two terms appear in both Arabic and Latin scripts, which accounts for (1% of the S5 total). The number of terms

appearing in both scripts is divided between the two word formation mechanisms M2 and M4, which each account for one term (50%); there are no occurrences of M1 and M3.

Regarding the distribution of terms in S5 by category, CAT2 has the highest number with 77 terms (45%), followed by CAT1 with 65 terms (38%), and then CAT3 with 30 terms (17%). It can be concluded that M1 is by far the most dominant mechanism in this sub-corpus, and that CAT2 is the most dominant category.

4.2.1.6 *Majallat Wāḥat al-Ḥāsib*

Table 4.6: S6 (*Majallat Wāḥat al-Ḥāsib*) Results

Mechanism	M1	M2	M3	M4	Total
No. of Terms	183	32	36	56	307
%	60%	10%	12%	18%	100%
No. of Loan Acronym Terms	14				
%	8%				
No. of Loanword Terms	169				
%	92%				
No. of Arabic and Latin Scripts Terms	2	0	2	15	19
%	11%	0%	11%	79%	6%
No. of only Latin Script Terms					37
Mechanism	M1	M2	M3	M4	Total
No. of CAT1 Terms	49	18	22	24	113
%	27%	56%	61%	43%	37%
No. of CAT2 Terms	83	14	14	32	143
%	45%	44%	39%	57%	47%
No. of CAT3 Terms	51	0	0	0	51
%	28%	0%	0%	0%	17%

S6 contains a total of 307 terms extracted from the magazine. The terms are divided between the four word formation mechanisms. M1 accounts for the highest number of terms, with 183 terms (60% of the S6 total). The M1 terms are divided between CAT2, CAT3 and CAT1, which include 83 terms (45%), 51 terms (28%) and 49 terms (27%), respectively. None of the terms produced by any of the other mechanisms are classified as CAT3. The M1 terms are also divided between loanwords and loan acronyms. Loanwords form a majority of 169 M1 terms (92%), while loan acronyms form a minority of 14 terms (8%).

M4 accounts for the second highest number of terms, with 56 terms (18% of the S6 total). The M4 terms are divided between CAT2 and CAT1, which include 32 terms (57%) and 24 terms (43%), respectively.

M3 accounts for the third highest number of terms, with 36 terms (12% of the S6 total). The M3 terms are divided between CAT1 and CAT2, which include 22 terms (61%) and 14 terms (39%), respectively.

M2 accounts for the lowest number of terms, with 32 terms (10% of the S6 total). The M2 terms are divided between CAT1 and CAT2, which include 18 terms (56%) and 14 terms (44%), respectively.

37 terms appear in Latin script only, while 19 terms appear in both Arabic and Latin scripts, which accounts for (6% of the S6 total). The terms appearing in both scripts are divided between three of the word formation mechanisms. M4 accounts for the highest number with 15 terms (79%), followed by M1 and M3 which both account for two terms (11%) each, whereas there are no occurrences of M2 terms.

Regarding the distribution of terms in S6 by category, CAT2 has the highest number with 143 terms (47%), followed by CAT1 with 113 terms (37%), and finally CAT3 with 51 terms (17%). It can be concluded that M1 is by far the most dominant mechanism in this sub-corpus, and that CAT2 is the most dominant category.

4.2.1.7 Summary

The total number of Latin script only terms, which exist only in C3 (corpus 3), represented in the three magazines is 177. This number is divided between the three sub-corpora, with 125 terms occurring in S4, 37 terms in S6, and 15 terms in S5.

These numbers are not counted in the overall total number of terms in the study as the Latin script only terms are English terms which do not apply to the classifications of the Arabic word formation mechanisms.

In conclusion, it can be noted that M1 is the most dominant among the mechanisms in all the sub-corpora except for S3, which has M4 as the most dominant mechanism. In addition, CAT2 is the most dominant among the categories, followed by CAT1, while CAT3 has the lowest number of terms in the sub-corpora.

4.2.2 Comparison of the Mechanisms within each Sub-corpus

This comparison focuses on the percentages of the computing terms produced by the four Arabic word formation mechanisms within each sub-corpus, in accordance with Figure 4.1.

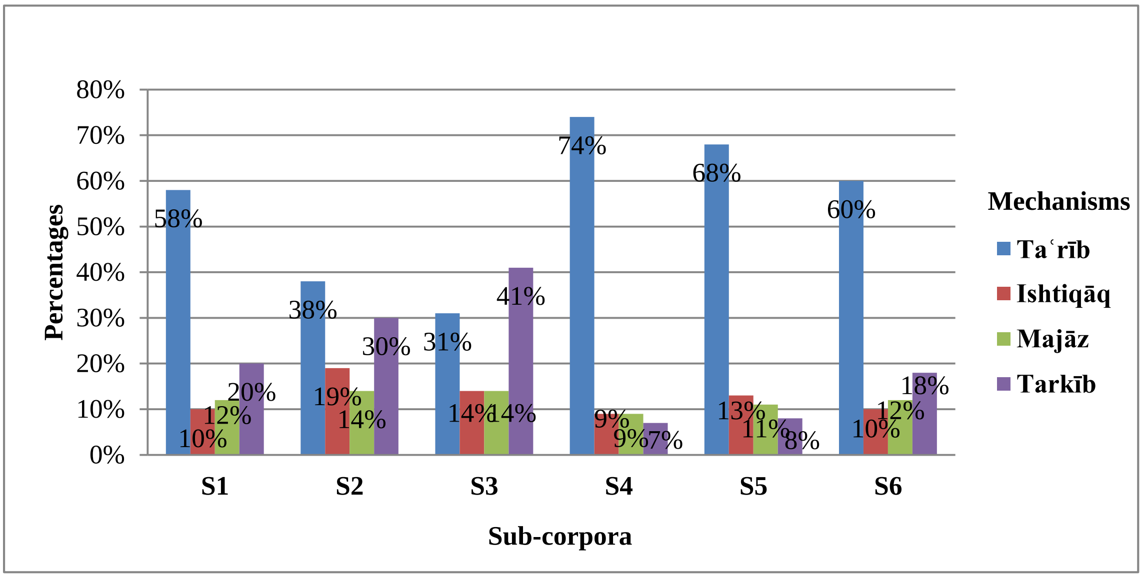

Figure 4.1: Percentages of the Computing Terms Produced by the Mechanisms within each Sub-corpus

S6 has the highest number of terms among the sub-corpora, containing a total of 307 terms. The percentages of S6 terms produced by each mechanism are as follows:

(60%) for M1, which has the highest percentage of the mechanisms, (18%) for M4, (12%) for M3, and (10%) for M2.

S1 has the second highest number of terms among the sub-corpora, containing a total of 250 terms. The percentages of S1 terms produced by each mechanism are as follows: (58%) for M1, which has the highest percentage of the mechanisms, (20%) for M4, (12%) for M3, and (10%) for M2.

S4 has the third highest number of terms among the sub-corpora, containing a total of 243 terms. The percentages of S4 terms produced by each mechanism are as follows: (74%) for M1, which has the highest percentage of the mechanisms, (9%) for each of M2 and M3, and (7%) for M4.

S2 has the fourth highest number of terms among the sub-corpora, containing a total of 212 terms. The percentages of S2 terms produced by each mechanism are as follows: (38%) for M1, which has the highest percentage of the mechanisms, (30%) for M4, (19%) for M2, and (14%) for M3.

S3 has the fifth highest number of terms among the sub-corpora, containing a total of 206 terms. The percentages of S3 terms produced by each mechanism are as follows: (41%) for M4, which has the highest percentage of the mechanisms, (31%) for M1, and (14%) for each of M2 and M3.

Finally, S5 has the lowest number of terms among the sub-corpora, containing a total of 172 terms. The percentages of S5 terms produced by each mechanism are as follows: (68%) for M1, which has the highest percentage of the mechanisms, (13%) for M2, (11%) for M3, and (8%) for M4.

It can be concluded that M1 is the most dominant mechanism within each of the sub-corpora except for S3, which has M4 as the most dominant mechanism. These results are discussed in the following chapter.

4.2.3 Comparison of the Mechanisms within all Sub-corpora

Figure 4.2 presents a comparison of the percentages of the computing terms produced by the mechanisms within all sub-corpora.

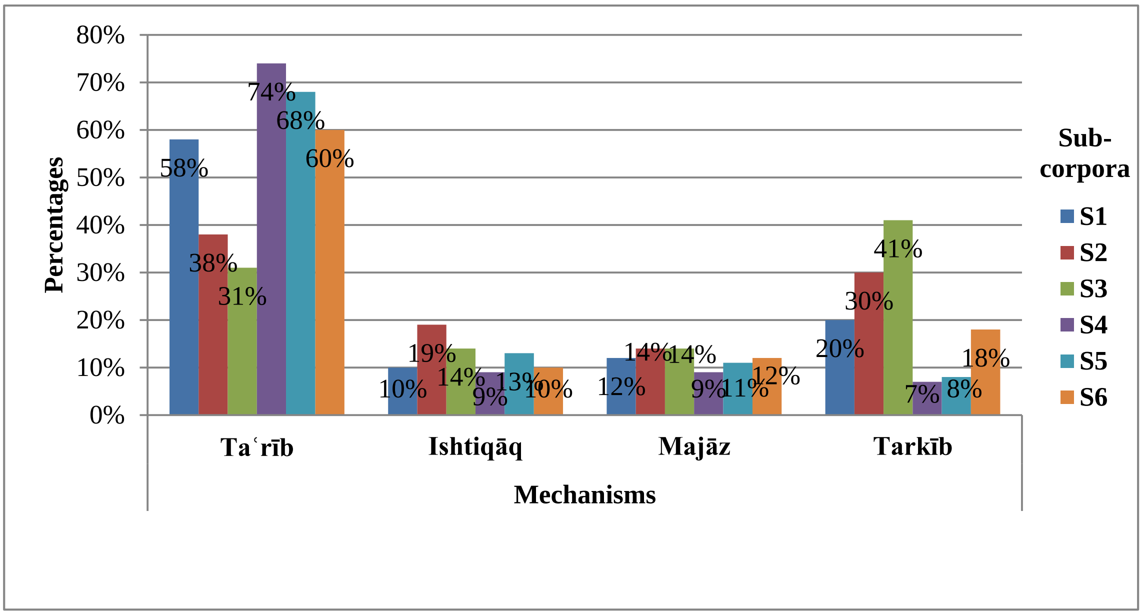

Figure 4.2: Percentages of the Computing Terms Produced by the Mechanisms within all Sub-corpora

In terms of M1, the percentages within each sub-corpus are as follows: (74%) for S4, (68%) for S5, (60%) for S6, (58%) for S1, (38%) for S2, and (31%) for S3. Therefore, it can be noted that S4 has the highest percentage of M1 within the sub-corpora, while S3 has the lowest percentage. In terms of M2, the percentages within each sub-corpus are as follows: (19%) for S2, (14%) for S3, (13%) for S5, (10%) for each of S1 and S6, and (9%) for S4. Therefore, it can be noted that S2 has the highest percentage of M2 within the sub-corpora, while S4 has the lowest percentage. In terms of M3, the percentages within each sub-corpus are as follows: (14%) for each of S2 and S3, (12%) for each of S1 and S6, (11%) for S5, and (9%) for S4. Therefore, it can be noted that S2 and S3 share the highest percentage of M3 within the sub-corpora, while S4 has the lowest percentage. In terms of M4, the percentages within each sub-corpus are as follows: (41%) for S3, (30%) for S2, (20%) for S1, (18%) for S6, (8%) for S5, and (7%) for S4. Therefore, it can be noted that S3 has the highest percentage of M4 within the sub-corpora, while S4 has the lowest percentage.

It can be further observed that the highest percentage of M1 and the lowest percentages of M2, M3 and M4 occur in S4; the highest percentage of M2 occurs in S2; the highest percentage of M3 occurs in S2 and S3; and the highest percentage of M4 and the lowest percentage of M1 occur in S3. These results are discussed in the following chapter.

4.3 Results

In this section there is a description of the overall results of the analysed data presented in Tables 4.7, 4.8 and 4.9. In addition, there are various comparisons involving the corpora/sub-corpora, mechanisms and categories, in order to demonstrate the levels of occurrence and the trends that can be observed from the comparisons.

4.3.1 Comparison of Mechanism Results

This section contains a description and comparison of the overall results of the four Arabic word formation mechanisms analysed in the study.

Table 4.7: Mechanism Results

Mechanism	No. of Terms	%
Taʿrīb	769	55%
Tarkīb	286	21%
Ishtiqāq	169	12%
Majāz	166	12%
Total	1,390	

The total number of terms in the study is 1,390. Among the mechanisms M1 accounts for the highest number with 769 terms (55% of the total), followed by M4 with 286 terms (21%), and then M2 with 169 terms and M3 with 166 terms, (12% each). It can be concluded that M1 accounts for the highest percentage of terms among the mechanisms, followed by M4, and then by M2 and M3. Therefore, it can be concluded that M1 is the most used mechanism in terms of the analysed computing terminology, while M2 and M3 are the least used. In the following chapter, there is a discussion of these results and reasons are suggested for these usage levels of the mechanisms.

4.3.2 Overall Mechanism Results

This section contains a description and comparison of all the results in the overview table (Table 4.8). In order to avoid ambiguity when reading the results in Table 4.8, a few guidelines are presented here. There are two recurrent rows in the table entitled 'Horizontal %' and 'Vertical %'. The 'Horizontal %' refers to the average number of terms within the mechanisms and categories among the corpora. For example, taking CAT2 from the category totals section, the average number of CAT2 terms in each corpus is 133 terms (36%) in C1, 119 terms (33%) in C3, and 113 terms (31%) in C2. These percentages are calculated from the total average number of CAT2 terms in the corpora (365). The 'Vertical %' refers to the average number of terms within the categories in each section or among the mechanisms within the corpora. For example, taking C3 in the category totals section, the average number of C3 terms in each category is 119 terms (49%) in CAT2, 87 terms (36%) in CAT1, and 34.7 terms (14%) in CAT3. These percentages are calculated from the total average number of C3 terms (240.7).

The total number of terms in the corpora/sub-corpora as a whole is 1,390. The number of terms in each sub-corpus is as follows: 307 in S6, which has the highest number of terms among the sub-corpora, 250 in S1, 243 in S4, 212 in S2, 206 in S3, and 172 in S5. The total average number of terms in the corpora is 699.7. The total number and the average number of terms in each corpus is as follows: a total of 250 terms and an average of 250 terms in C1, which has the highest average number of terms among the corpora; a total of 722 terms and an average of 240.7 terms in C3; and a total of 418 terms and an average of 209 terms in C2, which has the lowest average number of terms.

The following descriptions and comparisons focus on the mechanisms used to produce terms in the corpora/sub-corpora, with reference to the categories in which these terms are classified.

With regard to M1, which accounts for the largest number of terms among the mechanisms, the total number of terms is 769. The number of M1 terms in each sub-corpus is as follows: 183 terms (24%) in S6, which has the highest percentage among the sub-corpora, 179 terms (23%) in S4, 146 terms (19%) in S1, 117 terms (15%) in S5, 80 terms (10%) in S2, and 64 terms (8%) in S3. The total average number of M1 terms in the corpora is 377.7. Regarding the average number of M1 terms in each corpus, there are 159.7 terms (42%) in C3, which has the highest average percentage of terms among the corpora, 146 terms (39%) in C1, and 72 terms (19%) in C2. It can be concluded that C3 and S6 have the highest percentages of M1 terms, while C2 and S3 have the lowest percentages in the respective corpora/sub-corpora.

Table 4.8: The Overview Table

Corpus	C1	C2		C3		
Sub-corpus	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Total No. of Terms in the Corpora/Sub-corpora				1,390		
No. of Terms in the Sub-Corpus	250	212	206	243	172	307
No. of Terms in the Corpus	250	418		722		
AVG No. of Terms in the Corpus	250	209		240.7		
Total AVG No. of Terms in the Corpora				699.7		
***Taʿrīb* (M1)**						
No. of CAT2 Terms in the Sub-corpus	75	37	29	102	53	83
%	20%	10%	8%	27%	14%	22%
Total No. of CAT2 Terms in the Sub-corpora			379	**%**	49%	
AVG No. of CAT2 Terms in the Corpus	75	33		79.3		
Horizontal %	40%	18%		42%		
Vertical %	51%	46%		50%		
Total AVG No. of CAT2 Terms in the Corpora			187.3			
No. of CAT1 Terms in the Sub-corpus	46	24	17	54	34	49
%	21%	11%	8%	24%	15%	22%
Total No. of CAT1 Terms in the Sub-corpora			224	**%**	29%	
AVG No. of CAT1 Terms in the Corpus	46	20.5		45.7		
Horizontal %	41%	18%		41%		
Vertical %	32%	28%		29%		
Total AVG No. of CAT1 Terms in the Corpora			112.2			
No. of CAT3 Terms in the Sub-corpus	25	19	18	23	30	51
%	15%	11%	11%	14%	18%	31%
Total No. of CAT3 Terms in the Sub-corpora			166	**%**	22%	
AVG No. of CAT3 Terms in the Corpus	25	18.5		34.7		
Horizontal %	32%	24%		44%		
Vertical %	17%	26%		22%		
Total AVG No. of CAT3 Terms in the Corpora			78.2			
No. of Terms in the Sub-corpus	146	80	64	179	117	183
%	19%	10%	8%	23%	15%	24%
Total No. of Terms produced by M1 in the Sub-corpora				769		
AVG No. of Terms in the Corpus	146	72		159.7		
Horizontal %	39%	19%		42%		
Vertical %	58%	34%		66%		
Total AVG No. of Terms produced by M1 in the Corpora				377.7		
***Tarkīb* (M4)**						
No. of CAT2 Terms in the Sub-corpus	27	40	51	14	6	32
%	16%	24%	30%	8%	4%	19%
Total No. of CAT2 Terms in the Sub-corpora			170	**%**	59%	
AVG No. of CAT2 Terms in the Corpus	27	45.5		17.3		
Horizontal %	30%	51%		19%		
Vertical %	54%	61%		59%		
Total AVG No. of CAT2 Terms in the Corpora			89.8			
No. of CAT1 Terms in the Sub-corpus	23	23	34	4	8	24
%	20%	20%	29%	3%	7%	21%
Total No. of CAT1 Terms in the Sub-corpora			116	**%**	41%	
AVG No. of CAT1 Terms in the Corpus	23	28.5		12		
Horizontal %	36%	45%		19%		
Vertical %	46%	39%		41%		
Total AVG No. of CAT1 Terms in the Corpora			63.5			
No. of Terms in the Sub-corpus	50	63	85	18	14	56
%	17%	22%	30%	6%	5%	20%
Total No. of Terms produced by M4 in the Sub-corpora				286		
AVG No. of Terms in the Corpus	50	74		29.3		

Horizontal %	33%	48%		19%		
Vertical %	20%	35%		12%		
Total AVG No. of Terms produced by M4 in the Corpora				153.3		
***Ishtiqāq* (M2)**						
No. of CAT2 Terms in the Sub-corpus	16	28	15	10	9	14
%	17%	30%	16%	11%	10%	15%
Total No. of CAT2 Terms in the Sub-corpora			92	**%**	54%	
AVG No. of CAT2 Terms in the Corpus	16	21.5		11		
Horizontal %	33%	44%		23%		
Vertical %	67%	63%		43%		
Total AVG No. of CAT2 Terms in the Corpora			48.5			
No. of CAT1 Terms in the Sub-corpus	8	12	13	13	13	18
%	10%	16%	17%	17%	17%	23%
Total No. of Terms in the CAT1 Sub-corpora			77	**%**	46%	
AVG No. of Terms in the CAT1 Corpus	8	12.5		14.7		
Horizontal %	23%	36%		42%		
Vertical %	33%	37%		57%		
Total AVG No. of CAT1 Terms in the Corpora			35.2			
No. of Terms in the Sub-corpus	24	40	28	23	22	32
%	14%	24%	17%	14%	13%	19%
Total No. of Terms produced by M2 in the Sub-corpora				169		
AVG No. of Terms in the Corpus	24	34		25.7		
Horizontal %	29%	41%		31%		
Vertical %	10%	16%		11%		
Total AVG No. of Terms produced by M2 in the Corpora				83.7		
***Majāz* (M3)**						
No. of CAT2 Terms in the Sub-corpus	15	13	13	11	9	14
%	20%	17%	17%	15%	12%	19%
Total No. of CAT2 Terms in the Sub-corpora			75	**%**	45%	
AVG No. of CAT2 Terms in the Corpus	15	13		11.3		
Horizontal %	38%	33%		29%		
Vertical %	50%	45%		43%		
Total AVG No. of CAT2 Terms in the Corpora			39.3			
No. of CAT1 Terms in the Sub-corpus	15	16	16	12	10	22
%	16%	18%	18 %	13%	11%	24%
Total No. of CAT1 Terms in the Sub-corpora			91	**%**	55%	
AVG No. of CAT1 Terms in the Corpus	15	16		14.7		
Horizontal %	33%	35%		32%		
Vertical %	50%	55%		57%		
Total AVG No. of CAT1 Terms in the Corpora			45.7			
No. of Terms in the Sub-corpus	30	29	29	23	19	36
%	18%	17%	17%	14%	11%	22%
Total No. of Terms produced by M3 in the Sub-corpora				166		
AVG No. of Terms in the	30	29		26		
Horizontal %	35%	34%		31%		
Vertical %	12%	14%		11%		
Total AVG No. of Terms produced by M3 in the Corpora				85		
Category Totals						
No. of CAT2 Terms in the Sub-corpus	133	118	108	137	77	143
%	19%	16%	15%	19%	11%	20%
Total No. of CAT2 Terms in the Sub-corpora			716			
AVG No. of CAT2 Terms in the Corpus	133	113		119		
Horizontal %	36%	31%		33%		
Vertical %	53%	54%		49%		

Total AVG No. of CAT2 Terms in the Corpora			365			
No. of CAT1 Terms in the Sub-corpus	92	75	80	83	65	113
%	18%	15%	16%	16%	13%	22%
Total No. of CAT1 Terms in the Sub-corpora			508			
AVG No. of CAT1 Terms in the Corpus	92	77.5		87		
Horizontal %	36%	30%		34%		
Vertical %	37%	37%		36%		
Total AVG No. of CAT1 Terms in the Corpora			256.5			
No. of CAT3 Terms in the Sub-corpus	25	19	18	23	30	51
%	15%	11%	11%	14%	18%	31%
Total No. of CAT3 Terms in the Sub-corpora			166			
AVG No. of CAT3 Terms in the Corpus	25	18.5		34.7		
Horizontal %	32%	24%		44%		
Vertical %	10%	9%		14%		
Total AVG No. of CAT3 Terms in the Corpora			78.2			
Total AVG No. of Terms in the Categories in the Corpus	250	209		240.7		
%	36%	30%		34%		

CAT2 has the highest number of M1 terms among the categories with 379 terms (49% of the total). The number of M1 CAT2 terms in each sub-corpus is as follows: 102 terms (27%) in S4, which has the highest percentage among the sub-corpora, 83 terms (22%) in S6, 75 terms (20%) in S1, 53 terms (14%) in S5, 37 terms (10%) in S2, and 29 terms (8%) in S3. The total average number of M1 CAT2 terms in the corpora is 187.3. The average number of M1 CAT2 terms in each corpus is as follows: 79.3 terms (42%) in C3, which has the highest average percentage of terms among the corpora, 75 terms (40%) in C1, and 33 terms (18%) in C2. This means that CAT2 has the highest percentage of M1 terms among the three categories.

CAT1 has the second highest number of M1 terms among the categories with 224 terms (29% of the total). The number of M1 CAT1 terms in each sub-corpus is as follows: 54 terms (24%) in S4, which has the highest percentage among the sub-corpora, 49 terms (22%) in S6, 46 terms (21%) in S1, 34 terms (15%) in S5, 24 terms (11%) in S2, and 17 terms (8%) in S3. The total average number of M1 CAT1 terms in the corpora is 112.2. In terms of the average number of M1 CAT1 terms in each corpus, there are 46 terms (41%) in C1 and 45.7 terms (41%) in C3, the two corpora being ranked in first place with regards to the highest percentage of the average number of terms among the corpora; there are 20.5 terms (18%) in C2. These results indicate that CAT1 has the second highest percentage of M1 terms among the three categories.

CAT3 has the lowest number of M1 terms among the categories with 166 terms (22% of the total). The number of M1 CAT3 terms in each sub-corpus is as follows: 51 terms (31%) in S6, which has the highest percentage among the sub-corpora, 30 terms (18%) in S5, 25 terms (15%) in S1, 23 terms (14%) in S4, 19 terms (11%) in S2 and 18 terms (11%) in S3. The total average number of M1 CAT3 terms in the corpora is 78.2. The average number of M1 CAT3 terms in each corpus is as follows: 34.7 terms (44%) in C3, which has the highest percentage of the average number of terms among the corpora, 25 terms (32%) in C1, and 18.5 terms (24%) in C2. This indicates that CAT3 has the lowest percentage of M1 terms among the three categories. It can be noted here that the terms classified as CAT3 do not occur with any of the other mechanisms.

It can be concluded that CAT2 has the highest percentage of M1 terms among the categories, accounting for (49% of the total M1 terms), followed by CAT1 (which has a 29% share), while CAT3 has the lowest percentage (22%) of M1 terms.

Moving on to M4, this mechanism accounts for the second highest number of terms: a total of 286 terms. The number of M4 terms in each sub-corpus is as follows: 85 terms (30%) in S3, which has the highest percentage among the sub-corpora, 63 terms (22%) in S2, 56 terms (20%) in S6, 50 terms (17%) in S1, 18 terms (6%) in S4, and 14 terms (5%) in S5. The total average number of M4 terms in the corpora is 153.3. The average number of M4 terms in each corpus is as follows: 74 terms (48%) in C2, which has the highest percentage of the average number of terms among the corpora, 50 terms (33%) in C1, and 29.3 terms (19%) in C3. It can be concluded that among the respective corpora/sub-corpora, C2 and S3 have the highest percentage of M4 terms, while C3 and S5 have the lowest percentage.

CAT2 has the highest number of M4 terms among the categories with 170 terms (59% of the total). The number of M4 CAT2 terms in each sub-corpus is as follows: 51 terms (30%) in S3, which has the highest percentage among the sub-corpora, 40 terms (24%) in S2, 32 terms (19%) in S6, 27 terms (16%) in S1, 14 terms (8%) in S4, and six terms (4%) in S5. The total average number of M4 CAT2 terms in the corpora is 89.8. The average number of M4 CAT2 terms in each corpus is as follows: 45.5 terms (51%) in C2, which has the highest percentage of the average number of terms among the corpora, 27 terms (30%) in C1, and 17.3 terms (19%) in C3. Thus, it can be stated that CAT2 has the highest percentage of M4 terms among the three categories.

CAT1 has the second highest number of M4 terms among the categories with 116 terms (41% of the total). The number of M4 CAT1 terms in each sub-corpus is as follows: 34 terms (29%) in S3, which has the highest percentage total among the sub-corpora, 24 terms (21%) in S6, 23 terms (20%) in each of S1 and S2, eight terms (7%) in S5, and four terms (3%) in S4. The total average number of M4 CAT1 terms in the corpora is 63.5. The average number of M4 CAT1 terms in each corpus is as follows: 28.5 terms (45%) in C2, which has the highest percentage of the average number of terms among the corpora, 23 terms (36%) in C1, and 12 terms (19%) in C3. This means that CAT1 has the second highest percentage of M4 terms among the categories.

It can be concluded that CAT2 has the highest percentage of M4 terms, accounting for (59% of M4 terms), followed by CAT1 (which has a 41% share), while CAT3 has no occurrences of M4 terms.

In relation to M2, this mechanism accounts for the third highest number of terms (a total of 169 terms). The number of M2 terms in each sub-corpus is as follows: 40 terms (24%) in S2, which has the highest percentage among the sub-corpora, 32 terms (19%) in S6, 28 terms (17%) in S3, 24 terms (14%) in S1, 23 terms (14%) in S4, and 22 terms (13%) in S5. The total average number of M2 terms in the corpora is 83.7. The average number of M2 terms in each corpus is as follows: 34 terms (41%) in C2, which has the highest percentage of the average number of terms among the corpora, 25.7 terms (31%) in C3, and 24 terms (29%) in C1. It can be concluded that among the respective corpora/sub-corpora, C2 and S2 have the highest percentage of M2 terms, while C1 and S5 have the lowest percentage.

CAT2 has the highest number of M2 terms among the categories with 92 terms (54% of the total). The number of M2 CAT2 terms in each sub-corpus is as follows: 28 terms (30%) in S2, which has the highest percentage among the sub-corpora, 16 terms (17%) in S1, 15 terms (16%) in S3, 14 terms (15%) in S6, 10 terms (11%) in S4, and nine terms (10%) in S5. The total average number of M2 CAT terms in the corpora is 48.5. The average number of M2 CAT2 terms in each corpus is as follows: 21.5 terms (44%) in C2, which has the highest percentage of the average number of terms among the corpora, 16 terms (33%) in C1, and 11 terms (23%) in C3. Thus, it can be stated that CAT2 has the highest percentage of M2 terms among the three categories.

CAT1 has the second highest number of M2 terms among the categories with 77 terms (46% of the total). The number of M2 CAT1 terms in each sub-corpus is as follows: 18 terms (23%) in S6, which has the highest percentage among the sub-corpora, 13 terms (17%) in each of S3, S4 and S5, 12 terms (16%) in S2, and eight terms (10%) in S1. The total average number of M2 CAT1 terms in the corpora is 35.2. The average number of M2 CAT1 terms in each corpus is as follows: 14.7 terms (42%) in C3, which has the highest percentage of the average number of terms among the corpora, 12.5 terms (36%) in C2, and eight terms (23%) in C1. This means that CAT1 has the second highest percentage of M2 terms among the three categories.

It can be concluded that CAT2 has the highest percentage of M2 terms among the categories, accounting for (54% of M2 terms), followed by CAT1 (which has a share of 46%), while there are no occurrences of M2 terms within CAT3.

Moreover, M3 has the lowest number of terms among the mechanisms, with a total of 166 terms. The number of M3 terms in each sub-corpus is as follows: 36 terms (22%) in S6, which has the highest percentage among the sub-corpora, 30 terms (18%) in S1, 29 terms (17%) in each of S2 and S3, 23 terms (14%) in S4, and 19 terms (11%) in S5. The total average number of M3 terms in the corpora is 85. The average number of M3 terms in each corpus is as follows: 30 terms (35%) in C1, which has the highest percentage of the average number of terms among the corpora, 29 terms (34%) in C2, and 26 terms (31%) in C3. It can be concluded that among the respective corpora/sub-corpora, C1 and S6 have the highest percentage of M3 terms, while C3 and S5 have the lowest percentage.

CAT1 has the highest number of M3 terms among the categories with 91 terms (55% of the total). The number of M3 CAT1 terms in each sub-corpus is as follows: 22 terms (24%) in S6, which has the highest percentage among the sub-corpora, 16 terms (18%) in each of S2 and S3, 15 terms (16%) in S1, 12 terms (13%) in S4, and 10 terms (11%) in S5. The total average number of M3 CAT1 terms in the corpora is 45.7. The average number of M3 CAT1 terms in each corpus is as follows: 16 terms (35%) in C2, which has the highest percentage of the average number of terms among the corpora, 15 terms (33%) in C1, and 14.7 terms (32%) in C3. Thus, it can be stated that CAT1 has the highest percentage of M3 terms among the three categories.

CAT2 has the second highest number of M3 terms among the categories with 75 terms (45% of the total). The number of M3 CAT2 terms in each sub-corpus is as follows: 15 terms (20%) in S1, which has the highest percentage among the sub-corpora, 14 terms (19%) in S6, 13 terms (17%) in each of S2 and S3, 11 terms (15%) in S4, and nine terms (12%) in S5. The total average number of M3 CAT2 terms in the corpora is 39.3. The average number of M3 CAT2 terms in each corpus is as follows: 15 terms (38%) in C1, which has the highest percentage of the average number of terms among the corpora, 13 terms (33%) in C2, and 11.3 terms (29%) in C3. This means that CAT2 has the second highest percentage of M3 terms among the three categories.

It can be concluded that CAT1 has the highest percentage of M3 terms among the categories, accounting for (55% of M3 terms), followed by CAT2 (which has a 45% share), while there are no occurrences of M3 terms within CAT3.

4.3.2.1 Summary

To sum up, regarding the total number of terms in the sub-corpora, S6 has the highest number of terms among the sub-corpora (307), while S5 has the lowest number of terms (172). In relation to the total average number of terms in the corpora, C1 has the highest number of terms among the corpora (250), while C2 has the lowest number of terms (209).

It is evident that S6 has the highest percentage of M1 terms among the sub-corpora (24%), while S3 has the lowest percentage (8%), and C3 has the highest percentage of M1 terms among the corpora (42%), while C2 has the lowest percentage (19%). S2 has the highest percentage of M2 terms among the sub-corpora (24%), while S5 has the lowest percentage (13%), and C2 has the highest percentage of M2 terms among the corpora (41%), while C1 has the lowest percentage (29%). S6 has the highest percentage of M3 terms among the sub-corpora (22%), while S5 has the lowest percentage (11%), and C1 has the highest percentage of M3 terms among the corpora (35%), while C3 has the lowest percentage (31%). S3 has the highest percentage of M4 terms among the sub-corpora (30%), while S5 has the lowest percentage (5%), and C2 has the highest percentage of M4 terms among the corpora (48%), while C3 has the lowest percentage (19%).

It can be concluded that CAT2 has the highest percentage of M1 terms among the categories (49%), followed by CAT1 (29%), while CAT3 has the lowest percentage (22%). CAT2 has the highest percentage of M2 terms among the categories (54%), followed by CAT1 (46%). CAT1 has the highest percentage of M3 terms among the categories (55%), followed by CAT2 (45%). CAT2 has the highest percentage of M4 terms among the categories (59%), followed by CAT1 (41%), while there are no occurrences of M2 terms in CAT3, M3 terms in CAT3 or M4 terms in CAT3.

4.3.3 Corpora Analysis

This section contains an analysis of the corpora results according to Table 4.8. This involves a comparison of the classification of terms according to mechanisms and categories within the corpora, and of the categories within all mechanisms.

C1 has the highest average number of terms among the corpora (250 terms). The average number of C1 terms is divided among the four mechanisms. M1 has the highest percentage of terms with 146 terms (58% of the total), followed by M4 with 50 terms (20%), then by M3 with 30 terms (12%), and finally by M2 with 24 terms (10%).

The average number of terms in C1 is also divided among the three categories. CAT2 has the highest average number with 133 terms (53% of the total). The percentages of C1 CAT2 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M2 (67%), M4 (54%), M1 (51%), and M3 (50%). CAT1 has the second highest average number of terms with 92 terms (37% of the total). The percentages of C1 CAT1 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M3 (50%), M4 (46%), M2 (33%), and M1 (32%). CAT3 has the lowest average number of terms with 25 terms (10% of the total). The C1 CAT3 terms are only produced by the mechanism of M1, which represents the total average number of CAT3 terms with (17%) of the C1 M1 terms, as there are no occurrences of CAT3 in the other mechanisms. Overall, M1 is the most dominant mechanism in C1, and CAT2 is the most dominant category.

C3 has the second highest average number of terms among the corpora with 240.7 terms. The average number of C3 terms is divided among the four mechanisms. M1 has the highest number with 159.7 terms (66% of the total), followed by M4 with 29.3 terms (12%), then by M3 with 26 terms and M2 with 25.7 terms, which share the lowest percentage of terms (11% of the total).

The average number of C3 terms is also divided among the three categories. CAT2 has the highest average number with 119 terms (49% of the total). The percentages of C3 CAT2 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M4 (59%), M1 (50%), M2 and M3 (43% each). CAT1 has the second highest average number of terms with 87 terms (36% of the total). The percentages of C3 CAT1 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M2 and M3 (57%) each, M4 (41%), and M1 (29%). CAT3 has the lowest average number of terms with 34.7 terms (14% of the total). The C3 CAT3 terms are only produced by the mechanism of M1, which represents the total average number of CAT3 terms with (22%) of the C3 M1 terms, as there are no occurrences of CAT3 in the other mechanisms. Overall, M1 is the most dominant mechanism in C3, and CAT2 is the most dominant category.

C2 has the lowest average number of terms among the corpora (209 terms). The average number of C2 terms is divided among the four mechanisms. M4 has the highest percentage of terms with 74 terms (35% of the total), followed by M1 with 72 terms (34%), then by M2 with 34 terms (16%), and finally by M3 with 29 terms (14%).

The average number of C2 terms is also divided among the three categories. CAT2 has the highest average number of terms with 113 terms (54% of the total). The percentages of C2 CAT2 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M2 (63%), M4 (61%), M1 (46%), and M3 (45%). CAT1 has the second highest average number of terms with 77.5 terms (37% of the total). The percentages of C2 CAT1 terms produced by the four mechanisms are ranked as follows (from highest to lowest): M3 (55%), M4 (39%), M2 (37%), and M1 (28%). CAT3 has the lowest average number of terms with 18.5 terms (9% of the total). The C2 CAT3 terms are only produced by the mechanism of M1, which represents the total average number of CAT3 terms with (26%) of the C2 M1 terms, as there are no occurrences of CAT3 in the other mechanisms. Overall, M4 is the most dominant mechanism in C2, and CAT2 is the most dominant category.

4.3.3.1 Comparison of the Mechanisms within each Corpus

Figure 4.3 displays the percentages of computing terms produced by the four Arabic word formation mechanisms within each corpus.

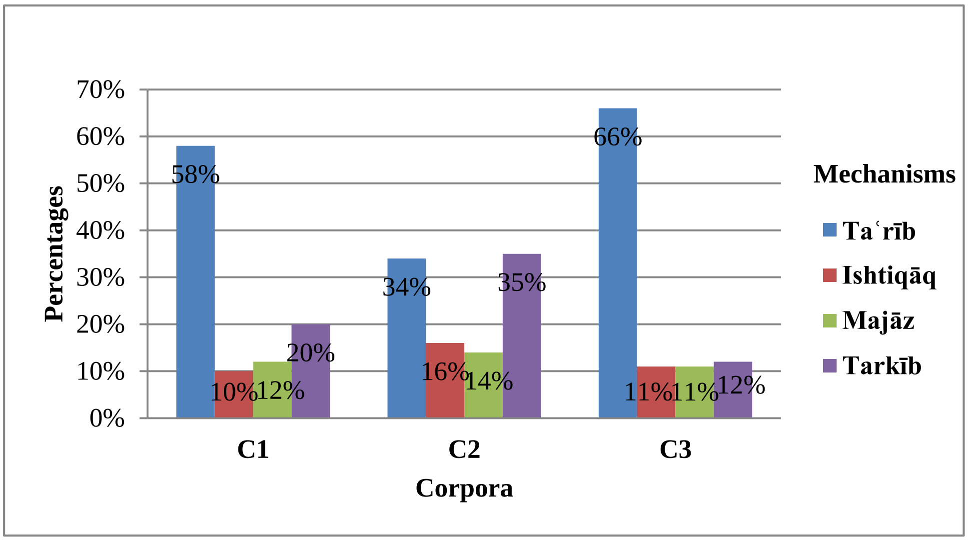

Figure 4.3: Percentages of the Computing Terms Produced by the Mechanisms within each Corpus

The average number of C1 terms produced by each mechanism, in percentage form, is as follows: (58%) for M1, which has the highest percentage among the mechanisms, (20%) for M4, (12%) for M3, and (10%) for M2. The equivalent data for C2 terms is as follows: (35%) for M4, which has the highest percentage among the mechanisms, (34%) for M1, (16%) for M2, and (14%) for M3. The corresponding data for C3 terms is as follows: (66%) for M1, which has the highest percentage among the mechanisms, (12%) for M4, and (11%) for each of M2 and M3. Overall, M1 is the most dominant mechanism in C1 and C3, while M4 is the most dominant mechanism in C2. These results are discussed in the following chapter.

4.3.3.2 Comparison of the Mechanisms within all Corpora

This comparison focuses on the percentages of computing terms produced by the mechanisms within all corpora, in accordance with Figure 4.4.

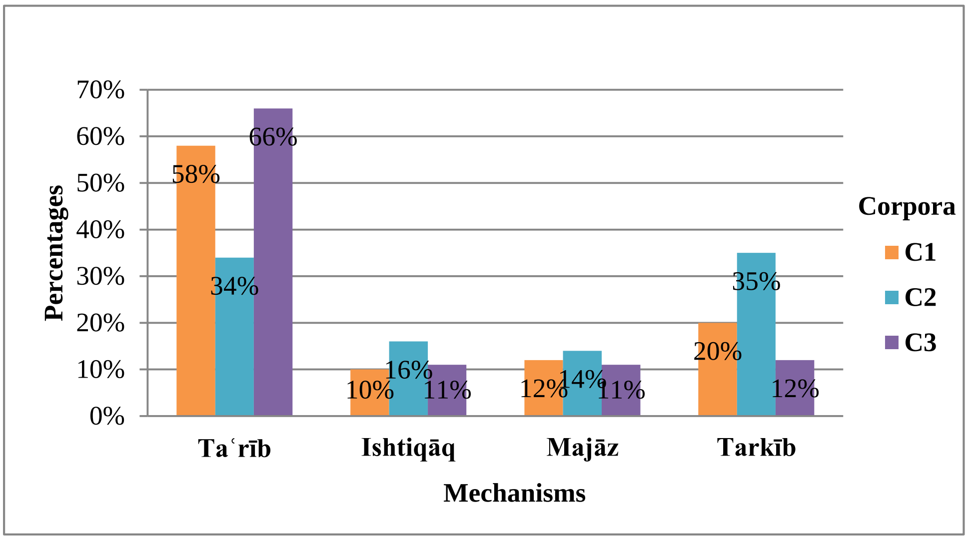

Figure 4.4: Percentages of the Computing Terms Produced by the Mechanisms within all Corpora

In terms of M1, the percentage of terms produced by this mechanism within each corpus is: (66%) in C3, (58%) in C1, and (34%) in C2; therefore, it can be noted that C3 has the highest percentage of terms produced by M1 within the corpora, while C2 has the lowest percentage. In terms of M2, the percentage of terms within each corpus is: (16%) in C2, (11%) in C3, and (10%) in C1; therefore, it can be noted that C2 has the highest percentage of terms produced by M2 within the corpora, while C1 has the lowest percentage. In terms of M3, the percentage of terms within each corpus is: (14%) in C2, (12%) in C1, and (11%) in C3; therefore, it can be noted that C2 has the highest percentage of terms produced by M3 within the corpora, while C3 has the lowest percentage. In terms of M4, the percentage of terms within each corpus is: (35%) in C2, (20%) in C1, and (12%) in C3; therefore, it can be noted that C2 has the highest percentage of terms produced by M4 within the corpora, while C3 has the lowest percentage.

It can be further observed that the highest percentage of terms produced by M1 and the lowest percentage of terms produced by M3 and M4 occur in C3; the highest percentage of terms produced by M2, M3 and M4 and the lowest percentage of terms produced by M1 occur in C2; and the lowest percentage of terms produced by M2 occur in C1. These results are discussed in the following chapter.

4.3.4 Comparison of the Categories

This section contains a description and comparison of the overall results of the three categories in the study.

Table 4.9: Category Results

Category	No. of Terms	%
Software	716	52%
Hardware	508	37%
Units of Measurement	166	12%
Total	1,390	

The total number of terms in the study is 1,390. CAT2 has the highest number of terms among the categories with 716 terms (52% of the total), followed by CAT1 with 508 terms (37% of the total), and finally CAT3 with 166 terms (12% of the total). It can be concluded that CAT2 has the highest percentage of terms among the categories, followed by CAT1, and then by CAT3. Therefore, it can be concluded that CAT2 is the most used category in terms of the analysed computing terminology, while CAT3 is the least used.

4.3.5 Description of Category Totals

The overall results of the three categories are demonstrated in this section, according to the data displayed in Table 4.8. CAT2 has the highest number of terms among the categories in the sub-corpora with 716 terms. The number of CAT2 terms in each sub-corpus is as follows: 143 terms (20%) in S6, which has the highest percentage among the sub-corpora, 137 terms (19%) in S4, 133 terms (19%) in S1, 118 terms (16%) in S2, 108 terms (15%) in S3, and 77 terms (11%) in S5. The total average number of CAT2 terms in the corpora is 365; this category accounts for the highest number of terms. The average number of CAT2 terms in each corpus is as follows: 133 terms (36%) in C1, which has the highest percentage of the average number of terms among the corpora, 119 terms (33%) in C3, and 113 terms (31%) in C2.

CAT1 has the second highest number of terms among the categories in the sub-corpora with 508 terms. The number of CAT1 terms in each sub-corpus is as follows: 113 terms (22%) in S6, which has the highest percentage among the sub-corpora, 92 terms (18%) in S1, 83 terms in S4 and 80 terms in S3 (16% each), 75 terms (15%) in S2, and 65 terms (13%) in S5. The total average number of CAT1 terms in the corpora is 256.5; this accounts for the second highest number of terms among the categories. The average number of CAT1 terms in each corpus is as follows: 92 terms (36%) in C1, which has the highest percentage of the average number of terms among the corpora, 87 terms (34%) in C3, and 77.5 terms (30%) in C2.

CAT3 has the lowest number of terms among the categories in the sub-corpora with 166 terms. The number of CAT3 terms in each sub-corpus is as follows: 51 terms (31%) in S6, which has the highest percentage among the sub-corpora, 30 terms (18%) in S5, 25 terms (15%) in S1, 23 terms (14%) in S4, 19 terms in S2 and 18 terms in S3 (11% each). The total average number of CAT3 terms is 78.2, which is the lowest number of terms among the categories. The average number of CAT3 terms in each corpus is as follows: 34.7 terms (44%) in C3, which has the highest percentage of the average number of terms among the corpora, 25 terms (32%) in C1, and 18.5 terms (24%) in C2.

4.3.5.1 Comparison of the Categories within each Mechanism

This comparison focuses on the percentages of computing terms of the three categories within each mechanism, in accordance with Figure 4.5.

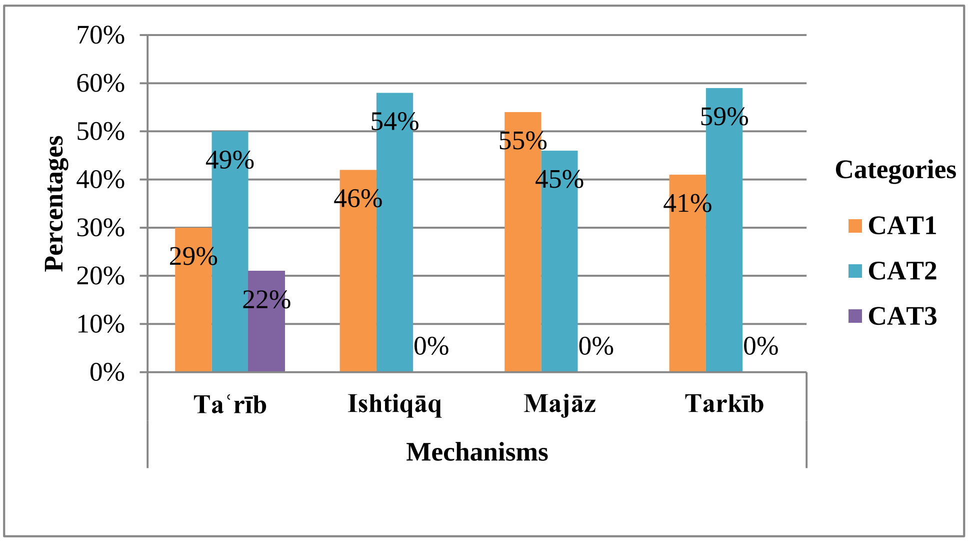

Figure 4.5: Percentages of the Computing Terms of the Categories within each Mechanism

Regarding M1, the percentages of terms in each category are as follows: (49%) in CAT2, (29%) in CAT1, and (22%) in CAT3. Therefore, it can be noted that CAT2 has the highest percentage of terms produced by M1 among the categories, while CAT3 has the lowest percentage. In terms of M2, the percentages of terms in each category are as follows: (54%) in CAT2, (46%) in CAT1, while there are no occurrences of terms in CAT3. Therefore, it can be noted that CAT2 has the highest percentage of terms produced by M2 among the categories, while there are no occurrences of terms in CAT3. Regarding M3, the percentages of terms in each category are as follows: (55%) in CAT1, (45%) in CAT2, while there are no occurrences of terms in CAT3. Therefore, it can be noted that CAT1 has the highest percentage of terms produced by M3 among the categories, while there are no occurrences of terms in CAT3. In terms of M4, the percentages of terms in each category are as follows: (59%) in CAT2, (41%) in CAT1, while there are no occurrences of terms in CAT3. Therefore, it can be noted that CAT2 has the highest percentage of terms produced by M4 among the categories, while there are no occurrences of terms in CAT3.

It can be further observed that the highest percentages of terms produced by M1, M2 and M4 occur in CAT2; the highest percentage of terms produced by M3 occurs in CAT1; and the only occurrences of terms produced by M1 are in CAT3. These results are discussed in the following chapter.

4.3.5.2 Comparison of the Categories within all Mechanisms

Figure 4.6 displays the percentages of computing terms of the categories within all mechanisms.

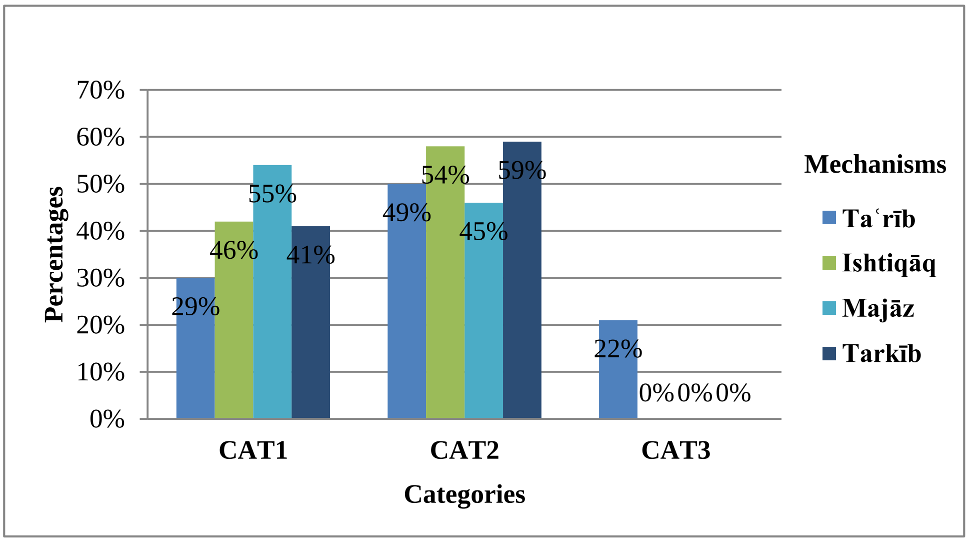

Figure 4.6: Percentages of the Computing Terms of the Categories within all Mechanisms

The percentages of CAT2 terms produced by each mechanism are as follows: M4 (59%), which has the highest percentage of CAT2 terms within the mechanisms, followed by M2 (54%), then M1 (49%), and finally M3 (45%). The percentages of CAT1 terms produced by each mechanism are as follows: M3 (55%), which has the highest percentage of CAT1 terms within the mechanisms, followed by M2 (46%), then M4 (41%), and finally M1 (29%). The CAT3 terms are only produced by M1 which accounts for (22%) of the M1 terms, as all the units of measurement terms are borrowings into Arabic. It can be concluded that M4 is the most dominant mechanism for CAT2, M3 is the most dominant mechanism for CAT1, and M1 is the only mechanism used for CAT3 terms.

4.4 Overlapping Terminology

In terms of the overlapping terminology in the corpora/sub-corpora, there are two main comparisons that will be discussed in the following section.

4.4.1 Frequency of Overlapping Terminology

The first comparison in this section focuses on the frequency of the overlapping terminology. Full details of the results of this comparison are available in Appendix B. Table 4.10 presents an overview of the results of this comparison.

Table 4.10: Frequency of Overlapping Terminology

<table>
<tr><th colspan="5">Total No. of Overlaps</th><th colspan="2">290</th><th colspan="4">%</th><th colspan="2">21%</th></tr>
<tr><th>Sub-corpus</th><th colspan="2">S1</th><th colspan="2">S2</th><th colspan="2">S3</th><th colspan="2">S4</th><th colspan="2">S5</th><th colspan="2">S6</th></tr>
<tr><th>No. of Overlaps</th><td colspan="2">132</td><td colspan="2">157</td><td colspan="2">127</td><td colspan="2">163</td><td colspan="2">151</td><td colspan="2">227</td></tr>
<tr><th>%</th><td colspan="2">46%</td><td colspan="2">54%</td><td colspan="2">44%</td><td colspan="2">56%</td><td colspan="2">52%</td><td colspan="2">78%</td></tr>
<tr><th>Corpus</th><th colspan="2">C1</th><th colspan="4">C2</th><th colspan="6">C3</th></tr>
<tr><th>AVG No. of Overlaps</th><td colspan="2">132</td><td colspan="4">142</td><td colspan="6">180.3</td></tr>
<tr><th>%</th><td colspan="2">46%</td><td colspan="4">49%</td><td colspan="6">62%</td></tr>
<tr><th>Mechanism</th><th colspan="3">M1</th><th colspan="3">M2</th><th colspan="3">M3</th><th colspan="3">M4</th></tr>
<tr><th>No. of Overlaps</th><td colspan="3">164</td><td colspan="3">39</td><td colspan="3">34</td><td colspan="3">53</td></tr>
<tr><th>%</th><td colspan="3">57%</td><td colspan="3">13%</td><td colspan="3">12%</td><td colspan="3">18%</td></tr>
<tr><th>Category</th><th colspan="4">CAT1</th><th colspan="4">CAT2</th><th colspan="4">CAT3</th></tr>
<tr><th>No. of Overlaps</th><td colspan="4">112</td><td colspan="4">137</td><td colspan="4">41</td></tr>
</table>

%	39%	47%	14%
Total No. of 2 Overlaps	121	**%**	42%
Total No. of 3 Overlaps	61	**%**	21%
Total No. of 4 Overlaps	44	**%**	15%
Total No. of 5 Overlaps	28	**%**	10%
Total No. of 6 Overlaps	36	**%**	12%

There is a total of 290 overlapping terms in the corpora/sub-corpora, which is (21%) of the total number of 1,390 terms.

The number of overlaps in each sub-corpus in proportion to the total number of overlaps is as follows: 227 overlaps (78%) in S6, which is the most subject to overlaps among the sub-corpora, 163 overlaps (56%) in S4, 157 overlaps (54%) in S2, 151 overlaps (52%) in S5, 132 overlaps (46%) in S1, and 127 overlaps (44%) in S3. The average number of overlaps in each corpus in proportion to the total number of overlaps is as follows: 180.3 overlaps (62%) in C3, which is the most subject to overlaps among the corpora, 142 overlaps (49%) in C2, and 132 overlaps (46%) in C1.

The number of overlaps for each mechanism in proportion to the total number of overlaps is as follows: 164 overlaps (57%) for M1, which is the most subject to overlaps among the mechanisms, 53 overlaps (18%) for M4, 39 overlaps (13%) for M2, and 34 overlaps (12%) for M3. The number of overlaps for each category in proportion to the total number of overlaps is as follows: 137 overlaps (47%) in CAT2, which is the most subject to overlaps among the categories, 112 overlaps (39%) in CAT1, and 41 overlaps (14%) in CAT3.

The total number of overlaps for each overlap group in proportion to the total number of overlaps is as follows: 121 overlaps (42%) for the two overlaps group, which has the highest percentage of overlaps among the overlap groups, 61 overlaps (21%) for the three overlaps group, 44 overlaps (15%) for the four overlaps group, 36 overlaps (12%) for the six overlaps group, and 28 overlaps (10%) for the five overlaps group.

4.4.2 Overlapping Terminology in the Corpora/Sub-corpora

The second comparison focuses on the overlapping terminology in the corpora/sub-corpora in general. Full details of the results of this comparison are available in Appendices C and D. The main results of this comparison are dealt with in this section. This comparison is classified into two main sections; one is concerned with the overlaps across, between and within the corpora. The other is concerned with the overlaps across and between the sub-corpora. Table 4.11 displays percentage data for all the overlapping terms in the corpora/sub-corpora and it is the source of all the comparisons made in the following section.

Table 4.11: Overlap Percentages in the Corpora/Sub-corpora

Comparators	Mechanisms				Categories			Total Overlap %
	M1	M2	M3	M4	CAT1	CAT2	CAT3	
C1, C2, C3	49%	13%	25%	13%	38%	51%	11%	**6%**
C1, C2	42%	15%	21%	22%	37%	53%	10%	**16%**
C1, C3	58%	11%	19%	13%	38%	51%	12%	**11%**
C2, C3	50%	16%	19%	15%	40%	47%	13%	**13%**
S1, S2, S3, S4, S5, S6	40%	23%	29%	9%	31%	63%	6%	**3%**
S1, S2	42%	13%	22%	23%	35%	55%	10%	**20%**
S1, S3	38%	18%	25%	19%	38%	55%	8%	**17%**
S1, S4	61%	12%	21%	6%	34%	56%	10%	**16%**
S1, S5	60%	13%	19%	7%	33%	54%	13%	**16%**
S1, S6	54%	12%	21%	13%	39%	52%	9%	**17%**
S2, S3	33%	21%	21%	25%	39%	52%	9%	**23%**
S2, S4	52%	21%	20%	8%	40%	49%	10%	**19%**
S2, S5	49%	23%	17%	10%	38%	49%	13%	**20%**
S2, S6	48%	19%	19%	13%	41%	50%	10%	**22%**
S3, S4	47%	19%	26%	7%	35%	53%	12%	**15%**
S3, S5	47%	21%	24%	8%	35%	48%	16%	**16%**
S3, S6	40%	20%	28%	12%	40%	48%	12%	**17%**
S4, S5	61%	19%	15%	5%	37%	51%	12%	**24%**
S4, S6	64%	15%	15%	5%	39%	51%	10%	**27%**
S5, S6	65%	15%	13%	7%	36%	47%	17%	**30%**
S1, S2, S3	35%	16%	27%	21%	35%	58%	6%	**9%**
S1, S2, S4	52%	14%	28%	7%	34%	53%	12%	**8%**
S1, S2, S5	52%	15%	23%	10%	33%	56%	12%	**8%**
S1, S2, S6	46%	13%	27%	13%	34%	57%	9%	**9%**
S1, S3, S4	48%	17%	29%	6%	33%	56%	10%	**7%**

S1, S3, S5	43%	19%	29%	10%	33%	60%	7%	**7%**
S1, S3, S6	38%	17%	32%	13%	40%	57%	4%	**7%**
S1, S4, S5	56%	17%	20%	7%	31%	59%	9%	**8%**
S1, S4, S6	59%	13%	22%	6%	35%	57%	7%	**9%**
S1, S5, S6	57%	14%	21%	8%	33%	56%	11%	**9%**
S2, S3, S4	43%	23%	27%	7%	39%	50%	11%	**8%**
S2, S3, S5	41%	25%	24%	10%	35%	51%	14%	**9%**
S2, S3, S6	37%	24%	28%	10%	42%	49%	9%	**9%**
S2, S4, S5	48%	25%	19%	8%	39%	50%	11%	**10%**
S2, S4, S6	51%	23%	20%	6%	41%	51%	9%	**10%**
S2, S5, S6	48%	25%	18%	10%	37%	52%	11%	**11%**
S3, S4, S5	44%	24%	26%	6%	34%	54%	12%	**8%**
S3, S4, S6	45%	22%	28%	5%	37%	55%	8%	**8%**
S3, S5, S6	44%	22%	25%	8%	36%	51%	14%	**9%**
S4, S5, S6	60%	19%	15%	5%	38%	52%	10%	**14%**
S1, S2, S3, S4	43%	18%	32%	7%	34%	57%	9%	**5%**
S1, S2, S3, S5	39%	21%	29%	11%	32%	61%	8%	**5%**
S1, S2, S3, S6	35%	19%	33%	13%	38%	58%	4%	**5%**
S1, S2, S4, S5	50%	17%	24%	9%	33%	57%	11%	**5%**
S1, S2, S4, S6	51%	15%	27%	7%	35%	56%	9%	**5%**
S1, S2, S5, S6	50%	16%	24%	10%	32%	58%	10%	**5%**
S1, S3, S4, S5	45%	21%	26%	8%	29%	63%	8%	**4%**
S1, S3, S4, S6	44%	19%	30%	7%	33%	63%	5%	**4%**
S1, S3, S5, S6	41%	20%	29%	10%	34%	61%	5%	**4%**
S1, S4, S5, S6	55%	17%	21%	8%	32%	60%	8%	**5%**
S2, S3, S4, S5	41%	27%	25%	7%	36%	52%	11%	**5%**
S2, S3, S4, S6	42%	25%	27%	6%	40%	52%	8%	**5%**
S2, S3, S5, S6	39%	27%	24%	10%	37%	53%	10%	**5%**
S2, S4, S5, S6	48%	24%	19%	8%	39%	52%	10%	**7%**
S3, S4, S5, S6	43%	24%	27%	6%	35%	55%	10%	**5%**
S1, S2, S3, S4, S5	42%	22%	28%	8%	31%	61%	8%	**3%**
S1, S2, S3, S4, S6	41%	20%	32%	7%	34%	61%	5%	**3%**
S1, S2, S3, S5, S6	38%	22%	30%	11%	32%	62%	5%	**3%**
S1, S2, S4, S5, S6	49%	18%	24%	9%	33%	58%	9%	**4%**
S1, S3, S4, S5, S6	43%	22%	27%	8%	30%	65%	5%	**3%**
S2, S3, S4, S5, S6	40%	28%	26%	7%	37%	53%	9%	**4%**

4.4.2.1 Overlaps Across, Between and Within the Corpora

The comparisons of the overlaps across and between the three corpora, and within the second and third corpora are presented in this section. The overlaps across all three corpora are presented first, followed by the overlaps between each two of the three corpora, and followed by the overlaps within each of the second and third corpora.

As highlighted previously, there are three corpora. In terms of the overlaps across all three corpora, the total overlap percentage is just (6%). M1 has the highest overlap percentage among the mechanisms (49%), followed by M3 (25%), and finally by M2 and M4 which share the lowest overlap percentage (13%). CAT2 has the highest overlap percentage among the categories (51%), followed by CAT1 (38%), and then CAT3 (11%).

In terms of the overlaps between the two corpora C1 and C2, the total overlap percentage is (16%). M1 has the highest overlap percentage among the mechanisms (42%), followed by M4 (22%), then M3 (21%), and finally M2 (15%). CAT2 has the highest overlap percentage among the categories (53%), followed by CAT1 (37%), and then CAT3 (10%).

In terms of the overlaps between the two corpora C1 and C3, the total overlap percentage is (11%). M1 has the highest overlap percentage among the mechanisms (58%), followed by M3 (19%), then M4 (13%), and finally M2 (11%). CAT2 has the highest overlap percentage among the categories (51%), followed by CAT1 (38%), and then CAT3 (12%).

In terms of the overlaps between the two corpora C2 and C3, the total overlap percentage is (13%). M1 has the highest overlap percentage among the mechanisms (50%), followed by M3 (19%), then M2 (16%), and finally M4 (15%). CAT2 has the highest overlap percentage among the categories (47%), followed by CAT1 (40%), and then CAT3 (13%).

The main results of the overlaps between any two of the three corpora show that the highest total overlap percentage occurs between C1 and C2 (16%), while the lowest overlap percentage occurs between C1 and C3 (11%). In terms of the mechanisms, the highest M1 overlap percentage occurs between C1 and C3 (58%), while the lowest M1 overlap percentage occurs between C1 and C2 (42%). The highest M2 overlap percentage occurs between C2 and C3 (16%), while the lowest M2 overlap percentage occurs between C1 and C3 (11%). The highest M3 overlap percentage occurs between C1 and C2 (21%), while the lowest M3 overlap percentage occurs between C1 and C3 and between C2 and C3 (19% each). The highest M4 overlap percentage occurs between C1 and C2 (22%), while the lowest M4 overlap percentage occurs between C1 and C3 (13%).

In terms of the categories, the highest CAT1 overlap percentage occurs between C2 and C3 (40%), while the lowest CAT1 overlap percentage occurs between C1 and C2 (37%). The highest CAT2 overlap percentage occurs between C1 and C2 (53%), while the lowest CAT2 overlap percentage occurs between C2 and C3 (47%). The highest CAT3 overlap percentage occurs between C2 and C3 (13%), while the lowest CAT3 overlap percentage occurs between C1 and C2 (10%). These results are discussed in the following chapter.

The comparisons of the overlaps within each of the second and third corpora are presented in the following sections.

4.4.2.1.1 The Second Corpus Overlaps

In terms of the overlaps within C2 which consists of the two sub-corpora S2 and S3, the total overlap percentage is (23%). M1 has the highest overlap percentage among the mechanisms (33%), followed by M4 (25%), and then by M2 and M3 which share the lowest overlap percentage (21% each). CAT2 has the highest overlap percentage among the categories (52%), followed by CAT1 (39%), and then CAT3 (9%). These results are discussed in the following chapter.

4.4.2.1.2 The Third Corpus Overlaps

The comparison of the overlaps within C3 which consists of the three sub-corpora S4, S5 and S6 is presented in this section. The overlaps across all three sub-corpora are presented first, and this is then followed by the overlaps between each two of the three sub-corpora.

In terms of the overlaps across all three sub-corpora, the total overlap percentage is (14%). M1 has the highest overlap percentage among the mechanisms (60%), followed by M2 (19%), then M3 (15%), and finally M4 (5%). CAT2 has the highest overlap percentage among the categories (52%), followed by CAT1 (38%), and then CAT3 (10%).

In terms of the overlaps between the two sub-corpora S4 and S5, the total overlap percentage is (24%). M1 has the highest overlap percentage among the mechanisms (61%), followed by M2 (19%), then M3 (15%), and finally M4 (5%). CAT2 has the highest overlap percentage among the categories (51%), followed by CAT1 (37%), and then CAT3 (12%).

In terms of the overlaps between the two sub-corpora S4 and S6, the total overlap percentage is (27%). M1 has the highest overlap percentage (64%), followed by M2 and M3 (15% each), and finally M4 (5%). CAT2 has the highest overlap percentage among the categories (51%), followed by CAT1 (39%), and then CAT3 (10%).

In terms of the overlaps between the two sub-corpora S5 and S6, the total overlap percentage is (30%). M1 has the highest overlap percentage (65%), followed by M2 (15%), then M3 (13%), and finally M4 (7%). CAT2 has the highest overlap percentage among the categories (47%), followed by CAT1 (36%), and then CAT3 (17%).

The main results of the overlaps between any two of the three sub-corpora S4, S5 and S6 show that the highest total overlap percentage occurs between S5 and S6 (30%), while the lowest overlap percentage occurs between S4 and S5 (24%). In terms of the mechanisms, the highest M1 overlap percentage occurs between S5 and S6 (65%), while the lowest overlap percentage occurs between S4 and S5 (61%). The highest M2 overlap percentage occurs between S4 and S5 (19%), while the lowest overlap percentage occurs between S4 and S6 and between S5 and S6 (15% each). The highest M3 overlap percentage occurs between S4 and S5 and between S4 and S6 (15% each), while the lowest overlap percentage occurs between S5 and S6 (13%). The highest M4 overlap percentage occurs between S5 and S6 (7%), while the lowest overlap percentage occurs between S4 and S5 and between S4 and S6 (5% each).

In terms of the categories, the highest CAT1 overlap percentage occurs between S4 and S6 (39%), while the lowest overlap percentage occurs between S5 and S6 (36%). The highest CAT2 overlap percentage occurs between S4 and S5 and between S4 and S6 (51% each), while the lowest overlap percentage occurs between S5 and S6 (47%). The highest CAT3 overlap percentage occurs between S5 and S6 (17%), while the lowest overlap percentage occurs between S4 and S6 (10%). These results are discussed in the following chapter.

4.4.2.2 Overlaps Across and Between the Sub-corpora

The main results of the comparisons concerned with the overlaps across and between the sub-corpora are presented in this section. These comparisons are classified into five sections depending on the number of the sub-corpora that overlap. The five sections start with overlaps across all sub-corpora, followed by overlaps between two sub-corpora, then overlaps across three sub-corpora, thereafter overlaps across four sub-corpora, and finally overlaps across five sub-corpora.

As highlighted previously, there are six sub-corpora. In terms of the overlaps across all six sub-corpora, the total overlap percentage is just (3%). M1 has the highest overlap percentage among the mechanisms (40%), followed by M3 (29%), then M2 (23%), and finally M4 which has the lowest overlap percentage (9%). CAT2 has the highest overlap percentage among the categories (63%), followed by CAT1 (31%), and then CAT3 (6%).

The main results of the overlaps between any two of the sub-corpora show that the highest total overlap percentage occurs between S5 and S6 (30%), while the lowest overlap percentage occurs between S3 and S4 (15%). In terms of the mechanisms, the highest M1 overlap percentage occurs between S5 and S6 (65%), while the lowest overlap percentage occurs between S2 and S3 (33%). The highest M2 overlap percentage occurs between S2 and S5 (23%), while the lowest overlap percentage occurs between S1 and S4 and between S1 and S6 (12% each). The highest M3 overlap percentage occurs between S3 and S6 (28%), while the lowest overlap percentage occurs between S5 and S6 (13%). The highest M4 overlap percentage occurs between S2 and S3 (25%), while the lowest overlap percentage occurs between S4 and S5 and between S4 and S6 (5% each).

In terms of the categories, the highest CAT1 overlap percentage occurs between S2 and S6 (41%), while the lowest overlap percentage occurs between S1 and S5 (33%). The highest CAT2 overlap percentage occurs between S1 and S4 (56%), while the lowest overlap percentage occurs between S5 and S6 (47%). The highest CAT3 overlap percentage occurs between S5 and S6 (17%), while the lowest overlap percentage occurs between S1 and S3 (8%).

The main results of the overlaps across any three sub-corpora show that the highest total overlap percentage occurs between S4, S5 and S6 (14%), while the lowest overlap percentage occurs between S1, S3 and S4, between S1, S3 and S5 and between S1, S3 and S6 (7% each). In terms of the mechanisms, the highest M1 overlap percentage occurs between S4, S5 and S6 (60%), while the lowest overlap percentage occurs between S1, S2 and S3 (35%). The highest M2 overlap percentage occurs between S2, S3 and S5, between S2, S4 and S5 and between S2, S5 and S6 (25% each), while the lowest percentage overlap occurs between S1, S2 and S6 and between S1, S4 and S6 (13% each). The highest M3 overlap percentage occurs between S1, S3 and S6 (32%), while the lowest overlap percentage occurs between S4, S5 and S6 (15%). The highest M4 overlap percentage occurs between S1, S2 and S3 (21%), while the lowest overlap percentage occurs between S3, S4 and S6 and between S4, S5 and S6 (5% each).

In terms of the categories, the highest CAT1 overlap percentage occurs between S2, S3 and S6 (42%), while the lowest overlap percentage occurs between S1, S4 and S5 (31%). The highest CAT2 overlap percentage occurs between S1, S3 and S5 (60%), while the lowest overlap percentage occurs between S2, S3 and S6 (49%). The highest CAT3 overlap percentage occurs between S2, S3 and S5 and between S3, S5 and S6 (14% each), while the lowest overlap percentage occurs between S1, S3 and S6 (4%).

The main results of the overlaps across any four sub-corpora show that the highest total overlap percentage occurs between S2, S4, S5 and S6 (7%), while the lowest overlap percentage occurs between S1, S3, S4 and S5, between S1, S3, S4 and S6 and between S1, S3, S5 and S6 (4% each). In terms of the mechanisms, the highest M1 overlap percentage occurs between S1, S4, S5 and S6 (55%), while the lowest overlap percentage occurs between S1, S2, S3 and S6 (35%). The highest M2 overlap percentage occurs between S2, S3, S4 and S5 and between S2, S3, S5 and S6 (27% each), while the lowest overlap percentage occurs between S1, S2, S4 and S6 (15%). The highest M3 overlap percentage occurs between S1, S2, S3 and S6 (33%), while the lowest overlap percentage occurs between S2, S4, S5 and S6 (19%). The highest M4 overlap percentage occurs between S1, S2, S3 and S6 (13%), while the lowest overlap percentage occurs between S2, S3, S4 and S6 and between S3, S4, S5 and S6 (6% each).

In terms of the categories, the highest CAT1 overlap percentage occurs between S2, S3, S4 and S6 (40%), while the lowest overlap percentage occurs between S1, S3, S4 and S5 (29%). The highest CAT2 overlap percentage occurs between S1, S3, S4 and S5 and between S1, S3, S4 and S6 (63% each), while the lowest overlap percentage occurs between S2, S3, S4 and S5, between S2, S3, S4 and S6 and between S2, S4, S5 and S6 (52% each). The highest CAT3 overlap percentage occurs between S1 S2, S4 and S5 and between S2, S3, S4 and S5 (11% each), while the lowest overlap percentage occurs between S1, S2, S3 and S6 (4%).

The main results of the overlaps across any five sub-corpora show that the highest total overlap percentage occurs between S1, S2, S4, S5 and S6 and between S2, S3, S4, S5 and S6 (4% each), while the lowest overlap percentage occurs between S1, S2, S3, S4 and S5, between S1, S2, S3, S4 and S6, between S1, S2, S3, S5 and S6 and between S1, S3, S4, S5 and S6 (3% each). In terms of the mechanisms, the highest M1 overlap percentage occurs between S1, S2, S4, S5 and S6 (49%), while the lowest overlap percentage occurs between S1, S2, S3, S5 and S6 (38%). The highest M2 overlap percentage occurs between S2, S3, S4, S5 and S6 (28%), while the lowest percentage occurs between S1, S2, S4, S5 and S6 (18%). The highest M3 overlap percentage occurs between S1, S2, S3, S4 and S6 (32%), while the lowest overlap percentage occurs between S1, S2, S4, S5 and S6 (24%). The highest M4 overlap percentage occurs between S1, S2, S3, S5 and S6 (11%), while the lowest overlap percentage occurs between S1, S2, S3, S4 and S6 and between S2, S3, S4, S5 and S6 (7% each).

In terms of the categories, the highest CAT1 overlap percentage occurs between S2, S3, S4, S5 and S6 (37%), while the lowest overlap percentage occurs between S1, S3, S4, S5 and S6 (30%). The highest CAT2 overlap percentage occurs between S1, S3, S4, S5 and S6 (65%), while the lowest overlap percentage occurs between S2, S3, S4, S5 and S6 (53%). The highest CAT3 overlap percentage occurs between S1, S2, S4, S5 and S6 and between S2, S3, S4, S5 and S6 (9% each), while the lowest overlap percentage occurs between S1, S2, S3, S4 and S6, between S1, S2, S3, S5 and S6 and between S1, S3, S4, S5 and S6 (5% each).

In general, it can be concluded that there are very low to moderate levels of agreement across, between and within the corpora, and across and between the sub-corpora according to the overlap percentages, albeit to various degrees.

There is a very low level of agreement across the corpora (6%), and across the sub-corpora (3%); a low level of agreement between C1 and C2 (16%), between C2 and C3 (13%), between C1 and C3 (11%), and across the sub-corpora of C3 (S4, S5 and S6) (14%). There is a moderate level of agreement between each two of the sub-corpora of C3 (S5 and S6) (30%), (S4 and S6) (27%), and (S4 and S5) (24%), and between the sub-corpora of C2 (S2 and S3) (23%). These results are discussed in the following chapter.

4.4.3 Overlaps of the Mechanisms between the Corpora

Table 4.12 displays the overlap results across and between the corpora according to the four Arabic word formation mechanisms. This table is used to compare the overlap results across all three corpora, and between each two of the corpora, in terms of the mechanisms.

Table 4.12: Overlap Percentages of the Mechanisms in the Corpora

<table>
<tr><th rowspan="2">Mechanism</th><th colspan="9">Corpus</th></tr>
<tr><th>C1</th><th>C2</th><th>C3</th><th>C1</th><th>C2</th><th>C1</th><th>C3</th><th>C2</th><th>C3</th></tr>
<tr><td>M1</td><td colspan="3">49%</td><td colspan="2">42%</td><td colspan="2">58%</td><td colspan="2">50%</td></tr>
<tr><td>M2</td><td colspan="3">13%</td><td colspan="2">15%</td><td colspan="2">11%</td><td colspan="2">16%</td></tr>
<tr><td>M3</td><td colspan="3">25%</td><td colspan="2">21%</td><td colspan="2">19%</td><td colspan="2">19%</td></tr>
<tr><td>M4</td><td colspan="3">13%</td><td colspan="2">22%</td><td colspan="2">13%</td><td colspan="2">15%</td></tr>
</table>

In terms of the mechanism overlaps across all three corpora, M1 has the highest overlap percentage (49%), followed by M3 (25%), and M2 and M4 (13% each). This means that M1 is the most common mechanism in the overlaps across the three corpora, while M2 and M4 are the least common. In terms of the mechanism overlaps between C1 and C2, M1 has the highest overlap percentage (42%), followed by M4 (22%), M3 (21%), and M2 (15%). This means that M1 is the most common mechanism in the overlaps between C1 and C2, while M2 is the least common. In terms of the mechanism overlaps between C1 and C3, M1 has the highest overlap percentage (58%), followed by M3 (19%), M4 (13%), and M2 (11%). This means that M1 is the most common mechanism in the overlaps between C1 and C3, while M2 is the least common. In terms of the mechanism overlaps between C2 and C3, M1 has the highest overlap percentage (50%), followed by M3 (19%), M2 (16%), and M4 (15%). This means that M1 is the most common mechanism in the overlaps between C2 and C3, while M4 is the least common. It can be concluded that M1 is the most common mechanism in the overlaps across and between the corpora. These results are discussed in the following chapter.

4.4.4 Overlaps of the Categories between the Corpora

Table 4.13 displays the overlap results across and between the corpora according to the three categories. This table is used to compare the overlap results across all three corpora, and between each two of the corpora, in terms of the categories.

Table 4.13: Overlap Percentages of the Categories in the Corpora

Category	Corpus								
	C1	**C2**	**C3**	**C1**	**C2**	**C1**	**C3**	**C2**	**C3**
CAT1	38%			37%		38%		40%	
CAT2	51%			53%		51%		47%	
CAT3	11%			10%		12%		13%	

In terms of the category overlaps across all three corpora, CAT2 has the highest overlap percentage (51%), followed by CAT1 (38%), and CAT3 (11%). This means that CAT2 is the most common category in the overlaps across the three corpora, while CAT3 is the least common. In terms of the category overlaps between C1 and C2, CAT2 has the highest overlap percentage (53%), followed by CAT1 (37%), and CAT3 (10%). This means that CAT2 is the most common category in the overlaps between C1 and C2, while CAT3 is the least common. In terms of the category overlaps between C1 and C3, CAT2 has the highest overlap percentage (51%), followed by CAT1 (38%), and CAT3 (12%). This means that CAT2 is the most common category in the overlaps between C1 and C3, while CAT3 is the least common. In terms of the category overlaps between C2 and C3, CAT2 has the highest overlap percentage (47%), followed by CAT1 (40%), and CAT3 (13%). This means that CAT2 is the most common category in the overlaps between C2 and C3, while CAT3 is the least common. It can be concluded that CAT2 is the most common category in the overlaps across and between the corpora, while CAT3 is the least common. These results are discussed in the following chapter.

4.5 Conclusion

With regard to the usage levels of the four Arabic word formation mechanisms in the study, it can be concluded that *taʿrīb* has the highest percentage occurrence among the mechanisms (55%), followed by *tarkīb* (21%), and then by *ishtiqāq* and *majāz* (12% each). Therefore, it can be concluded that *taʿrīb* is the most frequently used mechanism in terms of the analysed computing terminology, while *ishtiqāq* and *majāz* are the least frequently used.

In terms of the levels of occurrence of the three categories in the study, it can be concluded that software has the highest percentage occurrence among the categories (52%), followed by hardware (37%), and then by units of measurement (12%). Therefore, it can be concluded that software is the most dominant category in terms of the analysed computing terminology, followed by hardware, while units of measurement is the least dominant.

In relation to the levels of occurrence of the mechanisms in the categories, it is observed that the highest percentages of terms produced by *taʿrīb*, *ishtiqāq* and *tarkīb* occur in the software category; the highest percentage of *majāz* occurs in the hardware category; and terms in the units of measurement category are all produced by *taʿrīb*.

In relation to the percentage of terms produced by *taʿrīb* in the sub-corpora, S6 has the highest percentage among the sub-corpora (24%), while S3 has the lowest percentage (8%). Moreover, in relation to the percentage of average number of terms produced by *taʿrīb* in the corpora, C3 has the highest percentage among the corpora (42%), while C2 has the lowest percentage (19%). In relation to the percentage of terms produced by *ishtiqāq* in the sub-corpora, S2 has the highest percentage among the sub-corpora (24%), while S5 has the lowest percentage (13%). Moreover, in relation to the percentage of average number of terms produced by *ishtiqāq* in the corpora, C2 has the highest percentage among the corpora (41%), while C1 has the lowest percentage (29%). In relation to the percentage of terms produced by *majāz* in the sub-corpora, S6 has the highest percentage among the sub-corpora (22%), while S5 has the lowest percentage (11%). Furthermore, regarding the percentage of average number of terms produced by *majāz* in the corpora, C1 has the highest percentage among the corpora (35%), while C3 has the lowest percentage (31%). In relation to the percentage of terms produced by *tarkīb* in the sub-corpora, S3 has the highest percentage among the sub-corpora (30%), while S5 has the lowest percentage (5%). In addition, in terms of the percentage of average number of terms produced by *tarkīb* in the corpora, C2 has the highest percentage among the corpora (48%), while C3 has the lowest percentage (19%).

With regard to the levels of occurrence of the computing terms produced by the mechanisms and classified into the categories in the sub-corpora, it can be concluded that *taʿrīb* is the most dominant mechanism in all the sub-corpora except for S3, which has *tarkīb* as the most dominant mechanism; and that software is the most dominant among the categories, followed by hardware, while units of measurement is the least dominant. It is also observed that the highest percentage of *taʿrīb* and the lowest percentages of *ishtiqāq*, *majāz* and *tarkīb* occur in S4; the highest percentage of *ishtiqāq* occurs in S2; the highest percentage of *majāz* occurs in S2 and S3; and the highest percentage of *tarkīb* and the lowest percentage of *taʿrīb* occur in S3.

In relation to the levels of occurrence of the computing terms produced by the mechanisms and classified into the categories in the corpora, it can be concluded that *taʿrīb* is the most dominant mechanism in C1 and C3, while *tarkīb* is the most dominant mechanism in C2; and that software is the most dominant among the categories, followed by hardware, while units of measurement is the least dominant. It is also observed that the highest percentage of *taʿrīb* and the lowest percentages of *majāz* and *tarkīb* occur in C3; the highest percentages of *ishtiqāq*, *majāz* and *tarkīb* and the lowest percentage of *taʿrīb* occur in C2; and the lowest percentage of *ishtiqāq* occur in C1.

In terms of the levels of occurrence of the overlapping terminology, it can be concluded that S6 is the most subject to overlaps among the sub-corpora (with an overlap score of 78%), while S3 is the least subject to overlaps (44%); and C3 is the most subject to overlaps among the corpora (62%), while C1 is the least subject to overlaps (46%). *Taʿrīb* is the most subject to overlaps among the mechanisms (57%), while *majāz* is the least subject to overlaps (12%). Software is the most subject to overlaps among the categories (47%), while units of measurement is the least subject to overlaps (14%). Finally, the two overlaps group has the highest overlap frequency among the overlap groups (42%), while the five overlaps group has the lowest frequency (10%).

In addition, in terms of the overlaps across and between the corpora, it can be concluded that *taʿrīb* is the most common among the mechanisms; and that software is the most common among the categories, while units of measurement is the least common.

Moreover, with reference to the overlap results, it can be concluded that there is a very low level of agreement across the corpora (6%), and across the sub-corpora (3%); a low level of agreement between C1 and C2 (16%), between C2 and C3 (13%), between C1 and C3 (11%), and across the three sub-corpora of C3 (S4, S5 and S6) (14%); and that there is a moderate level of agreement between each two of the sub-corpora of C3 (S5 and S6) (30%), (S4 and S6) (27%), and (S4 and S5) (24%), and between the two sub-corpora of C2 (S2 and S3) (23%).

In the next chapter, there is a detailed discussion of the study results, ending with concluding remarks on the thesis findings.

Chapter Five: Discussion

5.1 Introduction

This chapter contains a detailed discussion of the study results and findings. It discusses the four Arabic word formation mechanisms of *taʿrīb* (lexical borrowing), *ishtiqāq* (derivation), *majāz* (semantic extension) and *tarkīb* (compounding) in terms of computing terminology creation. It discusses various aspects of the mechanism of *taʿrīb* which apply to computing terminology. The discussion of the aspects of *taʿrīb* involves loan acronyms, loanword etymology, the word classes of the loanwords, naturalized and inflectionally active loanwords, loanword gender, loanword phonology, loanword spelling, and the effects of Arabic colloquial varieties on loanword pronunciation and spelling. This is followed by an illustration of a guideline for the recommended usage of loanword spelling in accordance with the loanwords in the corpus/sub-corpus of *Muʿjam al-Ḥāsibāt* (the Cairo Academy computer dictionary). In addition, the chapter includes a discussion of the mechanism of *ishtiqāq* in terms of the Arabic 'morphological patterns' (*ʾawzān*) of the derived computing words in the study. It also contains a discussion of the mechanism of *tarkīb* in terms of the Arabic compounding forms of the Arabic computing compounds in the study. Furthermore, it discusses the terms that appear in the study in Latin script only and in both Arabic and Latin scripts. It discusses the Arabic plural forms which apply to the computing terms, and examines the *nisba* (relative adjectives) in relation to the computing terms.

In addition, this chapter provides an illustration of the extent of usage of the four Arabic word formation mechanisms in computing terminology creation in the study, the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in the Arabic language, the level of occurrence of the mechanisms in the corpora/sub-corpora, and in the terminological categories, and the category levels in the study. Moreover, the chapter presents a model for computing terminology translation according to the four Arabic word formation mechanisms.

Furthermore, the chapter contains a discussion of the results of the comparisons made among the corpora/sub-corpora in terms of the overlapping computing terminology in them. It also contains a discussion of the results of the comparisons made among the mechanisms and categories, and among the mechanisms and categories in the corpora, in terms of the overlapping computing terminology. It demonstrates the levels of agreement and similarities between the compared corpora/sub-corpora and explains the trends that can be observed. It also assesses the competence of the selected computer dictionaries in terms of computing terminology creation, and the level of consultation of these dictionaries by the selected computer magazines. Finally, it presents a summary and conclusion of the findings discussed in the chapter.

5.2 *Taʿrīb*

This section discusses the various aspects of the mechanism of *taʿrīb* which apply to computing terminology. It assesses the loan acronym results in terms of each sub-corpus and the sub-corpora as a whole in order to demonstrate the influence of acronym borrowing as a mechanism of *taʿrīb*. It discusses the etymology of loanwords in the study. In addition, it presents the word classes of the loanwords, along with the naturalized and inflectionally active loanwords, in terms of each sub-corpus, and the sub-corpora as a whole. It also provides a presentation of loanword gender in the study. It discusses the phonology of the loanwords in the study and the

English sound correspondences, and explains the Arabic treatment of the English phonemes in the study. Moreover, it discusses the effects of using variant loanword spellings among and within the sub-corpora, and demonstrates the effects of Arabic colloquial varieties on loanword pronunciation and spelling. It also offers a guideline for the recommended usage of loanword spellings in accordance with the loanwords in the corpus/sub-corpus of the Cairo Academy computer dictionary.

5.2.1 Loan Acronyms

The loan acronym results are discussed in terms of each sub-corpus and the sub-corpora as a whole in order to demonstrate the influence of acronym borrowing as a mechanism of *taʿrīb*.

S1 (*Muʿjam al-Ḥāsibāt*) has the highest percentage of loan acronyms in the sub-corpora with (30%) of the total number of *taʿrīb* terms, followed by S5 (*Majallat Sūq al-ʿAṣr*) (11%), then S3 (The Al-Kilani Dictionary of Computer and Internet Terminology) (9%), S6 (*Majallat Wāḥat al-Ḥāsib*) (8%), S4 (NetworkSet Magazine) (5%), and finally S2 (Mahmoud's Dictionary of Computer and Internet Terms) (4%). It can be noted that S1 is arguably the only sub-corpus that relies to a large extent on acronym borrowing as the other sub-corpora do not use it much. It can be concluded that since the corpus/sub-corpus of the Cairo Academy computer dictionary is produced by an official source of the language, it should be more familiar with or better equipped to apply the process of lexical borrowing than the other selected dictionaries and magazines.

In terms of the sub-corpora as a whole, there is a total of 769 *taʿrīb* terms. The terms are divided into loanwords, which form a majority of 680 terms (88%), and loan acronyms, which form a total of 89 terms (12%). This means that acronym borrowing is less influential as a mechanism of *taʿrīb* (see Figure 5.1).

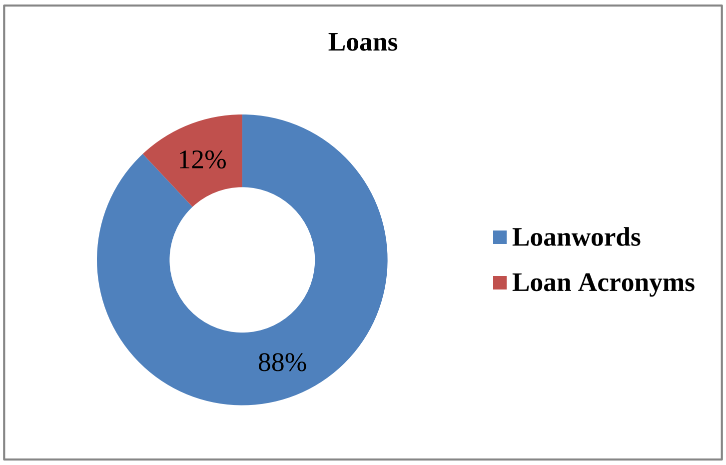

Figure 5.1: An Overview of the Sub-corpora Loanword and Loan Acronym Results

As discussed in the literature review chapter, loan acronyms are directly borrowed from the SL into the TL by using the corresponding initials. This usage can be seen in Table 5.1. It can be seen from the examples that the Arabic loan acronyms correspond phonologically to their English donor acronyms.

Table 5.1: Arabic Loan Acronym Examples

English	Arabic Transliteration
BIOS = basic input/output system	*bāyūs*
PING = packet internet groper	*binj*
DOS = disk operating system	*dūs*
RAM = random access memory	*rām*
ROM = read only memory	*rūm*
WAP = wireless application protocol	*wāb*

5.2.2 Loanword Etymology

As English is the most widely used language globally, Arabic tends to borrow more from it than from other languages. Also, as a result of the excellence of the main English-speaking countries in the various areas of technology, the Arabic-speaking countries import many of these technologies and often use lexical borrowing as a convenient mechanism to coin Arabic equivalents for the English terms. Therefore, it is safe to say that English is the language from which Arabic has borrowed most of its technical terms in recent times. However, Arabic has also used other languages as sources such as Italian, French, Turkish and Persian.

Examples of Arabic loanwords from English are *mūdim* (modem), *ʾintarnit* (internet), and *bāyt* (byte). These were three of the most common terms borrowed from English into Arabic in the study as they were used in all six sub-corpora. However, it must be noted that some terms in the study were imported into Arabic from languages other than English before they were used as technical computing terms. These terms include *baṭṭāriyya* (battery) from the Italian word *batteria*, *kharṭūsha* (cartridge) from the French word *cartouche*, *barnāmaj* (program) from the Persian word *barnāmah*, *kushk* (kiosk) from the Turkish word *köşk*, and *dardasha* (chat) from the Turkish word *dardalushmak*.

5.2.3 Word Classes of Loanwords, and Naturalized and Inflectionally Active Loanwords

The loanwords in the study were subject to various classifications in order to show the extent of the occurrence of each classified group, and to highlight loanword tendencies in the Arabic computing terminology data. The loanwords in the study were classified into nouns and adjectives, which are the only two word classes that apply to the extracted loanwords. In addition, two categories, naturalized loanwords and inflectionally active (grammatically productive) loanwords, were assigned to the loanwords.

In this section, there is a discussion of each sub-corpus and the sub-corpora as a whole in terms of these classifications. The discussion of the word classes of the loanwords is presented first, which is followed by a discussion of the two categories. In each of these discussions, all of the loanwords are also discussed with reference to the three terminological categories of hardware, software, and units of measurement. The discussion highlights which word classes are more common for the loanwords in the study, the sub-corpora, and the three terminological categories. It also shows the levels of occurrence of the naturalized and the inflectionally active loanwords in the study, the sub-corpora, and the three categories. The discussion is illustrated with examples from the study. Concluding remarks are offered at the end of the two main discussions.

Table 5.2: Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
S1				
Loanwords	92%	8%	35%	18%
CAT1	34%	0%	25%	0%
CAT2	47%	100%	61%	100%
CAT3	19%	0%	14%	0%
S2				
Loanwords	94%	6%	58%	26%
CAT1	32%	0%	37%	5%
CAT2	43%	100%	46%	95%
CAT3	25%	0%	17%	0%
S3				
Loanwords	89%	11%	47%	25%
CAT1	30%	0%	23%	0%
CAT2	39%	100%	60%	100%
CAT3	32%	0%	17%	0%
S4				
Loanwords	94%	6%	40%	17%
CAT1	32%	0%	42%	7%
CAT2	54%	100%	50%	93%
CAT3	14%	0%	8%	0%
S5				

Loanwords	92%	8%	52%	21%
CAT1	31%	0%	36%	0%
CAT2	41%	100%	52%	100%
CAT3	28%	0%	11%	0%
S6				
Loanwords	93%	7%	46%	19%
CAT1	29%	0%	40%	6%
CAT2	42%	100%	46%	94%
CAT3	30%	0%	13%	0%
Total in the Sub-Corpora				
Loanwords	93%	7%	45%	20%
CAT1	31%	0%	36%	3%
CAT2	45%	100%	51%	97%
CAT3	23%	0%	13%	0%

In terms of S1, the total number of loanwords is 146. The loanwords are divided between nouns, which form a majority of 134 terms (92% of the total number of S1 loanwords), and adjectives, which form a total of only 12 terms (8%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S1. In relation to nouns, the number of terms in each category is as follows: 63 terms (47% of S1 noun loanwords) in CAT2 (software), 46 terms (34%) in CAT1 (hardware), and 25 terms (19%) in CAT3 (units of measurement), which means that CAT2 is the most dominant category, while CAT3 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (12 terms; 100% of S1 adjective loanwords).

In terms of S2, the total number of loanwords is 80. The loanwords are divided between nouns, which form a majority of 75 terms (94% of the total number of S2 loanwords), and adjectives, which form only five terms (6%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S2. In relation to nouns, the number of terms in each category is as follows: 32 terms (43% of S2 noun loanwords) in CAT2, 24 terms (32%) in CAT1, and 19 terms (25%) in CAT3, which means that CAT2 is the most dominant category, while CAT3 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (five terms; 100% of S2 adjective loanwords).

In terms of S3, the total number of loanwords is 64. The loanwords are divided between nouns, which form a majority of 57 terms (89% of the total number of S3 loanwords), and adjectives, which form only seven terms (11%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S3. In relation to nouns, the number of terms in each category is as follows: 22 terms (39% of S3 noun loanwords) in CAT2, 18 terms (32%) in CAT3, and 17 terms (30%) in CAT1, which means that CAT2 is the most dominant category, while CAT1 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (seven terms; 100% of S3 adjective loanwords).

In terms of S4, the total number of loanwords is 179. The loanwords are divided between nouns, which form a majority of 169 terms (94% of the total number of S4 loanwords), and adjectives, which form only ten terms (6%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S4. In relation to nouns, the number of terms in each category is as follows: 92 terms (54% of S4 noun loanwords) in CAT2, 54 terms (32%) in CAT1, and 23 terms (14%) in CAT3, which means that CAT2 is the most dominant category in S4, while CAT3 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (ten terms; 100% of S4 adjective loanwords).

In terms of S5, the total number of loanwords is 117. The loanwords are divided between nouns, which form a majority of 108 terms (92% of the total number of S5 loanwords), and adjectives, which form only nine terms (8%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S5. In relation to nouns, the number of terms in each category is as follows: 44 terms

(41% of S5 noun loanwords) in CAT2, 34 terms (31%) in CAT1, and 30 terms (28%) in CAT3, which means that CAT2 is the most dominant category in S5, while CAT3 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (nine terms; 100% of S5 adjective loanwords).

In terms of S6, the total number of loanwords is 183. The loanwords are divided between nouns, which form a majority of 171 terms (93% of the total number of S6 loanwords), and adjectives, which form only 12 terms (7%) (see Table 5.2). Therefore, it can be concluded that nouns are much more dominant than adjectives in S6. In relation to nouns, the number of terms in each category is as follows: 71 terms (42% of S6 noun loanwords) in CAT2, 51 terms (30%) in CAT3, and 49 terms (29%) in CAT1, which means that CAT2 is the most dominant category, while CAT1 is the least dominant. In relation to adjectives, all of the loanwords are in CAT2 (12 terms; 100% of S6 adjective loanwords).

In terms of the sub-corpora as a whole, the total number of loanwords is 769. The loanwords are divided between nouns, which form a majority of 714 terms (93%), and adjectives, which form only 55 terms (7%) (see Table 5.2). As a result, it can be noted that nouns comprise the majority of the loanwords, while adjectives comprise the minority. Therefore, it can be concluded that nouns are much more dominant than adjectives in the sub-corpora. This means that the Arabic computing loanwords are mostly nouns, occasionally adjectives, and almost never verbs, as they do not occur in the study.

In relation to noun loanwords, the total number of terms in each category is as follows: 324 terms (45%) in CAT2, 224 terms (31%) in CAT1, and 166 terms (23%) in CAT3, which means that CAT2 is the most dominant category, while CAT3 is the least dominant (see Table 5.2). Therefore, it can be concluded that the noun loanwords in the Arabic computing terminology are mostly software terms, and to a lesser extent hardware and units of measurement terms, respectively. In relation to adjective loanwords, all 55 terms are in CAT2. Therefore, it can also be concluded that adjective loanwords in the Arabic computing terminology are only software terms, and in relation to this study these loanwords are never hardware or units of measurement terms.

Examples of the terms from the applicable terminological categories for each of the noun and adjective loanwords in the study are:

Hardware noun loanwords: *mūdim* (modem).

Software noun loanwords: *barnāmaj* (program).

Units of measurement noun loanwords: *jayjā* (giga).

Software adjective loanwords: *ʾiliktrūnī* (electronic).

The naturalized loanwords and the inflectionally active loanwords in the study will now be discussed. The loanwords are identified as naturalized if they have become part of the Arabic language or if they are no longer viewed as foreign words such as *kumbiyūtir* (computer) and *barmajah* (programming). The loanwords are identified as inflectionally active if they can turn from one word class into another, specifically from a noun to an adjective or a verb, or from an adjective to a noun or a verb, as nouns and adjectives are the only two word classes found in the extracted loanwords. Examples from the study are as follows:

The noun *tiknūlūjyā* (technology) can turn into an adjective as in *tiknūlūjī* (technological).

The noun *fayrūs* (virus) can turn into a verb as in *yatafayras* (getting a virus).

The adjective *ʾūtūmātīkī* (automatic) can turn into a noun as in *ʾawtama* or *ʾatmata* (automation).

In terms of S1, the total number of loanwords is 146. Naturalized loanwords comprise 51 terms (35% of the total number of S1 loanwords), while inflectionally active loanwords comprise 26 terms (18%) (see Table 5.2). In relation to the naturalized loanwords, there are 31 terms (61% of S1 naturalized loanwords) in CAT2, 13 terms (25%) in CAT1, and seven terms (14%) in CAT3, which means that naturalized loanwords in S1 most frequently occur in CAT2, while they occur least frequently in CAT3. All of the inflectionally active loanwords appear in CAT2 (26 terms; 100% of S1 inflectionally active loanwords), which means that inflectionally active loanwords in S1 only occur in CAT2, while they never occur in CAT1 and CAT3.

In terms of S2, the total number of loanwords is 80. Naturalized loanwords comprise 46 terms (58% of the total number of S2 loanwords), while inflectionally active loanwords comprise 21 terms (26%) (see Table 5.2). In relation to the naturalized loanwords, there are 21 terms (46% of S2 naturalized loanwords) in CAT2, 17 terms (37%) in CAT1, and eight terms (17%) in CAT3, which means that naturalized loanwords most frequently occur in CAT2, while they least frequently occur in CAT3. In relation to the inflectionally active loanwords, CAT2 comprises the majority of loanwords with 26 terms (95% of S2 inflectionally active loanwords), while CAT1 comprises only one term (5%), which means that inflectionally active loanwords in S2 most frequently occur in CAT2, while they rarely occur in CAT1 and never occur in CAT3.

In terms of S3, the total number of loanwords is 64. Naturalized loanwords comprise 30 terms (47% of the total number of S3 loanwords), while inflectionally active loanwords comprise 16 terms (25%) (see Table 5.2). In relation to the naturalized loanwords, there are 18 terms (60% of S3 naturalized loanwords) in CAT2, seven terms (23%) in CAT1, and five terms (17%) in CAT3, which means that naturalized loanwords in S3 most frequently occur in CAT2, while they least frequently occur in CAT3. All of the inflectionally active loanwords occur in CAT2 (16 terms; 100% of S3 inflectionally active loanwords), which means that inflectionally active loanwords in S3 only occur in CAT2, while they never occur in CAT1 and CAT3.

In terms of S4, the total number of loanwords is 179. Naturalized loanwords comprise 72 terms (40% of the total number of S4 loanwords), while inflectionally active loanwords comprise 30 terms (17%) (see Table 5.2). In relation to the naturalized loanwords, there are 36 terms (50% of S4 naturalized loanwords) in CAT2, 30 terms (42%) in CAT1, and six terms (8%) in CAT3, which means that naturalized loanwords in S4 most frequently occur in CAT2, while they least frequently occur in CAT3. In relation to the inflectionally active loanwords, CAT2 comprises the majority of loanwords with 28 terms (93% of S4 inflectionally active loanwords), while CAT1 comprises only two terms (7%), which means that inflectionally active loanwords in S4 most frequently occur in CAT2, while they rarely occur in CAT1, and never occur in CAT3.

In terms of S5, the total number of loanwords is 117. Naturalized loanwords comprise 61 terms (52% of the total number of S5 loanwords), while inflectionally active loanwords comprise 25 terms (21%) (see Table 5.2). In relation to the naturalized loanwords, there are 32 terms (52% of S5 naturalized loanwords) in CAT2, 22 terms (36%) in CAT1, and seven terms (11%) in CAT3, which means that naturalized loanwords in S4 most frequently occur in CAT2, while they least frequently occur in CAT3. All of the inflectionally active loanwords occur in CAT2 (25 terms; 100% of S5 inflectionally active loanwords), which means that inflectionally active loanwords in S5 only occur in CAT2, while they never occur in CAT1 and CAT3.

In terms of S6, the total number of loanwords is 183. Naturalized loanwords comprise 84 terms (46% of the total number of S6 loanwords), while inflectionally active loanwords comprise 34 terms (19%) (see Table 5.2). In relation to the naturalized loanwords, there are 39 terms (46% of S6 naturalized loanwords) in CAT2, 34 terms (40%) in CAT1, and 11 terms (13%) in CAT3, which means that naturalized loanwords in S6 most frequently occur in CAT2, while they least frequently occur in CAT3. In relation to the inflectionally active loanwords, CAT2 comprises the majority of loanwords with 32 terms (94% of S6 inflectionally active loanwords), while CAT1 comprises only two terms (6%), which means that inflectionally active loanwords in S6 most frequently occur in CAT2, while they rarely occur in CAT1, and they never occur in CAT3.

As mentioned earlier, the total number of loanwords in the sub-corpora as a whole is 769. The naturalized loanwords comprise 344 terms (45% of the total number of loanwords). This means that there is a moderate tendency to naturalize Arabic computing loanwords. There are 177 naturalized loanword terms (51% of naturalized loanwords) in CAT2, 123 terms (36%) in CAT1, and 44 terms (13%) in CAT3, which means that naturalized loanwords most frequently occur in CAT2, followed by CAT1, while they least frequently occur in CAT3 (see Table 5.2). Therefore, it can be concluded that the software terms are the most naturalized Arabic computing loanwords, and to a lesser extent the hardware and units of measurement terms. This could be due to the fact that CAT2 has the highest percentage of loanwords in the study at (49%), followed by CAT1 (29%), while CAT3 has the lowest percentage (22%).

The inflectionally active loanwords comprise 152 terms (20% of the total number of loanwords). This means that there is a relatively low tendency for Arabic computing loanwords to be inflectionally active. In relation to the inflectionally active loanwords, the majority of loanwords are in CAT2 (147 terms; 97% of inflectionally active loanwords), while only five terms are in CAT1 (3%) (see Table 5.2). This means that inflectionally active loanwords most frequently occur in CAT2, while they rarely occur in CAT1, and they never occur in CAT3. Therefore, it can be concluded that the software terms are the most inflectionally active Arabic computing loanwords, and to a much lesser extent the hardware terms, but never the units of measurement terms. This could be related to the same reason highlighted for the naturalized loanwords, but in part it is because the units of measurement terms cannot be inflectionally active.

Examples of the applicable terminological categories for the naturalized and inflectionally active loanwords from the study are:

Hardware naturalized loanwords: *baṭṭāriyya* (battery).

Software naturalized loanwords: *tiknūlūjyā* (technology).

Units of measurement naturalized loanwords: *kīlū* (kilo).

Hardware inflectionally active loanwords: *filtar* (filter).

Software inflectionally active loanwords: *ʾūtūmātīkī* (automatic).

5.2.4 Loanword Gender

In Arabic computing terminology, singular loanwords are mostly masculine but sometimes they are feminine. Therefore, the following discussion assesses the cases of singular feminine computing loanwords illustrated by examples from the study.

The Arabic feminine noun is of two types:

1- The True Feminine (*ḥaqīqī*)

This type can be identified by one of the three feminine signs. The most common way to identify a feminine word is by the suffix the (*tāʾ marbūṭa*) *a* (ـة or ة). Most singular feminine noun loanwords and all singular feminine adjective loanwords end in *tāʾ marbūṭa*. Examples are:

Nouns: *baṭṭāriyya* (battery), *ʾayqūna* (icon), and *faltara* (filtering).

Adjectives: *ʾūtūmātiyya* (automatic), *ʾiliktrūniyya* (electronic), and *daynāmiyya* (dynamic).

Singular feminine words can also be identified by the suffix the (*ʾalif mamdūda*) *āʾ* (اء) as in *ḥamrāʾ* (red), or the (*ʾalif maqṣūra*) *ā* (ى) as in *ḥublā* (pregnant).

2- The Figurative Feminine (*majāzī*)

This type is not identified by any of the three feminine signs. Singular feminine words can be identified by Arabs as feminine as in *kāmirā* (camera), as feminine by nature as in *ʾum* (mother), or by using them with feminine adjectives and so forth as in *mīmūrī* (memory), which is a feminine loanword that can be described with a feminine adjective as *mīmūrī dākhiliyya* (internal memory).

Singular masculine loanwords regularly use the feminine sound plural rather than the masculine sound plural as loanwords do not usually fit the Arabic phonological system, as in *mūdim* (modem), *mūdimāt* (modems).

Examples of singular masculine loanwords are:

Nouns: *dunjul* (dongle), *filtar* (filter), *kūd* (code), and *brūksī* (proxy).

Adjectives: *ʾūtūmātī* (automatic), *ʾiliktrūnī* (electronic), *daynāmī* (dynamic), and *istātī* (static).

5.2.5 Loanword Phonology

In terms of the phonology of the loanwords in the study, Table 5.3 (the overview table) presents the Arabic treatment of English phonemes for the computing terminology in the study along with examples. The English phonemes are presented against the corresponding Arabic phonemes in the table. It can be noted that in most cases the corresponding transcription in Arabic is based not on the pronunciation of the sounds in question, or the phonemes, but on the written symbols (i.e. the graphemes).

It should be noted that there is a data calculation for the correspondences between the consonant phonemes but not for the vowels in the tables presenting the sub-corpora results in this section; this is because such a calculation would not serve the purposes of this study. Arabic vowel phoneme correspondences may differ depending on the speaker but this is not the case for consonants, which depend on the graphemes. Consonant phonemes have clearer correspondences than vowel phonemes since loanwords in Arabic are regularly written without diacritics, which make the vowel phoneme correspondences trickier to point out. This leads vowel phoneme correspondences to have more possibilities than consonants.

In terms of the loanwords in the study, the majority of English phonemes are represented by their counterparts in Arabic. However, in some cases single English phonemes are represented by two or more different phonemes in Arabic or vice versa. This section discusses the findings highlighted in the overview table and also in relation to each of the six sub-corpora in the study.

Table 5.3: Overview of the English Loanword Phoneme Correspondences in Arabic

English Phoneme	Arabic Phoneme	Donor word	Transcription	Loanword	Transcription
Consonants					
/d/	/d/	modem	/ˈməʊdem/	مودم	/mu:dim/
	/t/	card	/kɑ:(r)d/	كارت	/ka:rt/
/t/	/t/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	font	/fɒnt/	فونط	/funtˤ/
/g/	/ʤ/	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/ʁ/	mega	/ˈmegə/	ميغا	/majʁa:/
	/q/	giga	/gɪgə/	قيقا	/qajqa:/
/g/	/ʤ/	dongle	/ˈdɒŋg(ə)l/	دنجل	/dunʤul/
/dʒ/		technology	/tekˈnɒlədʒi/	تكنولوجيا	/tiknulu:ʤja:/
/k/	/k/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
	/x/	cartridge/ *cartouche*	/kaRtuʃ/	(fr) خرطوشة	/xartˤu:ʃa/
/s/	/s/	console	/kənˈsəʊl/	كونسول	/kunsu:l/
	/sˤ/	console	/kənˈsəʊl/	كونصول	/kunsˤu:l/
	/z/	hertz	/hɜ:(r)ts/	هرتز	/hirtz/
/b/	/b/	cable	/ˈkeɪb(ə)l/	كبل	/kabl/
/p/		proxy	/ˈprɒksi/	بروكسي	/bruksi:/
/f/	/f/	font	/fɒnt/	فونط	/funtˤ/
/v/		video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/ʃ/	/ʃ/	cash	/kæʃ/	كاش	/ka:ʃ/
/tʃ/		chat	/tʃæt/	شات	/ʃa:t/
/n/	/n/	font	/fɒnt/	فونط	/funtˤ/
/ŋ/		dongle	/ˈdɒŋg(ə)l/	دُنجل	/dunʤul/
/θ/	/θ/	bluetooth	/ˈblu:ˌtu:θ/	بلوتوث	/blu:tu:θ/
/h/	/h/	hardware	/ˈhɑ:(r)dˌweə(r)/	هاردوير	/ha:rdwajr/
/l/	/l/	cable	/ˈkeɪb(ə)l/	كبل	/kabl/
/m/	/m/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
/r/	/r/	microfilm	/ˈmaɪkrəʊˌfɪlm/	ميكروفيلم	/majkru:film/
/w/	/w/	hardware	/ˈhɑ:(r)dˌweə(r)/	هاردوير	/ha:rdwajr/
/j/	/j/	computer	/kəmˈpju:tə(r)/	كمبيوتر	/kumbju:tir/
/z/	/z/	transistor	/trænˈzɪstə(r)/	ترانزستور	/tra:nzistu:r/
Vowels					
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u/	computer	/kəmˈpju:tə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزستور	/tra:nzistu:r/
/æ/	/a/	hacker	/ˈhækə(r)/	هكر	/hakar/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
/ɒ/	/u/	proxy	/ˈprɒksi/	بروكسي	/bruksi:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/ʌ/	/a/	buffer	/ˈbʌfə(r)/	بفر	/bafar/
/ʊ/	/u/	netbook	/ˈnetbʊk/	نتبوك	nitbuk
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i:/	electronic	ɪlekˈtrɒnɪk	إليكتروني	ʔili:ktru:ni:
	/aj/	mega	/ˈmegə/	ميجا	/majʤa:/
/ɪ/	/i/	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
	/i:/	dynamic	/daɪˈnæmɪk/	ديناميكي	/di:na:mi:ki:/

	/aj/	giga	/gɪgə/	جيجا	/ʤajʤa:/
/ɑ:/	/a:/	hardware	/ˈhɑ:(r)dˌweə(r)/	هاردوير	/ha:rdwajr/
	/a/	card	kɑ:(r)d	كرت	kart
/ɔ:/	/u:/	broadband	/ˈbrɔ:dˌbænd/	برودباند	/bru:dba:nd/
	/u/	automatic	/ˌɔ:təˈmætɪk/	أتوماتي	/ʔutu:ma:ti:/
/u:/	/u:/	bluetooth	/ˈblu:ˌtu:θ/	بلوتوث	/blu:tu:θ/
/i:/	/i:/	kilo	/ˈki:ləʊ/	كيلو	/ki:lu:/
	/i/	nanometre	/ˈnænəʊˌmi:tə(r)/	نانومتر	/na:nu:mitr/
/ɜ:/	/u:/	password	/ˈpɑ:sˌwɜ:(r)d/	باسوورد	/ba:swu:rd/
	/i/	hertz	/hɜ:(r)ts/	هرتز	/hirtz/
	/ai/	server	/ˈsɜ:(r)və(r)/	سيرفر	/sajrfar/

As can be seen from Table 5.3, in terms of the consonant correspondences, the English phoneme /d/ is rendered in Arabic as /d/ or /t/. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. The English phoneme /g/ is rendered in Arabic as /ʤ/, /ʁ/ or /q/. The English phonemes /g/ and /dʒ/ are both rendered in Arabic as /ʤ/. The English phoneme /k/ is rendered in Arabic as /k/, /q/ or /x/. The English phoneme /s/ is rendered in Arabic as /s/, /sˤ/ or /z/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The English phonemes /ʃ/ and /tʃ/ are both rendered in Arabic as /ʃ/. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /æ/ is rendered in Arabic as the vowel phoneme /a/ or /a:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɑ:/ is rendered in Arabic as the vowel phoneme /a:/ or /a/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/ or /u/. The English vowel phoneme /u:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /i:/ is rendered in Arabic as the vowel phoneme /i:/ or /i/. The

English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /u:/ or /i/, or the diphthong phoneme /aj/.

Muʿjam al-Ḥāsibāt

Table 5.4: S1 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/k/	/k/	49	94%	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	2	4%	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
	/x/	1	2%	cartridge/ *cartouche*	/kaRtuʃ/	خرطوشة (fr)	/xartˁu:ʃa/
/s/	/s/	36	92%	console	/kənˈsəʊl/	كونسول	/kunsu:l/
	/sˁ/	1	3%	console	/kənˈsəʊl/	كونصول	/kunsˁu:l/
	/z/	2	5%	hertz	/hɜ:(r)ts/	هرتز	/hirtz/
/t/	/t/	60	94%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˁ/	4	6%	font	/fɒnt/	فونط	/funtˁ/
/b/	/b/	20	38%	cable	/ˈkeɪb(ə)l/	كبل	/kabl/
/p/		33	62%	proxy	/ˈprɒksi/	بروكسي	/bruksi:/
/g/	/ʤ/	17	74%	dongle	/ˈdɒŋg(ə)l/	دُنجل	/dundʒul/
/dʒ/		6	26%	gadget	/ˈgædʒɪt/	جادجت	/ʤa:ʤit/
/f/	/f/	18	75%	font	/fɒnt/	فونط	/funtˁ/
/v/		6	25%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/n/	/n/	30	88%	font	/fɒnt/	فونط	/funtˁ/
/ŋ/		4	12%	dongle	/ˈdɒŋg(ə)l/	دُنجل	/dundʒul/

Vowels					
English Phoneme	**Arabic Phoneme**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزستُور	/tra:nzistu:r/
/ɒ/	/u/	proxy	/ˈprɒksi/	بروكسي	/bruksi:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/aj/	mega	/ˈmegə/	ميجا	/majʤa:/
/ɪ/	/i/	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
	/i:/	dynamic	/daɪˈnæmɪk/	ديناميكي	/di:na:mi:ki:/
	/aj/	giga	/gɪgə/	جيجا	/ʤajʤa:/
/ɔ:/	/u:/	semaphore	/ˈseməˌfɔ:(r)/	سيمافور	/si:ma:fu:r/
	/u/	automatic	/ˌɔ:təˈmætɪk/	أتوماتي	/ʔutu:ma:ti:/

As can be seen from Table 5.4, in terms of the consonant correspondences, the English phoneme /k/ is rendered in Arabic as /k/, /q/ or /x/. In (94%) of cases it is rendered as /k/, while in (4%) and (2%) of cases it is rendered as /q/ and /x/, respectively. The English phoneme /s/ is rendered in Arabic as /s/, /sˁ/ or /z/. In (92%)

of cases it is rendered as /s/, while in (5%) and (3%) of cases it is rendered as /z/ and /sˤ/, respectively. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. In (94%) of cases it is rendered as /t/, while in (6%) of cases it is rendered as /tˤ/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. The phoneme /p/ represents (62%) of cases, while the phoneme /b/ represents (38%) of cases. The English phonemes /g/ and /dʒ/ are both rendered in Arabic as /ʤ/. The phoneme /g/ represents (74%) of cases, while the phoneme /ʤ/ represents (26%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The phoneme /f/ represents (75%) of cases, while the phoneme /v/ represents (25%) of cases. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/. The phoneme /n/ represents (88%) of cases, while the phoneme /ŋ/ represents (12%) of cases.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/ or /u/.

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Table 5.5: S2 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/d/	/d/	10	83%	modem	/ˈməʊdem/	مودم	/mu:dim/
	/t/	2	17%	card	/kɑ:(r)d/	كارت	/ka:rt/
/t/	/t/	39	91%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	4	9%	watt	/wɒt/	واط	/wa:tˤ/
/k/	/k/	32	91%	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	1	3%	icon	/ˈaɪkɒn/	أيقون	/ʔajqu:n/
	/x/	2	6%	cartridge/	/kaRtuʃ/	(fr) خرطوشة	/xartˤu:ʃa/

				cartouche			
/s/	/s/	10	77%	mouse	/maʊs/	ماوس	/ma:ws/
	/z/	3	23%	hertz	/hɜː(r)ts/	هرتز	/hirtz/
/b/	/b/	17	50%	cable	/ˈkeɪb(ə)l/	كبل	/kabl/
/p/		17	50%	proxy	/ˈprɒksi/	بروكسي	/bruksi:/
/g/	/ʤ/	11	85%	giga	/ɡɪɡə/	جيجا	/ʤajʤa:/
/dʒ/		2	15%	jumper	/ˈdʒʌmpə(r)/	جامبر	/ʤa:mbar/
/f/	/f/	6	60%	format	/ˈfɔː(r)mæt/	فورمات	/fu:rma:t/
/v/		4	40%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/n/	/n/	19	95%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
/ŋ/		1	5%	PING	/pɪŋ/	بينج	/bi:nʤ/

Vowels

English Phoneme	Arabic Phoneme	Donor word	Transcription	Loanword	Transcription
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u/	computer	/kəmˈpjuːtə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزيستور	/tra:nzi:stu:r/
/ɒ/	/u/	technology	/tekˈnɒlədʒi/	تكنولوجيا	/tiknulu:ʤja:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/aj/	mega	/ˈmeɡə/	ميجا	/majʤa:/
/ɪ/	/i/	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
	/i:/	dynamic	/daɪˈnæmɪk/	ديناميكي	/di:na:mi:ki:/
	/aj/	giga	/ɡɪɡə/	جيجا	/ʤajʤa:/
/ɑ:/	/a:/	card	/kɑː(r)d/	كارت	/ka:rt/
	/a/	card	/kɑː(r)d/	كرت	/kart/
/ɜ:/	/i/	hertz	/hɜː(r)ts/	هرتز	/hirtz/
	/aj/	hertz	/hɜː(r)ts/	هيرتز	/hajrtz/

As can be seen from Table 5.5, in terms of the consonant correspondences, the English phoneme /d/ is rendered in Arabic as /d/ or /t/. In (83%) of cases it is rendered as /d/, while in (17%) of cases it is rendered as /t/. The English phoneme /t/ is rendered in Arabic as /t/ or /$t^ʕ$/. In (91%) of cases it is rendered as /t/, while in (9%) of cases it is rendered as /$t^ʕ$/. The English phoneme /k/ is rendered in Arabic as /k/, /q/ or /x/. In (91%) of cases it is rendered as /k/, while in (6%) and (3%) of cases it is rendered as /x/ and /q/, respectively. The English phoneme /s/ is rendered in Arabic as /s/ or /z/. In (77%) of cases it is rendered as /s/, while in (23%) of cases it is rendered as /z/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. Each of the phonemes /b/ and /p/ are equally represented (both occurring in 50% of cases). The English phonemes /g/ and /dʒ/ are both rendered in Arabic as /ʤ/. The phoneme

/g/ represents (85%) of cases, while the phoneme /dʒ/ represents (15%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The phoneme /f/ represents (60%) of cases, while the phoneme /v/ represents (40%) of cases. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/. The phoneme /n/ represents (95%) of cases, while the phoneme /ŋ/ represents (5%) of cases.

In terms of the vowel correspondences, it is evident that the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɑ:/ is rendered in Arabic as the vowel phoneme /a:/ or /a/. The English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/.

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Table 5.6: S3 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/g/	/ʤ/	9	64%	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/ʁ/	5	36%	mega	/ˈmegə/	ميغا	/majʁa:/
/k/	/k/	31	94%	cartridge	/ˈkɑ:(r)trɪʤ/	كارتريدج	/ka:rtriʤ/
	/q/	1	3%	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
	/x/	1	3%	cartridge/ *cartouche*	/kaRtuʃ/	(fr) خرطوشة	/xartˤu:ʃa/
/s/	/s/	6	67%	console	/kənˈsəʊl/	كونسول	/kunsu:l/
	/z/	3	33%	hertz	/hɜ:(r)ts/	هرتز	/hirtz/
/t/	/t/	61	98%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	1	2%	cartridge/ *cartouche*	/kaRtuʃ/	(fr) خرطوشة	/xartˤu:ʃa/
/b/	/b/	13	50%	cable	/ˈkeɪb(ə)l/	كبل	/kabl/
/p/		13	50%	computer	/kəmˈpju:tə(r)/	كمبيوتر	/kumbju:tir/
/f/	/f/	5	63%	microfilm	/ˈmaɪkrəʊˌfɪlm/	ميكروفيلم	/majkru:film/
/v/		3	38%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
Vowels							

English Phoneme	Arabic Phoneme	Donor word	Transcription	Loanword	Transcription
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	computer	/kəmˈpjuːtə(r)/	كمبيوتر	/kumbju:tir/
	/u/	computer	/kəmˈpjuːtə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزستور	/tra:nzistu:r/
/ɒ/	/u/	technology	/tekˈnɒlədʒi/	تكنولوجيا	/tiknulu:ʤja:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/aj/	mega	/ˈmegə/	ميغا	/majʁa:/
/ɪ/	/i/	cartridge	/ˈkɑː(r)trɪdʒ/	كارتريدج	/ka:rtriʤ/
	/i:/	dynamic	/daɪˈnæmɪk/	ديناميكي	/di:na:mi:ki:/
	/aj/	giga	/gɪgə/	جيجا	/ʤajʤa:/
/ɔ:/	/u:/	baud	/bɔːd/	بود	/bu:d/
/ɜ:/	/i/	hertz	/hɜː(r)ts/	هرتز	/hirtz/
	/aj/	hertz	/hɜː(r)ts/	هيرتز	/hajrtz/

As can be seen from Table 5.6, in terms of the consonant correspondences, the English phoneme /g/ is rendered in Arabic as /ʤ/ or /ʁ/. In (64%) of cases it is rendered as /ʤ/, while in (36%) of cases it is rendered as /ʁ/. The English phoneme /k/ is rendered in Arabic as /k/, /q/ or /x/. In (94%) of cases it is rendered as /k/, while in (3%) of cases it is rendered as /q/ and in (3%) of cases as /x/. The English phoneme /s/ is rendered in Arabic as /s/ or /z/. In (67%) of cases it is rendered as /s/, while in (33%) of cases it is rendered as /z/. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. In (98%) of cases it is rendered as /t/, while in (2%) of cases it is rendered as /tˤ/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. Each of the phonemes /b/ and /p/ are equally represented in (50%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The phoneme /f/ represents (63%) of cases, while the phoneme /v/ represents (38%) of cases.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/.

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Table 5.7: S4 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/d/	/d/	27	93%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
	/t/	2	7%	card	/kɑː(r)d/	كارت	/ka:rt/
/t/	/t/	92	98%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	2	2%	battery/ *batteria*	/batteˈria/	(it) بطارية	/batˤtˤa:rijja/
/g/	/ʤ/	8	47%	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/ʁ/	9	53%	mega	/ˈmegə/	ميغا	/majʁa:/
/k/	/k/	67	97%	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	2	3%	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
/s/	/s/	46	90%	mouse	/maʊs/	ماوس	/ma:ws/
	/z/	5	10%	hertz	/hɜː(r)ts/	هرتز	/hirtz/
/b/	/b/	28	47%	cable	/ˈkeɪb(ə)l/	كابل	/ka:bl/
/p/		31	53%	computer	/kəmˈpjuːtə(r)/	كمبيوتر	/kumbju:tir/
/f/	/f/	14	50%	software	/ˈsɒf(t)ˌweə(r)/	سوفتوير	/su:ftwajr/
/v/		14	50%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/ʃ/	/ʃ/	2	33%	cash	/kæʃ/	كاش	/ka:ʃ/
/tʃ/		4	67%	switch	/swɪtʃ/	سويتش	/switʃ/
/n/	/n/	38	84%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
/ŋ/		7	16%	link	/lɪŋk/	لينك	/link/

Vowels					
English Phoneme	**Arabic Phoneme**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u/	computer	/kəmˈpjuːtə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	computer	/kəmˈpjuːtə(r)/	كومبيوتر	/ku:mbju:tir/
/ɒ/	/u/	technology	/tekˈnɒlədʒi/	تكنولوجيا	/tiknulu:ʤja:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/æ/	/a/	hacker	/ˈhækə(r)/	هكر	/hakar/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/aj/	mega	/ˈmegə/	ميجا	/majʤa:/
/ɪ/	/i/	link	/lɪŋk/	لينك	/link/
	/i:/	automatic	/ˌɔːtəˈmætɪk/	أوتوماتيكي	/ʔu:tu:ma:ti:ki:/
	/aj/	giga	/gɪgə/	جيجا	/ʤajʤa:/
/ɑ:/	/a:/	hardware	/ˈhɑː(r)dˌweə(r)/	هاردوير	/ha:rdwajr/
	/a/	restart	/ˌriːˈstɑː(r)t/	ريسترت	/ri:start/
/ɔ:/	/u:/	port	/pɔː(r)t/	بورت	/bu:rt/
	/u/	automatic	/ˌɔːtəˈmætɪk/	أتوماتيك	/ʔutu:ma:ti:k/

/u:/	/u:/	bluetooth	/ˈblu:ˌtu:θ/	بلوتوث	/blu:tu:θ/
/i:/	/i:/	keyboard	/ˈki:ˌbɔ:(r)d/	كيبورد	/ki:bu:rd/
	/i/	ethernet	/ˈi:θə(r)net/	إثرنت	/ʔiθarnit/
/ɜ:/	/u:/	password	/ˈpɑ:sˌwɜ:(r)d/	باسوورد	/ba:swu:rd/
	/i/	server	/ˈsɜ:(r)və(r)/	سرفر	/sirfar/
	/aj/	server	/ˈsɜ:(r)və(r)/	سيرفر	/sajrfar/

As can be seen from Table 5.7, in terms of the consonant correspondences, the English phoneme /d/ is rendered in Arabic as /d/ or /t/. In (93%) of cases it is rendered as /d/, while in (7%) of cases it is rendered as /t/. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. In (98%) of cases it is rendered as /t/, while in (2%) of cases it is rendered as /tˤ/. The English phoneme /g/ is rendered in Arabic as /ʤ/ or /ʁ/. In (53%) of cases it is rendered as /ʁ/, while in (47%) of cases it is rendered as /ʤ/. The English phoneme /k/ is rendered in Arabic as /k/ or /q/. In (97%) of cases it is rendered as /k/, while in (3%) of cases it is rendered as /q/. The English phoneme /s/ is rendered in Arabic as /s/ or /z/. In (90%) of cases it is rendered as /s/, while in (10%) of cases it is rendered as /z/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. The phoneme /p/ represents (53%) of cases, while the phoneme /b/ represents (47%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. Each of the phonemes /f/ and /v/ are equally represented in (50%) of cases. The English phonemes /ʃ/ and /tʃ/ are both rendered in Arabic as /ʃ/. The phoneme /tʃ/ represents (67%) of cases, while the phoneme /ʃ/ represents (33%) of cases. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/. The phoneme /n/ represents (84%) of cases, while the phoneme /ŋ/ represents (16%) of cases.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /æ/ is rendered in Arabic as the vowel phoneme /a/ or /a:/. The

English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɑ:/ is rendered in Arabic as the vowel phoneme /a:/ or /a/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/ or /u/. The English vowel phoneme /u:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /i:/ is rendered in Arabic as the vowel phoneme /i:/ or /i/. The English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /u:/ or /i/, or the diphthong phoneme /aj/.

Majallat Sūq al-ʿAṣr

Table 5.8: S5 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/d/	/d/	18	95%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
	/t/	1	5%	cards	/kɑ:(r)ds/	كروت	/kuru:t/
/t/	/t/	65	98%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	1	2%	battery/ *batteria*	/batteˈria/	(it) بطارية	/batˤtˤa:rijja/
/g/	/ʤ/	18	64%	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/ʁ/	10	36%	mega	/ˈmegə/	ميغا	/majʁa:/
/k/	/k/	42	95%	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	2	5%	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
/s/	/s/	16	73%	mouse	/maʊs/	ماوس	/ma:ws/
	/z/	6	27%	hertz	/hɜ:(r)ts/	هيرتز	/hajrtz/
/b/	/b/	27	51%	cable	/ˈkeɪb(ə)l/	كابل	/ka:bl/
/p/		26	49%	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
/f/	/f/	6	43%	profile	/ˈprəʊfaɪl/	بروفايل	/bru:fa:jl/
/v/		8	57%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/n/	/n/	35	97%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
/ŋ/		1	3%	link	/lɪŋk/	لينك	/link/

Vowels					
English Phoneme	**Arabic Phoneme**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u/	computer	/kəmˈpju:tə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزستور	/tra:nzistu:r/
/ɒ/	/u/	technology	/tekˈnɒlədʒi/	تكنولوجيا	/tiknulu:ʤja:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/

/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/iː/	electronic	/ɪlekˈtrɒnɪk/	إليكتروني	/ʔiliːktruːniː/
	/aj/	mega	/ˈmeɡə/	ميجا	/majʤaː/
/ɪ/	/i/	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
	/iː/	automatic	/ˌɔːtəˈmætɪk/	أوتوماتيكي	/ʔuːtuːmaːtiːkiː/
	/aj/	giga	/ɡɪɡə/	جيجا	/ʤajʤaː/
/ɔː/	/uː/	broadband	/ˈbrɔːdˌbænd/	برودباند	/bruːdbaːnd/
/uː/	/uː/	bluetooth	/ˈbluːˌtuːθ/	بلوتوث	/bluːtuːθ/
/ɜː/	/i/	megahertz	/ˈmeɡəˌhɜː(r)ts/	ميجاهرتز	/majʤaːhirtz/
	/aj/	server	/ˈsɜː(r)və(r)/	سيرفر	/sajrfar/

As can be seen from Table 5.8, in terms of the consonant correspondences, the English phoneme /d/ is rendered in Arabic as /d/ or /t/. In (95%) of cases it is rendered as /d/, while in (5%) of cases it is rendered as /t/. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. In (98%) of cases it is rendered as /t/, while in (2%) of cases it is rendered as /tˤ/. The English phoneme /g/ is rendered in Arabic as /ʤ/ or /ʁ/. In (64%) of cases it is rendered as /ʤ/, while in (36%) of cases it is rendered as /ʁ/. The English phoneme /k/ is rendered in Arabic as /k/ or /q/. In (95%) of cases it is rendered as /k/, while in (5%) of cases it is rendered as /q/. The English phoneme /s/ is rendered in Arabic as /s/ or /z/. In (73%) of cases it is rendered as /s/, while in (27%) of cases it is rendered as /z/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. The phoneme /b/ represents (51%) of cases, while the phoneme /p/ represents (49%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The phoneme /v/ represents (57%) of cases, while the phoneme /f/ represents (43%) of cases. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/. The phoneme /n/ represents (97%) of cases, while the phoneme /ŋ/ represents (3%) of cases.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /u:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/.

Majallat Wāḥat al-Ḥāsib

Table 5.9: S6 English Loanword Phoneme Correspondences in Arabic

Consonants							
English Phoneme	**Arabic Phoneme**	**No. of Tokens**	**%**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/d/	/d/	26	93%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
	/t/	2	7%	card	/kɑ:(r)d/	كرت	/kart/
/t/	/t/	91	96%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/tˤ/	4	4%	volt	/vəʊlt/	فولط	/fu:ltˤ/
/g/	/ʤ/	10	27%	giga	/gɪgə/	جيجا	/ʤajʤa:/
	/ʁ/	21	57%	mega	/ˈmegə/	ميغا	/majʁa:/
	/q/	6	16%	giga	/gɪgə/	قيقا	/qajqa:/
/k/	/k/	69	97%	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/q/	2	3%	icon	/ˈaɪkɒn/	أيقونة	/ʔajqu:na/
/s/	/s/	34	81%	mouse	/maʊs/	ماوس	/ma:ws/
	/z/	8	19%	hertz	/hɜ:(r)ts/	هيرتز	/hajrtz/
/b/	/b/	45	62%	cable	/ˈkeɪb(ə)l/	كابل	/ka:bl/
/p/		28	38%	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
/f/	/f/	18	60%	profile	/ˈprəʊfaɪl/	بروفايل	/bru:fa:jl/
/v/		12	40%	video	/ˈvɪdiəʊ/	فيديو	/fi:dju:/
/ʃ/	/ʃ/	2	40%	phishing	/ˈfɪʃɪŋ/	فيشينج	/fiʃinʤ/
/tʃ/		3	60%	chat	/tʃæt/	شات	/ʃa:t/
/n/	/n/	45	98%	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
/ŋ/		1	2%	link	/lɪŋk/	لينك	/link/

Vowels					
English Phoneme	**Arabic Phoneme**	**Donor word**	**Transcription**	**Loanword**	**Transcription**
/ə/	/a/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u/	computer	/kəmˈpju:tə(r)/	كمبيوتر	/kumbju:tir/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
	/u:/	transistor	/trænˈzɪstə(r)/	ترانزستور	/tra:nzistu:r/
/ɒ/	/u/	technology	/tekˈnɒləʤi/	تكنولوجيا	/tiknulu:ʤja:/
	/u:/	electronic	/ɪlekˈtrɒnɪk/	إلكتروني	/ʔiliktru:ni:/
/æ/	/a/	hacker	/ˈhækə(r)/	هكر	/hakar/
	/a:/	camera	/ˈkæmərə/	كاميرا	/ka:mira:/
/e/	/i/	internet	/ˈɪntə(r)ˌnet/	إنترنت	/ʔintarnit/
	/i:/	electronic	/ɪlekˈtrɒnɪk/	إليكتروني	/ʔili:ktru:ni:/
	/aj/	mega	/ˈmegə/	ميجا	/majʤa:/
/ɪ/	/i/	pixel	/ˈpɪks(ə)l/	بكسل	/biksil/
	/i:/	automatic	/ˌɔ:təˈmætɪk/	أوتوماتيكي	/ʔutuma:ti:ki:/

	/aj/	giga	/gɪgə/	جيجا	/ʤajʤa:/
/ɑ:/	/a:/	hardware	/ˈhɑː(r)dˌweə(r)/	هاردوير	/ha:rdwajr/
	/a/	card	/kɑː(r)d/	كرت	/kart/
/ɔ:/	/u:/	broadband	/ˈbrɔːdˌbænd/	برودباند	/bru:dba:nd/
/u:/	/u:/	bluetooth	/ˈbluːˌtuːθ/	بلوتوث	/blu:tu:θ/
/i:/	/i:/	keyboard	/ˈkiːˌbɔː(r)d/	كيبورد	/ki:bu:rd/
	/i/	nanometre	/ˈnænəʊˌmiːtə(r)/	نانومتر	/na:nu:mitr/
/ɜ:/	/i/	megahertz	/ˈmegəˌhɜː(r)ts/	ميغاهرتز	/majʁa:hirtz/
	/aj/	server	/ˈsɜː(r)və(r)/	سيرفر	/sajrfar/

As can be seen from Table 5.9, in terms of the consonant correspondences, the English phoneme /d/ is rendered in Arabic as /d/ or /t/. In (93%) of cases it is rendered as /d/, while in (7%) of cases it is rendered as /t/. The English phoneme /t/ is rendered in Arabic as /t/ or /tˤ/. In (96%) of cases it is rendered as /t/, while in (4%) of cases it is rendered as /tˤ/. The English phoneme /g/ is rendered in Arabic as /ʤ/, /ʁ/ or /q/. In (57%) of cases it is rendered as /ʁ/, while in (27%) and (16%) of cases it is rendered as /ʤ/ and /q/, respectively. The English phoneme /k/ is rendered in Arabic as /k/ or /q/. In (97%) of cases it is rendered as /k/, while in (3%) of cases it is rendered as /q/. The English phoneme /s/ is rendered in Arabic as /s/ or /z/. In (81%) of cases it is rendered as /s/, while in (19%) of cases it is rendered as /z/. The English phonemes /b/ and /p/ are both rendered in Arabic as /b/. The phoneme /b/ represents (62%) of cases, while the phoneme /p/ represents (38%) of cases. The English phonemes /f/ and /v/ are both rendered in Arabic as /f/. The phoneme /f/ represents (60%) of cases, while the phoneme /v/ represents (40%) of cases. The English phonemes /ʃ/ and /tʃ/ are both rendered in Arabic as /ʃ/. The phoneme /tʃ/ represents (60%) of cases, while the phoneme /ʃ/ represents (40%) of cases. The English phonemes /n/ and /ŋ/ are both rendered in Arabic as /n/. The phoneme /n/ represents (98%) of cases, while the phoneme /ŋ/ represents (2%) of cases.

In terms of the vowel correspondences, the English vowel phoneme /ə/ is rendered in Arabic as the vowel phoneme /a/, /i/, /u/, /a:/ or /u:/. The English vowel phoneme /ɒ/ is rendered in Arabic as the vowel phoneme /u/ or /u:/. The English vowel phoneme /æ/ is rendered in Arabic as the vowel phoneme /a/ or /a:/. The English vowel phoneme /e/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɪ/ is rendered in Arabic as the vowel phoneme /i/ or /i:/, or the diphthong phoneme /aj/. The English vowel phoneme /ɑ:/ is rendered in Arabic as the vowel phoneme /a:/ or /a/. The English vowel phoneme /ɔ:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /u:/ is rendered in Arabic as the vowel phoneme /u:/. The English vowel phoneme /i:/ is rendered in Arabic as the vowel phoneme /i:/ or /i/. The English vowel phoneme /ɜ:/ is rendered in Arabic as the vowel phoneme /i/, or the diphthong phoneme /aj/.

5.2.6 Loanword Spelling

Variant loanword spellings for single donor words occur regularly among and within the sub-corpora. This means that the sub-corpora do not only differ in terms of the word formation mechanisms used, but they also differ in using the specific mechanism of lexical borrowing into Arabic. These differences are a source of terminological confusion, and result in inconsistency in using the mechanism of *taʿrīb*. Cases and examples of variant loanword spellings among and within the sub-corpora are discussed next.

In many cases, variant loanword spellings are a result of using a short vowel instead of a long vowel or vice versa, or adding or omitting a consonant, which could be related to the colloquial variety of Arabic using the loanword. For example, the term ‘computer’ is spelt in two ways in the study: one with a short vowel [u] as in *kumbiyūtir*, and one with a long vowel [ū] as in *kūmbiyūtir*. In another example, the term ‘cable’ is used in three ways in the study: one with a short vowel [a] as *ka̲bl*, one with a long vowel [ā] as in *kā̲bl*, and one with an additional consonant [y] and a short vowel [a] as in *kaybal*.

In other cases, variant loanword spellings are cases of misspelling the loanwords, as was identified within single sub-corpora. For example, two loanword spellings were identified for the term 'electronic': one with a short vowel [i] as in *ʾiliktrūnī*, which is the common spelling, and one with a long vowel [ī] as in *ʾilīktrūnī*, which is an unfamiliar spelling.

In other cases, mainly applicable to adjectives, variant loanword spellings are a result of using a different loanword gender; one spelling using a masculine loanword gender, and one using a feminine loanword gender, which can be related to the context in which the loanword is used. For example, the term *ʾiliktrūnī*/*ʾiliktrūniyya* (electronic) is used as a masculine adjective in the compound *kitāb ʾiliktrūnī* (electronic book) and as a feminine adjective in the compound *maktaba ʾiliktrūniyya* (electronic library), since in Arabic the adjective usually agrees in gender with the noun it follows. As can be seen from this example, the noun was masculine in the first case and feminine in the second.

In other cases, variant loanword spellings are a result of using different Arabic consonants to correspond to a single English consonant. For example, in the term 'mega' the English consonant [g] is rendered in one case as the Arabic consonant [j] as in *mayj̲ā*, in another case as the Arabic consonant [gh] as in *mayg̲h̲ā*, and in a third case as the Arabic consonant [q] as in *mayq̲ā*. This is also related to the colloquial variety of Arabic using the loanword.

In a few cases, variant loanword spellings are a result of using a compound word as a loanword which consists of two units in some cases and a single unit in others. The compound word is borrowed as two units when it is dealt with as a compound consisting of two words, while it is borrowed as a single unit when it is dealt with as a single word. For example, the English term ‘laptop’ is a compound which is borrowed in Arabic as two units with a space between them as in *lāb tūb*, while it is also borrowed as a single unit without a space as in *lābtūb*.

The discussion turns now to a comparison of the results of the variant loanword spellings among and within the sub-corpora.

Table 5.10: The Results of Variant Loanword Spellings in the Sub-corpora

Sub-corpus	S1	S2	S3	S4	S5	S6
Total No. of Loanwords	769					
Total No. of Variant Loanword Spellings Among Sub-corpora	341					
%	44%					
Total No. of Variant Loanword Spellings Within Sub-corpora	248					
%	32%					
No. of Variant Loanword Spellings Among Sub-corpora	37	37	31	76	63	97
% of Variant Loanword Spellings Among Sub-corpora	11%	11%	9%	22%	18%	28%
Total No. of Loanwords in the Sub-corpus	146	80	64	179	117	183
No. of Variant Loanword Spellings Within Sub-corpora	12	13	17	79	44	83
% of Variant Loanword Spellings Within Sub-corpora	8%	16%	27%	44%	38%	45%

The total number of variant loanword spellings among the sub-corpora form 341 terms, which is (44%) of the total of 769 loanwords. The total number of variant loanword spellings within the sub-corpora form 248 terms, which is (32%) of the total number of loanwords. These two relatively high percentages of variant loanword spellings indicate terminological confusion and inconsistency in the use of loanwords in the sub-corpora. This trend is even more evident in the magazine sub-corpora.

The breakdown of the variant loanword spellings among the sub-corpora is as follows: 97 terms (28% of the total number of variant loanword spellings) in S6, 76 terms (22%) in S4, 63 terms (18%) in S5, 37 terms (11%) in each of S1 and S2, and

31 terms (9%) in S3. This shows that the selected magazines are more subject to variant loanword spellings than the selected dictionaries.

The total number of variant loanword spellings within each sub-corpus is as follows: 83 terms (45%) in S6, which is the most subject to variant loanword spellings within the sub-corpora, 79 terms (44%) in S4, 44 terms (38%) in S5, 17 terms (27%) in S3, 13 terms (16%) in S2, and 12 terms (8%) in S1. This also shows that the selected magazines are generally more subject to variant loanword spellings than the selected dictionaries. This could be due to the different editors involved in producing the magazines in comparison with the much lower number of lexicographers producing the dictionaries. Also, it could be argued that magazines are far less professional and not as dependable as dictionaries in terms of the lexical terms they use or produce.

5.2.6.1 The Effects of Arabic Colloquial Varieties on Loanword Pronunciation and Spelling

In terms of loanword pronunciation, some Arabic colloquial varieties use the English sound /g/, which is evident in the term ‘game’ /geɪm/, instead of the proper Arabic sound /q/ in a term such as *qindīl* (lamp), which is pronounced as *gindīl* in some Arabic colloquial varieties. An example from the study is that some Arabic colloquial varieties use the English sound /g/ in a term like ‘graphic’ /ˈɡræfɪk/ as in *grāfīk* instead of its proper Arabic corresponding sound, which is /ʤ/ as in *jrāfīk*.

In terms of loanword spellings, it can be noted that in some loanword cases in the study, the English letter [g] is spelt in Arabic as the letter [q] or [gh] rather than [j], which is the only corresponding Arabic letter used for the English letter [g] in the Cairo Academy dictionary, as well as in Standard Arabic. This is the result of taking letters used by Arabic colloquial varieties rather than Standard Arabic. An example from the study is that the English letter [g] in the term ‘giga’ is spelt in some Arabic colloquial varieties with the letters [q] and [gh] as in *qayqā* and *ghayghā*, respectively, instead of its proper corresponding Arabic letter, which is [j] as in jayjā. The following section provides a guideline for the recommended usage of loanword spellings.

5.2.6.2 Recommended Loanword Spellings

It can be noted from the loanwords found in the study that in the cases of the variant loanword spellings for single donor words, the loanwords can be spelt differently when used in Arabic. This section highlights these different spellings and provides a guideline for the recommended usage of loanword spellings in accordance with the corpus/sub-corpus of *Muʿjam al-Ḥāsibāt*, the dictionary produced by the Cairo Academy, which is an official source of the Arabic language.

In the examples in Table 5.11, which include both consonant and vowel cases, the cases of variant loanword spellings in the study are displayed in the top row(s). These are followed by a row at the bottom of each example in bold font containing the loanwords which comply with the recommended usage of loanword spellings, in accordance with the Cairo Academy computer dictionary.

Table 5.11: Recommended Loanword Spellings

English	Arabic	Donor word	Loanword Transliteration
Consonants			
[g]	[q]	giga	qayqā
	[gh]		ghayghā
	[j]		**jayjā**
[d]	[t]	card	kart
	[d]		**kard**
[t]	[t]	volt	fūlt
	[ṭ]		**fūlṭ**

	[t]	watt	wāt
	[ṭ]		**wāṭ**
Vowels			
[o]	[ū]	computer	kūmbyūtir
	[u]		**kumbyūtir**
[a]	[ā]	hacker	hākar
	[a]		**hakar**
[e]	[ī]	electronic	ʾilīktrūnī
	[i]		**ʾiliktrūnī**
[i]	[ī]	transistor	trānzīstūr
	[i]		**trānzistūr**
	[ī]	pixel	bīksil
	[i]		**biksil**
[i:]	[i]	ethernet	ʾitharnit
	[ī]		**ʾītharnit**

In terms of the consonant cases, the English letter [g] in the term ‘giga’ is spelt in Arabic as [q] and [gh] in *qayqā* and *ghayghā*, respectively, but it is recommended for it to be spelt as [j] as in *jayjā*. The English letter [d] in the term ‘card’ is spelt in Arabic as [t] in *kart*, but it is recommended for it to be spelt as [d] as in *kard*. The English letter [t] in the term ‘volt’ is spelt in Arabic as [t] in *fūlt*, but it is recommended for it to be spelt as [ṭ] as in *fūlṭ*; this is similar to the term ‘font’, which is spelt with [ṭ] in *fūnṭ* instead of [t]. Similarly, the English letter [t] in the term ‘volt’ is spelt in Arabic as [t] in *wāt*, but it is recommended for it to be spelt as [ṭ] as in *wāṭ*.

In terms of the vowel cases, the English short vowel [o] in the term ‘computer’ is spelt in Arabic as a long vowel [ū] in *kūmbyūtir*, but it is recommended for it to be spelt as a short vowel [u] as in *kumbyūtir*. The English short vowel [a] in the term ‘hacker’ is spelt in Arabic as a long vowel [ā] in *hākar*, but it is recommended for it to be spelt as a short vowel [a] as in *hakar*. The English short vowel [e] in the term ‘electronic’ is spelt in Arabic as a long vowel [ī] in *ʾilīktrūnī*, but it is recommended for it to be spelt as a short vowel [i] as in *ʾiliktrūnī*. The English short vowel [i] in the term ‘transistor’ is spelt in Arabic as a long vowel [ī] in *trānzīstūr*, but it is recommended for it to be spelt as a short vowel [i] as in *trānzistūr*. Also, the English short vowel [i] in the term ‘pixel’ is spelt in Arabic as a long vowel [ī] in *bīksil*, but it is recommended for it to be spelt as a short vowel [i] as in *biksil*. The English long vowel [i:] in the term ‘ethernet’ /ˈiːθə(r)net/ is spelt in Arabic as a short vowel [i] in *ʾitharnit*, but it is recommended for it to be spelt as a long vowel [ī] as in *ʾītharnit*.

5.3 *Ishtiqāq*

The Arabic ‘morphological patterns’ (*ʾawzān*) of the derived words which are classified under the mechanism of *ishtiqāq* in the study are discussed in this section in detail. The Arabic relative adjectives and plural terms are excluded from this discussion as a result of them containing suffixes, since common Arabic patterns are not applicable to such word classes.

The number of derived words in the study, the number of derived words where Arabic patterns are applicable, and the number of Arabic patterns applied to the derived words in general and with regard to the two categories of hardware and software are discussed, along with examples of each pattern. Moreover, the patterns applied to each category and their frequencies are discussed to show which patterns were applied to which category.

Table 5.12: The Arabic ‘Morphological Patterns’ of the Derived Words in the Study

Example		Transliteration	Pattern	Transliteration	Software	Hardware	Total
wire	سلك	silk	فِعْل	fiʿl	0	4	4
screen	شاشة	shāsha	فَعَلَة	faʿala	0	6	6
drive	سوَّاقة	sawwāqa	فَعَّالَة	faʿʿāla	0	3	3
computer	حاسوب	ḥāsūb	فَاعُول	fāʿūl	0	6	6
mode	نمط	namaṭ	فَعَل	faʿal	1	0	1
file	ملف	malaff	فَعَلّ	faʿall	6	0	6
security	أمن	ʾamn	فَعْل	faʿl	3	0	3
click	نقرة	naqra	فَعْلَة	faʿla	2	0	2
form	صيغة	ṣīgha	فِعْلَة	fiʿla	2	0	2
attachment	مرفق	murfaq	مُفْعَل	mufʿal	2	0	2
converter	محول	muḥawwil	مُفَعِّل	mufaʿʿil	3	0	3
online	متصل	muttaṣil	مُفْتَّعِل	mufttaʿil	1	0	1

browser	مستعرض	mustaʿriḍ	مُسْتَفْعِل	mustafʿil	4	0	4
technology	تقنية	taqniya	تَفْعِلَة	tafʿila	8	0	8
downloading	تحميل	taḥmīl	تَفْعِيل	tafʿīl	8	0	8
security	أمان	ʾamān	فَعَال	faʿāl	1	0	1
recovery	استرجاع	ʾistirjāʿ	اسْتِفْعَال	ʾistifʿāl	1	0	1
restore	استعادة	ʾistiʿāda	اسْتِفْعَالَة	ʾistifʿāla	1	0	1
computer	حاسب	ḥāsib	فَاعِل	fāʿil	1	10	11
link	رابط	rābiṭ					
printer	طابعة	ṭābiʿa	فَاعِلَة	fāʿila	1	7	8
folder	حافظة	ḥāfiẓa					
controller	متحكم	mutaḥakkim	مُتَفَعِّل	mutafaʿʿil	6	2	8
browser	متصفح	mutaṣaffiḥ					
Total No. of Derived Words with Patterns					51	38	89
% of Derived Words with Patterns					57%	43%	100%
% of Derived Words							53%
Total No. of Derived Words							169
Total No. of Patterns					21		
% of Derived Words with Patterns					24%		
No. of Hardware Patterns					4		
% of No. of Patterns					19%		
No. of Software Patterns					14		
% of No. of Patterns					67%		
No. of Patterns for Both Categories					3		
% of No. of Patterns					14%		

Table 5.12 displays the Arabic patterns used in the study for the derived words, and shows which patterns were applied to the derived words of each of the software and hardware categories, and which patterns were applied in both categories, along with examples of each pattern.

As mentioned earlier, the total number of derived words in the study is 169, of which Arabic patterns are applicable to 89, which equates to (53%) of the total number of derived words. These 89 words are the words without suffixes. This total is divided between software with 51 words (57%), and hardware with 38 words (43%).

A total of 21 Arabic patterns are applied to the derived words in the study, which is (24%) of the total number of derived words where Arabic patterns are applicable. This total is divided between software with 14 patterns (67% of words where Arabic patterns are applicable), hardware with four patterns (19%), while three patterns are shared by both categories (14%).

The results of the derived word patterns highlight that only seven patterns (four specific to hardware plus three shared) are applied to the hardware words, which is less than half the number of 17 patterns (14 specific to software plus three shared) applied to the software words. This indicates that the software words use more varieties of patterns than the hardware words. It should be noted that this could be the result of particular patterns being used more often in either category. This is the case, for example, with the Arabic pattern *fāʿil* which applies to 10 of the 38 derived words in the hardware category. The words to which this 'pattern' applies are the hardware derived words *māsiḥ* (scanner) and *ḥāsib* (computer), and the software derived word *rābiṭ* (link). In another example, the pattern *tafʿīl* applies to eight of the 51 derived words in the software category. The words to which this pattern applies are the software derived words *taḥdīth* (update), *taḥmīl* (downloading), *taʾmīn* (security), *takbīr* (zoom), and *taṣghīr* (minimize).

In contrast, some particular patterns are used less frequently. The software category contains seven patterns of a single frequency applied to the derived words in the study, whereas in the hardware category each 'pattern' is applied to a minimum of two derived words. This also explains why the software category contains more patterns for the derived words than the hardware category. The software derived words with a single frequency pattern in the study are *namaṭ* (mode) complying with the pattern *faʿal*, *muttaṣil* (online) complying with the pattern *mufttaʿil, ʾamān* (security) complying with the pattern *faʿāl*, *ʾistirjāʿ* (recovery) complying with the pattern *ʾistifʿāl, ʾistiʿāda* (restore) complying with the pattern *ʾistifʿāla*, *rābiṭ* (link) complying with the pattern *fāʿil*, and *ḥāfiẓa* (folder) complying with the pattern *fāʿila*. The hardware derived word with the two frequencies pattern in the study is *mutaḥakkim* (controller) complying with the pattern *mutafaʿʿil*, which is a pattern also applied to the software derived word *mutaṣaffiḥ* (browser).

The three patterns which are common in both the software and hardware categories for the derived words in the study are *fāʿil* for *ḥāsib* (computer) as a hardware derived word and *rābiṭ* (link) as a software derived word, *fāʿila* for *ṭābiʿa* (printer) as a hardware derived word and *ḥāfiẓa* (folder) as a software derived word, and *mutafaʿʿil* for *mutaḥakkim* (controller) as a hardware derived word and *mutaṣaffiḥ* (browser) as a software derived word. These three patterns have the highest frequencies in the derived words in the study with eleven, eight, and eight occurrences, respectively. These patterns are fairly common in the Arabic language; therefore, they apply to the derived words in both categories in the study and at high frequencies.

The pattern which is used at the highest frequency in the derived words in the study is *fāʿil*, which applies to 11 of the derived words, 10 of which are hardware derived words and one is a software derived word; this is a very common pattern in the Arabic language. In contrast, the five patterns which are used at the lowest frequency in the derived words in the study are *faʿal* for *namaṭ* (mode), *muftaʿil* for *muttaṣil* (online), *faʿāl* for *ʾamān* (security), *ʾistifʿāl* for *ʾistirjāʿ* (recovery), and *ʾistifʿāla* for *ʾistiʿāda* (restore), each of which applies to only one of the derived words listed. Most of these patterns are not very common in the Arabic language.

5.4 *Tarkīb*

As discussed in the literature review chapter, there are four Arabic compounding forms used in the study. These are the two general forms of the *ʾiḍāfa* construction (genitive structure) and *naʿt* (epithet structure), and the forms of the hybrid compounds (half *ʾiḍāfa* and half *naʿt*), and prefixed negative particle compounds. The Arabic compounds in the study are distributed among these four compounding forms. The results of these four forms are compared and discussed in terms of each sub-corpus and the sub-corpora as a whole in order to demonstrate which compounding forms are more commonly used to create Arabic computing compounds. The discussion begins with the results of the Arabic compounding forms in terms of each sub-corpus, and this is then followed by a discussion of the overall results of the Arabic compounding forms in the sub-corpora as a whole. Moreover, examples from the study are provided on each compounding form.

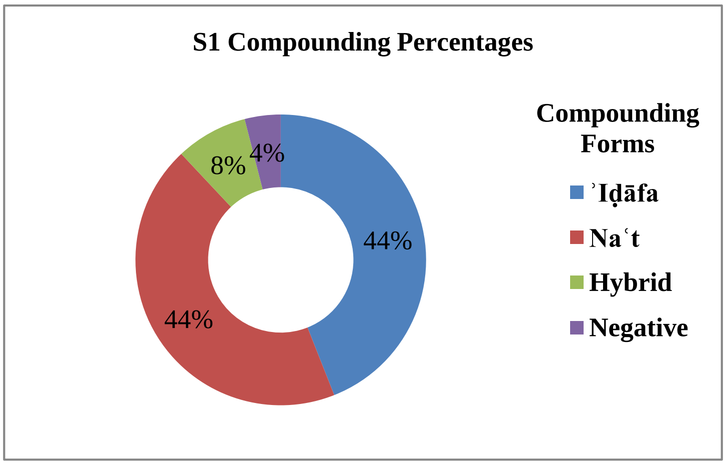

Figure 5.2: S1 Arabic Compounding Results

In terms of *tarkīb* in S1, the total number of terms is 50. This number is divided among four compounding forms. *ʾIḍāfa* and *naʿt* account for the highest percentage of terms each (44% of S1 *tarkīb* terms; 22 terms), the hybrid form accounts for four terms (8%), and the prefixed negative particle form accounts for two terms (4%). This shows that *ʾiḍāfa* and *naʿt* are equally the most dominant Arabic compounding forms, followed by the hybrid form, and finally the prefixed negative particle form (see Figure 5.2).

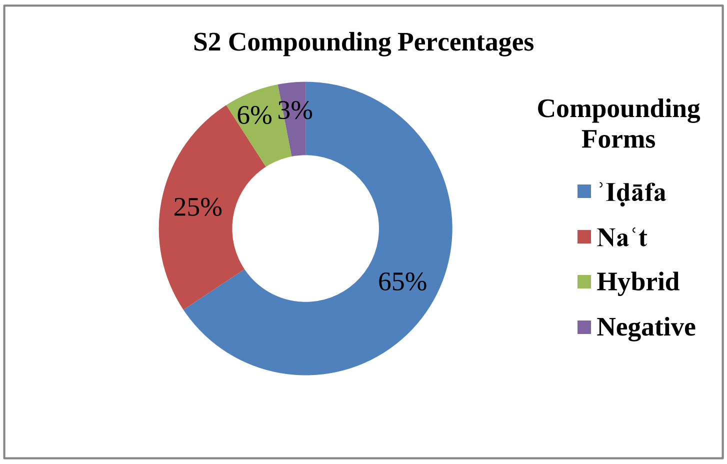

Figure 5.3: S2 Arabic Compounding Results

In terms of *tarkīb* in S2, the total number of terms is 63. This number is divided among four compounding forms. *ʾIḍāfa* accounts for the highest percentage of terms (65% of S2 *tarkīb* terms; 41 terms), *naʿt* accounts for 16 terms (25%), the hybrid form accounts for four terms (6%), and the prefixed negative particle form accounts for two terms (3%). This shows that *ʾiḍāfa* is clearly the most dominant Arabic compounding form, followed by *naʿt*, then the hybrid form, and finally the prefixed negative particle form (see Figure 5.3).

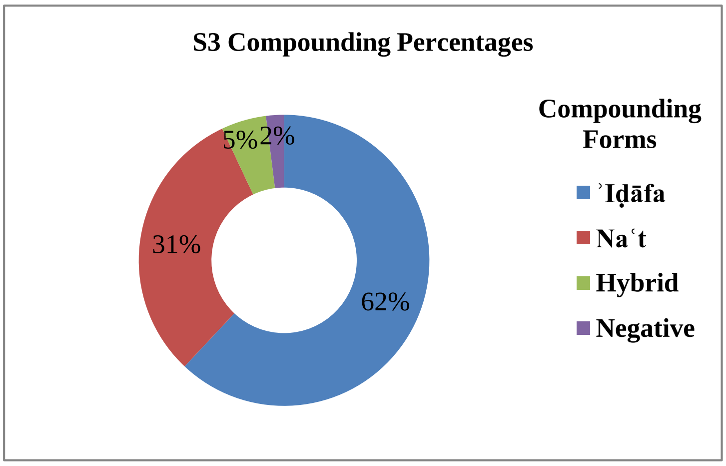

Figure 5.4: S3 Arabic Compounding Results

In terms of *tarkīb* in S3, the total number of terms is 85. This number is divided among four compounding forms. *ʾIḍāfa* accounts for the highest percentage of terms

(62% of S3 *tarkīb* terms; 53 terms), *naʿt* accounts for 26 terms (31%), the hybrid form accounts for four terms (5%), and the prefixed negative particle form accounts for two terms (2%). This shows that *ʾiḍāfa* is clearly the most dominant Arabic compounding form, followed by *naʿt*, then the hybrid form, and finally the prefixed negative particle form (see Figure 5.4).

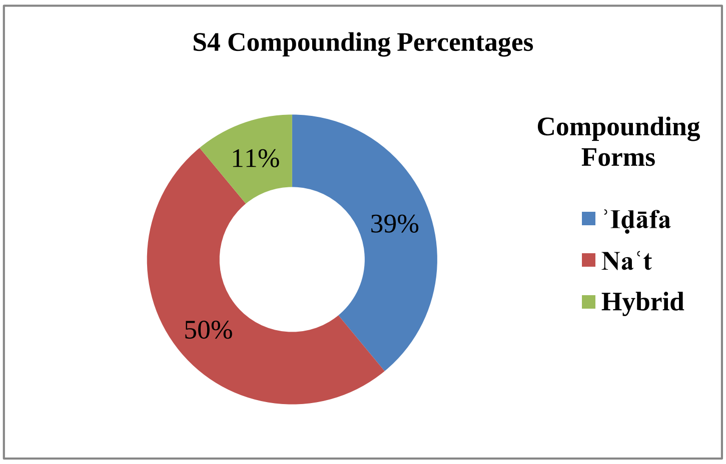

Figure 5.5: S4 Arabic Compounding Results

In terms of *tarkīb* in S4, the total number of terms is 18. This number is divided among three compounding forms. *Naʿt* accounts for the highest percentage of terms (50% of S4 *tarkīb* terms; nine terms), *ʾiḍāfa* accounts for seven terms (39%), and the hybrid form accounts for two terms (11%), while there are no occurrences of the prefixed negative particle form. This shows that *naʿt* is the most dominant Arabic compounding form, followed by *ʾiḍāfa*, and finally the hybrid form (see Figure 5.5).

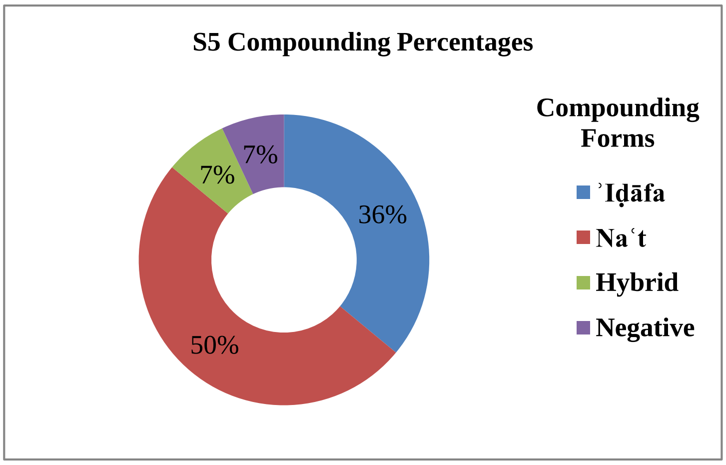

Figure 5.6: S5 Arabic Compounding Results

In terms of *tarkīb* in S5, the total number of terms is 14. This number is divided among four compounding forms. *Naʿt* accounts for the highest percentage of terms (50% of S5 *tarkīb* terms; seven terms), *ʾiḍāfa* accounts for five terms (36%), and the hybrid and the prefixed negative particle forms account for one term (7%) each. This shows that *naʿt* is the most dominant Arabic compounding form, followed by *ʾiḍāfa*, and then the hybrid and the prefixed negative particle forms (see Figure 5.6).

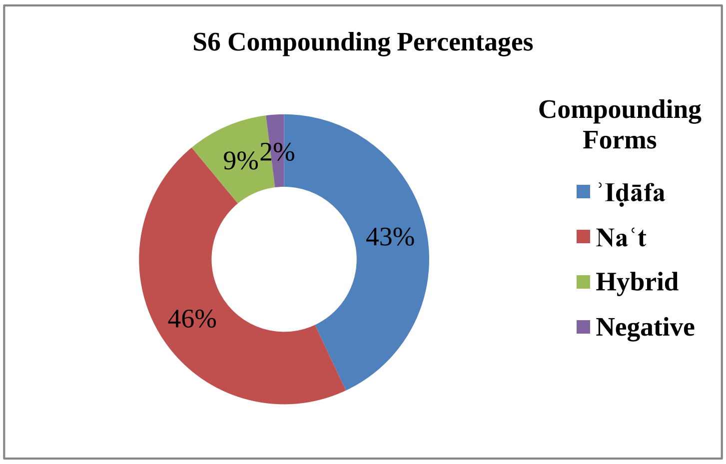

Figure 5.7: S6 Arabic Compounding Results

In terms of *tarkīb* in S6, the total number of terms is 56. This number is divided among four compounding forms. *Naʿt* accounts for the highest percentage of terms (46% of S6 *tarkīb* terms; 26 terms), *ʾiḍāfa* accounts for 24 terms (43%), the hybrid form accounts for five terms (9%), and the prefixed negative particle form accounts for one term (2%). This shows that *naʿt* is the most dominant Arabic compounding form, followed by *ʾiḍāfa*, then the hybrid form, and finally the prefixed negative particle form (see Figure 5.7).

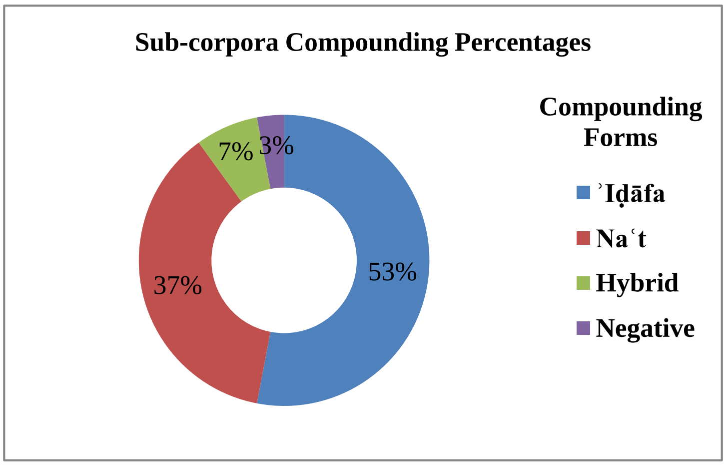

Figure 5.8: Sub-corpora Arabic Compounding Overall Results

In terms of *tarkīb* in the sub-corpora as a whole, the total number of terms is 286. This number is divided among four compounding forms. *ʾIḍāfa* accounts for the highest percentage of terms (53% of *tarkīb* terms; 152 terms), *naʿt* accounts for 106 terms (37%), the hybrid form accounts for 20 terms (7%), and the prefixed negative particle form accounts for eight terms (3%). This shows that *ʾiḍāfa* is clearly the most dominant Arabic compounding form, followed by *naʿt*, then the hybrid form, which is less dominant, and finally the prefixed negative particle form, which is the least dominant.

It can be noted that *ʾiḍāfa* accounts for the highest percentage of terms in the dictionary sub-corpora except for S1 where the percentages of *ʾiḍāfa* and *naʿt* are equal. In contrast, *naʿt* accounts for the highest percentage of terms in all the magazine sub-corpora. The hybrid form accounts for the third highest percentage of terms in all sub-corpora except for S5 where the percentages of the hybrid and the prefixed negative particle forms are equal. In relation to the prefixed negative particle form, it accounts for the lowest percentage of terms in all sub-corpora except for S4, which does not have any occurrences of this form.

It can be concluded that *ʾiḍāfa* is generally the most common compounding form in the dictionary sub-corpora, while *naʿt* is the most common in the magazine sub-corpora. Also, the hybrid form is the second least common in most of the sub-corpora, while the prefixed negative particle form is the least common. Therefore, it can be noted that in terms of the sub-corpora, the dictionaries tend to rely on the compounding form of *ʾiḍāfa*, while the magazines tend to rely on *naʿt*. However, in all cases the hybrid and the prefixed negative particle compounding forms are not commonly used, although the former is relied upon more than the latter.

In terms of the overall results of the Arabic compounding forms in the sub-corpora as a whole, it can be noted that *ʾiḍāfa* is the most common, followed by *naʿt*, and then the hybrid and the prefixed negative particle forms, respectively. It can also be concluded that *ʾiḍāfa* is simply the most common Arabic compounding form, closely followed by *naʿt*. These two compounding forms comprise the majority of Arabic compounds in the sub-corpora, which means that they are significantly the most common compounding forms for Arabic computing compounds. The hybrid form is the second least common, while the prefixed negative particle form is the least common. These two compounding forms comprise a minority of the Arabic compounds in the sub-corpora, which means that they are considerably less common compounding forms for Arabic computing compounds.

Table 5.13: Examples of Applied Arabic Compounding Forms in the Study

Example No.	English	Arabic	Transliteration
		ʾIḍāfa	
1	headphones	سماعة رأس	sammāʿat raʾs
2	keyboard	لوحة المفاتيح	lawḥat al-mafātīḥ
3	data processing	معالجة البيانات	muʿālajat al-bayānāt
4	NOS = network operating system	نظام أداء الشبكات	niẓām ʾadāʾ al-shabakāt
5	HD = high definition	عالي الوضوح	ʿālī al-wuḍūḥ
		Naʿt	
1	laptop	حاسوب محمول	ḥāsūb maḥmūl
2	broadband	نطاق عريض	niṭāq ʿarīḍ
3	scanner	ماسح ضوئي	māsiḥ ḍawʾī
4	DAT = digital audio tape	شريط صوتي رقمي	sharīṭ ṣawtī raqmī
		Hybrid	
1	RAM = random access memory	ذاكرة التوصل العشوائي	dhākirat al-tawaṣṣul al-ʿashwāʾī
2	DOS = disk operating system	نظام تشغيل قرصي	niẓām tashghīl qurṣī
		Negative	
1	wireless	لاسلكي	lā-silkī
2	off-line	غير مباشر	ghayr mubāshir

The selected examples attempt to cover all possible cases for each of the Arabic compounding forms applied in the study.

In terms of *ʾiḍāfa*, it can be noted that most of the Arabic compounds in the examples consist of two or more nouns. Moreover, the nouns comprising the compounds do not agree in terms of indefiniteness in most examples. In example 1, the *ʾiḍāfa* is in the meaning of the preposition ‘for’, as the literal underlying structure for the Arabic compound is ‘phone <u>for</u> the head’. The nouns in this compound agree in indefiniteness. In examples 2 and 3, the *ʾiḍāfa* is in the meaning of the preposition ‘of’, as the literal underlying structure for the Arabic compounds are ‘a board <u>of</u> keys’, and ‘the processing <u>of</u> data’, respectively. The nouns in these compounds do not agree in definiteness as the first noun in each is indefinite while the second is definite. In example 4, the *ʾiḍāfa* is in the meaning of the prepositions ‘for’ and ‘of’, respectively, as the literal underlying structure for the Arabic compound is ‘a system <u>for</u> the operation <u>of</u> the networks’. The nouns in this compound do not agree in definiteness as the first and second nouns are indefinite while the third is definite. In example 5, the genitive comes after the adjective in order to modify or limit its function so as to say ‘high of definition’ (AI-Kharabsheh, 2003, p. 139).

In terms of *naʿt*, it can be noted that the Arabic compounds in the examples consist of a noun followed by one adjective or more. The components of these compounds agree in case, gender, number, and definiteness or indefiniteness, which are compounding conditions to qualify for *naʿt*. In examples 1 and 2, the nouns are followed by regular adjectives, whereas in example 3 the noun is followed by one relative adjective, while in example 4 the noun is followed by two relative adjectives, all of which end with the masculine *nisba* suffix (-ī).

In terms of the hybrid form, in each of examples 1 and 2, the Arabic compound consists of *ʾiḍāfa* in the shape of the first two nouns, and *naʿt* as the relative adjective following the *ʾiḍāfa* compound. In example 1, the two nouns in the compound do not agree in definiteness as the first noun is indefinite and the second noun is definite; however, the second noun agrees with the following adjective in definiteness, which is a condition for qualifying as *naʿt*. In example 2, the two nouns and the adjective in the compound all agree in indefiniteness.

In terms of the prefixed negative particle form, in each of the two examples, the Arabic compounds consist of two parts. In example 1, the Arabic compound consists of two free morphemes forming one single new term. In example 2, the Arabic compound consists of two-part orthographically separated lexemes. Both examples start with the negation particles *lā* in example 1 and *ghayr* in example 2, which correspond to the negation particle ‘not’. The second part of the compound in example 1 is a relative adjective meaning ‘wired’. As a compound, it literally means ‘not wired’. The second part of the compound in example 2 is an adjective meaning ‘direct’. As a compound, it literally means ‘not direct’.

5.5 Latin Script Terms

The terms appearing in the study in Latin script only and in both Arabic and Latin scripts are discussed in this section in detail. These terms occur only in the magazine sub-corpora. One reason for this could be that the magazines are not as professional as the dictionaries at terminology creation. Another reason, in terms of the Latin-only script terms, could be that the magazines use a Latin term when an Arabic equivalent is not available, or for ease of use, rather than trying to find or coin Arabic equivalents. For example, it can be difficult to find appropriate technical equivalents in Arabic for English terms such as configuration and hotspot, and in order to avoid ambiguity, English terms are used in place of their Arabic equivalents. Another reason, in relation to the terms appearing in both Arabic and Latin scripts, could be that the Latin term is used to clarify or specify the meaning of the equivalent Arabic term. For example, the compound *al-ʾalyāf al-ḍawʾiyya* (fiber optics) appears in both Arabic and Latin scripts. The Latin script compound was added to clarify the meaning of the Arabic compound, since fiber optics is a new technology and the meaning could have been unclear to the reader if it was written only in Arabic.

In this section, the overall results of the terms appearing in both Arabic and Latin scripts in the magazine corpus according to the four Arabic word formation mechanisms used to produce terms appearing in both Arabic and Latin scripts are discussed.

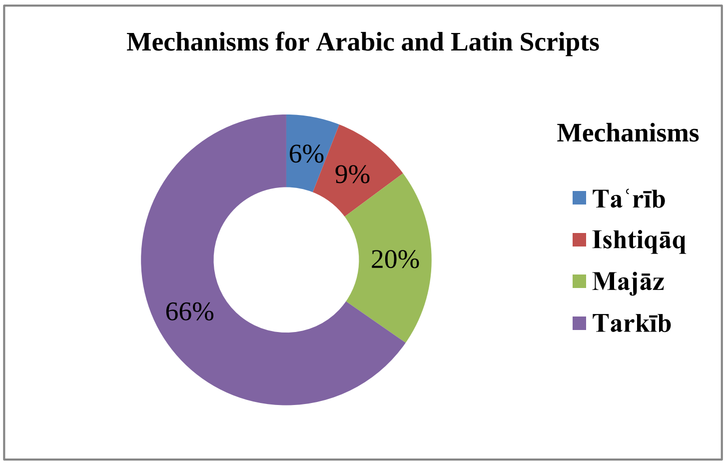

Figure 5.9: Overall Results of C3 Mechanisms Used to Produce Terms Appearing in both Arabic and Latin Scripts

As discussed previously, the total number of terms in C3 (corpus 3, the three magazines) is 722. This total is divided among the four Arabic word formation mechanisms with 479 terms (66% of the total number of C3 terms) produced by *taʿrīb*, 88 terms (12%) produced by *tarkīb*, 78 terms (11%) produced by *majāz*, and 77 terms (11%) produced by *ishtiqāq*.

The total number of terms appearing in both Arabic and Latin script is 35. This total is divided among the four Arabic word formation mechanisms with 23 terms (66% of the total number of terms appearing in both Arabic and Latin scripts) in *tarkīb*, seven terms (20%) in *majāz*, three terms (9%) in *ishtiqāq*, and two terms (6%) in *taʿrīb*. This means that *tarkīb* is clearly the most used mechanism for the terms appearing in both Arabic and Latin scripts, followed by *majāz*, then *ishtiqāq* and finally *taʿrīb*; the latter two are used infrequently. This could be because translated compounds can be more ambiguous than translated single terms. Therefore, it can be concluded that translated compounds have a higher tendency to appear in both Arabic and Latin script than do single terms, in order to clarify the meaning of the Arabic compound.

5.6 Plurals

In this section there is a discussion of the Arabic plural terms highlighted in the study. This discussion presents the results of the plural terms, including the results of the two Arabic plural forms (sound and broken) in terms of the four Arabic word formation mechanisms used, in order to show which plural form is more common in the terms produced by each mechanism, and for the computing terminology in the study in general.

Table 5.14: Results of the Mechanism Plurals

Mechanism	M1	M2	M3	M4
Total No. of Terms	1,390			
Mechanism No. of Terms	769	169	166	286
Total No. of Plurals	260			
% of Total No. of Terms	19%			
Total No. of Sound Plurals	173			
% of Total No. of Plurals	67%			
Total No. of Broken Plurals	87			
% of Total No. of Plurals	33%			
Mechanism No. of Plurals	108	70	41	41
% of Total No. of Plurals	42%	27%	16%	16%
Mechanism No. of Sound Plurals	85	44	20	24
% of Mechanism No. of Plurals	79%	63%	49%	59%
Mechanism No. of Broken Plurals	23	26	21	17
% of Mechanism No. of Plurals	21%	37%	51%	41%

The total number of plurals in the study is 260 terms (19% of the 1,390 terms in the study). The total number of sound plurals is 173 terms (67% of the total number of plural terms in the study), while the total number of broken plurals is 87 terms (33%) (see Table 5.14). This shows that the sound plural form is used more than the broken plural form in Arabic computing terminology.

In relation to the mechanism of *taʿrīb*, the total number of plurals is 108 (42% of the total number of plurals in the study). The number of sound plurals is 85 (79% of the total number of plural *taʿrīb* terms), while the number of broken plurals is 23 (21%). For example, the term *baṭṭāriyyāt* (batteries) is a sound plural, and the term *barāmij* (programs) is a broken plural. In relation to the mechanism of *ishtiqāq*, the total number of plurals is 70 (27% of the total number of plural terms in the study). The number of sound plurals is 44 (63% of the total number of plural *ishtiqāq* terms), while the number of broken plurals is 26 (37%). For example, the term *ḥāsibāt* (computers) is a sound plural, and the term *ḥawāsib* is a broken plural. In relation to the mechanism of *majāz*, the total number of plurals is 41 (16% of the total number of plural terms in the study). The number of broken plurals is 21 (51% of the total number of plural *majāz* terms), while the number of sound plurals is 20 (49%). For example, the term *shabakāt* (networks) is a sound plural, and the term *manāfidh* (ports) is a broken plural. In relation to the mechanism of *tarkīb*, the total number of plurals is 41 (16% of the total number of plural terms in the study). The number of sound plurals is 24 (59% of the total number of plural *tarkīb* terms), while the number of broken plurals is 17 (41%). The compound *ḥāsibāt* *maḥmūla* (laptops) is an example of a sound plural, and the compound *ʾaqrāṣ* *ṣulba* (hard disks) is an example of a broken plural.

In relation to the breakdown of the plurals within the mechanisms, *taʿrīb* has the highest percentage of sound plural terms (79%), followed by *ishtiqāq* (63%), then *tarkīb* (59%), and finally *majāz* (49%). In relation to the broken plurals, *majāz* has the highest percentage of terms within the mechanisms (51%), followed by *tarkīb* (41%), then *ishtiqāq* (37%), and finally *taʿrīb* (21%).

It can be concluded that the plural form which is used the most by the mechanisms of *taʿrīb*, *ishtiqāq* and *tarkīb* is the sound plural, while with the mechanism of *majāz*, the broken plural, is used slightly more frequently than the sound plural. It can also be concluded that *taʿrīb* comprises the highest percentage of sound plurals and the lowest percentage of broken plurals within the mechanisms.

This is because loanwords do not usually fit the Arabic phonological system, which means that they take a sound plural form rather than a broken plural form.

Moreover, it can be noted that the feminine sound plurals comprise the majority of the sound plurals with 170 terms (98% of the total number of sound plurals), while the masculine sound plurals comprise only three terms (2%). The masculine sound plurals are represented in the study by only one plural loanword, *mubarmijūn* (programmers), which is used in all three magazines in the third corpus. This means that the feminine sound plural is by far the more common sound plural form in Arabic computing terminology.

It can be noted that masculine loanwords regularly use feminine sound plurals rather than masculine sound plurals. It can also be pointed out that loanwords that do not fit the Arabic phonological system use feminine sound plurals, whereas the ones that fit the Arabic phonological system can use the broken plural. This trend is highlighted in the following examples.

The examples on the left are Arabic computing loanwords, while on the right are parallel examples of Arabic loanwords from other fields. These loanwords fit the Arabic phonological system and as a result have broken plurals.

kūd (code), *ʾakwād* (codes)	*kūb* (cup), *ʾakwāb* (cups)
filtar (filter), *falātir* (filters)	*daftar* (notebook), *dafātir* (notebooks)
kaybal (cable), *kayābil* (cables)	*saykal* (bicycle), *sayākil* (bicycles)
kharṭūsha (cartridge), *kharāṭīsh* (cartridges)	*ṭarbūsh* (tarboosh), *ṭarābīsh* (tarbooshes)

The examples on the left are Arabic computing loanwords, while on the right are parallel examples of Arabic loanwords from other fields. These loanwords do not fit the Arabic phonological system and as a result use feminine sound plurals.

mūdim (modem), *mūdimāt* (modems) *mūdīl* (model), *mūdīlāt* (models)

fraym (frame), *fraymāt* (frames) *kraym* (cream), *kraymāt* (creams)

fīdyū (video), *fīdyūhāt* (videos) *stīryū* (stereo), *stīryūhāt* (stereos)

5.7 *Nisba*

The Arabic relative adjectives in the study are discussed in terms of the Arabic word formation mechanisms that produce native Arabic terms, *ishtiqāq* and *tarkīb*, while the mechanism of *majāz* does not contain any terms subject to *nisba*. As mentioned previously, *nisba* occurs only with adjectives.

In relation to *tarkīb*, an Arabic compound regularly consists of two or more words. As discussed previously in relation to the *naʿt* compounding form, an adjective follows the noun it qualifies. It can be noted that the Arabic compounding form of *naʿt* applies to all Arabic compounds containing an adjective ending with the *nisba* suffix (*ī* or *iyya* for masculine and feminine adjectives, respectively). The number of *tarkīb* terms subject to *nisba* in the study is 84 terms (29% of the 286 *tarkīb* terms). This means that there is a moderate percentage of *nisba* in the terms produced by the *tarkīb* mechanism; as a result, *nisba* is a relatively important mechanism of *tarkīb*. For example, in the compound *ḥāsib ʾālī* (automatic computer), the first term is the noun *ḥāsib* (computer) and is followed by a qualifying adjective containing the masculine *nisba* suffix (*ī*) in *ʾālī* (automatic). In a further example, in the compound a*l-ḥawsaba al-saḥābiyya* (cloud computing) the first term is the noun a*l-ḥawsaba* (computing), which is followed by a qualifying adjective containing the feminine *nisba* suffix (*iyya*) in *al-saḥābiyya* (cloud).

In terms of *ishtiqāq*, the number of terms subject to *nisba* in the study is 11 (7% of the 169 *ishtiqāq* terms). Thus, there is a low percentage of *nisba* in the *ishtiqāq* mechanism, which is the result of many of the derived terms being classified as parts of the Arabic compounds; this also explains why *tarkīb* contains a higher percentage of *nisba* than *ishtiqāq* in this case. As a result, *nisba* is not considered as an important mechanism of *ishtiqāq* in this study. For example, the derived term *raqmī* (digital) is a masculine adjective, which contains the masculine *nisba* suffix (*ī*). In a further example, the derived term *khalfiyya* (background) is a feminine adjective, which contains the feminine *nisba* suffix (*iyya*).

5.8 The Usage of the Arabic Word Formation Mechanisms and the Impact and Importance of *Taʿrīb* in Arabic

The extent of usage of the four Arabic word formation mechanisms in the study in terms of computing terminology creation is illustrated in accordance with the results discussed in the data analysis chapter. It is noted that *taʿrīb* is the most used mechanism in computing terminology creation since it comprises (55%) of the terms in the study. This is attributable to the fact that all the terms in the units of measurement category are borrowings into Arabic, which means that they are all classified under the mechanism of *taʿrīb*. Additionally, in terms of the other two categories, there is a much higher number of software and hardware terms of *taʿrīb* than of any other mechanism. *Tarkīb* is the second most used mechanism in computing terminology creation, comprising (21%) of the terms in the study, followed by *ishtiqāq* and *majāz* which are the least used mechanisms, comprising (12%) of terms each.

This means that the mechanism of *taʿrīb* is generally preferred to the other Arabic word formation mechanisms in the case of computing terminology creation. This can be attributed to the capability of *taʿrīb* to cope with the high numbers of new technical terms entering the Arabic language. Also, it can be a result of the simplicity of using *taʿrīb* to produce loanwords rather than coining equivalents of new foreign terms using other Arabic word formation mechanisms. Another reason could be the lack of effort of the Arabic language academies in producing the appropriate native Arabic equivalents of new foreign computing terms. Finally, it could also be a result of the difficulties that can face the mechanisms of *ishtiqāq*, *majāz* and *tarkīb* in producing new technical computing terms.

In conclusion, it can be noted that *taʿrīb* is by far the most used mechanism in computing terminology creation, followed by *tarkīb*, and followed equally by *ishtiqāq* and *majāz* as the least used mechanisms. This also means that *taʿrīb* is an Arabic word formation mechanism which clearly has a major impact on and is of great importance to Arabic in terms of computing terminology creation in comparison with the other mechanisms as it is the most used mechanism for the creation of this type of terminology.

5.8.1 The Levels of Use of the Arabic Word Formation Mechanisms within all Corpora/Sub-corpora

In this section, there is a discussion of the levels of use of the four Arabic word formation mechanisms within all corpora/sub-corpora according to the percentages in Table 5.15.

Table 5.15: The Levels of Use of the Arabic Word Formation Mechanisms within all Corpora/Sub-corpora

Corpus	**C1**	**C2**		**C3**		
Sub-corpus	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Taʿrīb						
Sub-corpus Mechanism %	58%	38%	31%	74%	68%	60%
Corpus AVG Mechanism %	58%	34%		66%		
Ishtiqāq						
Sub-corpus Mechanism %	10%	19%	14%	9%	13%	10%

Corpus AVG Mechanism %	10%	16%		11%		
Majāz						
Sub-corpus Mechanism %	12%	14%	14%	9%	11%	12%
Corpus AVG Mechanism %	12%	14%		11%		
Tarkīb						
Sub-corpus Mechanism %	20%	30%	41%	7%	8%	18%
Corpus AVG Mechanism %	20%	35%		12%		

5.8.1.1 The Levels of Use of the Mechanisms within all Sub-corpora

In relation to the use of *taʿrīb* rather than the other mechanisms, S4 has the highest percentage use within the sub-corpora with (74%) of its terms using *taʿrīb*, followed by S5 with (68%), then S6 with (60%), S1 with (58%), S2 with (38%), and finally S3 with (31%). Thus, the magazines rely on *taʿrīb* more than the dictionaries since they are less professional sources of the language and prefer using loanwords to native Arabic words.

In relation to the use of *ishtiqāq*, S2 has the highest percentage use within the sub-corpora with (19%) of its terms using *ishtiqāq*, followed by S3 with (14%), then S5 with (13%), S1 and S6 with (10% each), and finally S4 with (9%). Thus, the dictionaries use *ishtiqāq* more than the magazines because they are more professional sources of the language and they try to utilise a word formation mechanism that produces native Arabic words.

In relation to *majāz*, S2 and S3 share the highest percentage use within the sub-corpora with (14%) of their terms using *majāz*, followed by S1 and S6 with (12% each), then S5 with (11%), and finally S4 with (9%). Thus the dictionaries tend to use *majāz* more than the magazines as they are more professional sources of the language and they try to utilise a word formation mechanism that produces native Arabic words.

In relation to *tarkīb*, S3 has the highest percentage use within the sub-corpora with (41%) of its terms using *tarkīb*, followed by S2 with (30%), then S1 with (20%), S6 with (18%), S5 with (8%), and finally S4 with (7%). Thus, the dictionaries use *tarkīb* more than the magazines as they are more professional sources of the language and they try to utilise a word formation mechanism that produces native Arabic words.

5.8.1.2 The Levels of Use of the Mechanisms within all Corpora

In relation to the share of *taʿrīb* terms, C3 has the highest percentage use within the corpora with (66%) of its terms using *taʿrīb*, followed by C1 (corpus 1) with (58%), and then C2 (corpus 2) with (34%). Thus, the magazines rely on *taʿrīb* more than the dictionaries as they are less professional sources of the language and prefer using loanwords to native Arabic words.

In relation to the share of *ishtiqāq* terms, C2 has the highest percentage use within the corpora with (16%) of its terms using *ishtiqāq*, followed by C3 with (11%), and then C1 with (10%). Thus, the dictionaries tend to use *ishtiqāq* more than the magazines as they are more professional sources of the language and try to utilise a word formation mechanism that produces native Arabic words.

In relation to the share of *majāz* terms, C2 has the highest percentage use within the corpora with (14%) of its terms using *majāz*, followed by C1 with (12%), and then C3 with (11%). Thus, the dictionaries tend to use *majāz* more than the magazines as they are more professional sources of the language and try to utilise a word formation mechanism that produces native Arabic words.

In relation to the share of *tarkīb* terms, C2 has the highest percentage use within the corpora with (35%) of its terms using *tarkīb*, followed by C1 with (20%), and then C3 with (12%). Thus, the dictionaries use *tarkīb* more than the magazines as they are more professional sources of the language and try to utilise a word formation mechanism that produces native Arabic words.

It can be concluded that the dictionaries try to utilise the word formation mechanisms of *ishtiqāq*, *majāz*, and *tarkīb*, which produce native Arabic terms, more than the magazines do. In turn, the magazines rely on *taʿrīb*, as they prefer using more loanwords than the computer dictionaries do.

5.8.1.3 The Distinctive Levels of Use of the Arabic Word Formation Mechanisms within all Corpora/Sub-corpora

In this section, there is a demonstration of the distinctive levels of use of the four Arabic word formation mechanisms within all corpora/sub-corpora (see Table 5.15).

It can be demonstrated that S2 has the highest percentage of *ishtiqāq* within the sub-corpora. S2 and S3 share the highest percentage of *majāz* within the sub-corpora. S3 has the highest percentage of *tarkīb* within the sub-corpora, and the lowest percentage of *taʿrīb*. These results can be attributed to the fact that S2 and S3 are dictionaries which are considered primary sources for lexicon, and have a greater tendency to use mechanisms that produce native Arabic terminology than magazines. S4 has the highest percentage of *taʿrīb* within the sub-corpora, and the lowest percentages of *ishtiqāq*, *majāz* and *tarkīb*. This can be attributed to the fact that S4 is an online magazine which is not an official source of the language, and tends to use more loanwords than dictionaries do. It therefore relies heavily on *taʿrīb*, which means that it does not make full use of the other Arabic word formation mechanisms. It relies on *taʿrīb* as this is an easier way of coining new terminology than using other Arabic word formation mechanisms, and is a mechanism that is capable of coping with the high number of computing terms entering the language.

It can also be demonstrated that C2 has the highest percentages of *ishtiqāq*, *majāz* and *tarkīb* within the corpora; and C3 has the highest percentage of *taʿrīb*. Again, these results confirm that the dictionaries of C1 and C2 can be considered more professional sources of the language than the magazines of C3. Thus, the dictionary corpora have a higher tendency to use mechanisms that produce native Arabic terminology than is the case with the magazine corpus, which has a higher tendency to use a mechanism that produces loanwords.

5.9 The Category Usage Levels

According to the category results in the study discussed in the data analysis chapter, it can be concluded that software is the most used category for computing terminology as it comprises (52%) of the terms in the study, followed by hardware comprising (37%), and then units of measurement, which is the least used category comprising (12%) of terms.

5.9.1 The Levels of Use of the Arabic Word Formation Mechanisms in the Categories

In this section, there is a discussion of the levels of use of the four Arabic word formation mechanisms in the categories.

The highest percentages of terms produced by *taʿrīb*, *ishtiqāq*, and *tarkīb* occur in the software category. This can be attributed to the fact that software has the highest total number of terms among the categories, which means that it is the most used category in the study. This means that software terms use *taʿrīb*, *ishtiqāq*, and *tarkīb* more than is the case with the other categories. The highest percentage of terms produced by *majāz* occurs in the hardware category. This is because hardware is the most used category in the study for *majāz*. This means that hardware terms use *majāz* more than the other categories. *Taʿrīb* is the only mechanism used in the units of measurement category; there are no occurrences of *ishtiqāq*, *majāz* and *tarkīb* in this category.

It can be concluded that the hardware and software categories contain terms produced by all four mechanisms, but the units of measurement category only contains terms produced by *taʿrīb*. This could be because the computing units of measurement terms are always borrowed rather than being translated into native Arabic words. It has also been shown that the software category has the highest amount of terms produced by three of the four mechanisms, *taʿrīb*, *ishtiqāq*, and *tarkīb*; the hardware category has the highest amount of terms produced by one of the four mechanisms, *majāz*; and the units of measurement category only contains terms produced by *taʿrīb*. These results reinforce the reasons discussed above.

5.9.1.1 The Distinctive Levels of Use of the Arabic Word Formation Mechanisms in the Categories

In relation to the distinctive levels of use of the four Arabic word formation mechanisms in the categories, the highest percentages of terms produced by *taʿrīb*, *ishtiqāq*, and *tarkīb* occur in the software category, while the highest percentage of terms produced by *majāz* occurs in the hardware category. This means that most of the *taʿrīb*, *ishtiqāq*, and *tarkīb* terms are software terms, and most of the *majāz* terms are hardware terms. In contrast, the lowest percentages of terms produced by all four mechanisms occur in the units of measurement category, in which the terms of this category occur only through *taʿrīb*.

5.10 A Model for Computing Terminology Translation

In this section, a model for computing terminology translation is presented based on the four Arabic word formation mechanisms analysed in the study. The model is based on the guidelines and the computing terminology produced by the Arabic Language Academy of Cairo in the corpus/sub-corpus of *Muʿjam al-Ḥāsibāt*.

This model is proposed in order to produce standardized terminology, and more accurate and proper Arabic equivalents of the original terms. It is also done to enable the creation or use of native Arabic terms instead of borrowing terms from other languages to increase the dependability on the Arabic lexicon, and to limit the use of loanwords, in order to restore the purity of the language.

It can be noted from the terms in the study that there are differences among the corpora in the translation of single terms into Arabic, and in the use of the Arabic word formation mechanisms in this translation. Therefore, the model for such cases along with examples from the study is presented in Table 5.16. The term(s) that comply with the guidelines of the Cairo Academy dictionary are presented in bold font in the top row(s) of each case and are followed by the row(s) at the bottom of each case containing the different term(s) taken from the study. There is a discussion of each case in the table.

Table 5.16: Computing Terminology Translation Model

English	Arabic	Transliteration	M1	M2	M3	M4
Hardware						
computer	**حاسب**	**ḥāsib**		X		
	حاسوب	**ḥāsūb**		X		
	حاسب آلي	ḥāsib ʾālī				X
	كمبيوتر	kumbyūtir	X			
server	**حاسوب خادم**	**ḥāsūb khādim**				X
	خادم	**khādim**			X	
	خادم الشبكة	khādim al-shabaka				X
	ملقم	mulaqqim			X	
	سيرفر	sayrfar	X			
microcomputer	**حاسوب دقيق**	**ḥāsūb daqīq**				X
	مايكروكمبيوتر	māykrū kumbyūtir	X			
cartridge	**خرطوشة (fr)**	**kharṭūsha**	X			
	كارتريدج	kārtrydj	X			
memory	**ذاكرة**	**dhākira**			X	
	ميموري	mīmūrī	X			
chip	**رقاقة**	**ruqāqa**			X	
	شريحة	sharīḥa			X	
hardware	**العتاد**	**al-ʿatād**			X	
	المكونات المادية	**al-mukawwināt al-mādiyya**				X
	المكونات الصلبة	al-mukawwināt al-ṣulba				X
	هاردوير	hārdwayr	X			
cable	**كبل**	**kabl**	X			
	كابل	kābl	X			
	كيبل	kaybal	X			
	سلك	silk		X		
scanner	**ماسح**	**māsiḥ**		X		
	ماسحة	**māsiḥa**			X	
	ماسح ضوئي	**māsiḥ ḍawʾī**				X
	ناسخ	nāsikh			X	
	سكانر	skānar	X			
controller	**متحكم**	**mutaḥakkim**		X		
	كنترولر	kuntrūlar	X			
processor	**معالج**	**muʿālij**			X	
	بروسيسور	brūsīsūr	X			
port	**منفذ**	**manfadh**			X	
	بورت	būrt	X			
router	**موجه**	**muwajjih**			X	
	راوتر	rāwtar	X			
	روتر	rūtar	X			
hub	**موزع مركزي**	**muwazziʿ markazī**				X
	هب	hab	X			
Software						
frame	**إطار**	**ʾiṭār**			X	
	فريم	fraym	X			
restart	**إعادة بدء**	**ʾiʿādat badʾ**				X
	إعادة تشغيل	**ʾiʿādat tashghīl**				X
	ريستارت	rīstārt	X			
command	**أمر**	**ʾamr**		X		
	كومند	kūmand	X			
	أمن	**ʾamn**		X		

security	**تأمين**	**taʾmīn**		X		
	أمان	ʾamān		X		
	سكيورتي	sikyūritī	X			
automation	**أوتمه**	**ʾawtama**	X			
	أتمتة	ʾatmata	X			
	برامج	**barāmij**	X			
software	**برمجيات**	**barmajiyyāt**	X			
	سوفتوير	sūftwayr	X			
	رسوم	**rusūm**		X		
graphics	**رسومات**	**rusūmāt**		X		
	جرافكس	jrāfiks	X			
login	**تسجيل دخول**	**tasjīl dukhūl**				X
	لوجن	lūjin	X			
format	**تهيئة**	**tahyiʾa**			X	
	فورمات	fūrmāt	X			
	حاجز حماية	**ḥājiz ḥimāya**				X
firewall	جدار ناري	jidār nārī				X
	فايروول	fāyarwūl	X			
	دردشة (tr)	**dardasha**	X			
chat	محادثة	muḥādatha			X	
	شات	shāt	X			
	زوم	**zūm**	X			
zoom	تكبير	takbīr		X		
	تصغير	taṣghīr		X		
bandwidth	**سعة الاتصال**	**siʿat al-ʾittiṣāl**				X
	باندويث	bāndwīth	X			
network	**شبكة**	**shabaka**			X	
	نتورك	nitwūrk	X			
off-line	**غير مباشر**	**ghayr mubāshir**				X
	دون اتصال	dūn ʾittiṣāl				X
	كلمة السر	**kalimat al-sirr**				X
password	كلمة المرور	kalimat al-murūr				X
	كلمة العبور	kalimat al-ʿubūr				X
	باسوورد	bāswūrd	X			
code	**كود**	**kūd**	X			
	شفرة	shifra			X	
wireless	**لاسلكي**	**lā-silkī**				X
	وايرلس	wāyarlis	X			
	مباشر	**mubāshir**			X	
on-line	متصل	muttaṣil		X		
	أون لاين	ʾūn lāyn	X			
browser	**متصفح**	**mutaṣaffiḥ**		X		
	مستعرض	mustaʿriḍ		X		
	مجلد	**mujallad**			X	
folder	حافظة	ḥāfiẓa		X		
	فولدر	fūldar	X			
backup	**نسخ احتياطي**	**naskh ʾiḥtiyāṭī**				X
	باكب	bākab	X			
	نطاق عريض	**niṭāq ʿarīḍ**				X
broadband	النطاق الواسع	al-niṭāq al-wāsiʿ				X
	برودباند	brūdbānd	X			
mode	**نمط**	**namaṭ**		X		
	مود	mūd	X			
multimedia	**وسائط متعددة**	**wasāʾiṭ mutaʿadida**				X
	ملتيميديا	maltīmīdyā	X			

As can be seen from Table 5.16, in relation to the hardware cases, the term 'computer' is better rendered by *ishtiqāq* as *ḥāsib* or *ḥāsūb* than by *tarkīb* as *ḥāsib ʾālī*, or by *taʿrīb* as *kumbyūtir*. The term 'server' is better rendered by *tarkīb* as *ḥāsūb khādim*, or by *majāz* as *khādim* than by *tarkīb* as *khādim al-shabaka*, by *majāz* as *mulaqqim*, or by *taʿrīb* as *sayrfar*. The term 'cartridge' is better rendered by *taʿrīb* as *kharṭūsha* rather than *kārtrydj*. The term 'memory' is better rendered by *majāz* as *dhākira* than by *taʿrīb* as *mīmūrī*. The term 'chip' is better rendered by *majāz* as *ruqāqa* rather than *sharīḥa*. The term 'hardware' is better rendered by *majāz* as *al-ʿatād*, or by *tarkīb* as *al-mukawwināt al-mādiyya* than by *tarkīb* as *al-mukawwināt al-ṣulba*, or by *taʿrīb* as *hārdwayr*. The term 'cable' is better rendered by *taʿrīb* as *kabl* than by *taʿrīb* as *kābl* or *kaybal*, or by *ishtiqāq* as *silk*. The term 'scanner' is better rendered by *ishtiqāq* as *māsiḥ*, by *majāz* as *māsiḥa*, or by *tarkīb* as *māsiḥ ḍawʾī* than by *majāz* as *nāsikh*, or by *taʿrīb* as *skānar*. The term 'controller' is better rendered by *ishtiqāq* as *mutaḥakkim* than by *taʿrīb* as *kuntrūlar*. The term 'processor' is better rendered by *majāz* as *muʿālij* than by *taʿrīb* as *brūsīsūr*. The term 'port' is better rendered by *majāz* as *manfadh* than by *taʿrīb* as *būrt*. The term 'router' is better rendered by *majāz* as *muwajjih* than by *taʿrīb* as *rāwtar* or *rūtar*. The term 'hub' is better rendered by *tarkīb* as *muwazziʿ markazī* than by *taʿrīb* as *hab*.

In relation to the software cases, the term 'frame' is better rendered by *majāz* as *ʾiṭār* than by *taʿrīb* as *fraym*. The term 'restart' is better rendered by *tarkīb* as *ʾiʿādat badʾ* or *ʾiʿādat tashghīl* than by *taʿrīb* as *rīstārt*. The term 'command' is better rendered by *ishtiqāq* as *ʾamr* than by *taʿrīb* as *kūmand*. The term 'security' is better rendered by *ishtiqāq* as *ʾamn* or *taʾmīn* than by *ishtiqāq* as *ʾamān*, or by *taʿrīb* as *sikyūritī*. The term 'automation' is better rendered by *taʿrīb* as *ʾawtama* rather than *ʾatmata*. The term 'software' is better rendered by *taʿrīb* as *barāmij* or *barmajiyyāt* rather than *sūftwayr*. The term 'graphics' is better rendered by *ishtiqāq* as *rusūm* or *rusūmāt* than by *taʿrīb* as *jrāfiks*. The term 'login' is better rendered by *tarkīb* as *tasjīl dukhūl* than by *taʿrīb* as *lūjin*. The term 'format' is better rendered by *majāz* as *tahyiʾa* than by *taʿrīb* as *fūrmāt*. The term 'firewall' is better rendered by *tarkīb* as *ḥājiz ḥimāya* than by *tarkīb* as *jidār nārī*, or by *taʿrīb* as *fāyarwūl*. The term 'chat' is better rendered by *taʿrīb* as *dardasha* than by *majāz* as *muḥādatha*, or by *taʿrīb* as *shāt*. The term 'zoom' is better rendered by *taʿrīb* as *zūm* than by *ishtiqāq* as *takbīr* or *taṣghīr*. The term 'bandwidth' is better rendered by *tarkīb* as *siʿat al-ʾittiṣāl* than by *taʿrīb* as *bāndwīth*.

The term 'network' is better rendered by *majāz* as *shabaka* than by *taʿrīb* as *nitwūrk*. The term 'off-line' is better rendered by *tarkīb* as *ghayr mubāshir* rather than *dūn ʾittiṣāl*. The term 'password' is better rendered by *tarkīb* as *kalimat al-sirr* than by *tarkīb* as *kalimat al-murūr* or *kalimat al-ʿubūr*, or by *taʿrīb* as *bāswūrd*. The term 'code' is better rendered by *taʿrīb* as *kūd* than by *majāz* as *shifra*. The term 'wireless' is better rendered by *tarkīb* as *lā-silkī* than by *taʿrīb* as *wāyarlis*. The term 'on-line' is better rendered by *majāz* as *mubāshir* than by *ishtiqāq* as *muttaṣil*, or by *taʿrīb* as *ʾūn lāyn*. The term 'browser' is better rendered by *ishtiqāq* as *mutaṣaffiḥ* rather than *mustaʿriḍ*. The term 'folder' is better rendered by *majāz* as *mujallad* than by *ishtiqāq* as *ḥāfiẓa*, or by *taʿrīb* as *fūldar*. The term 'backup' is better rendered by *tarkīb* as *naskh ʾiḥtiyāṭī* than by *taʿrīb* as *bākab*. The term 'broadband' is better rendered by *tarkīb* as *niṭāq ʿarīḍ* than by *tarkīb* as *al-niṭāq al-wāsiʿ*, or by *taʿrīb* as *brūdbānd*. The term 'mode' is better rendered by *ishtiqāq* as *namaṭ* than by *taʿrīb* as *mūd*. The term 'multimedia' is better rendered by *tarkīb* as *wasāʾiṭ mutaʿadida* than by *taʿrīb* as *maltīmīdyā*.

It can be seen from the above that in most cases, the Arabic word formation mechanisms of *ishtiqāq*, *majāz* and *tarkīb* are preferred over *taʿrīb* in the translation of computing terminology into Arabic. This finding supports the efforts made by the Cairo Academy to produce native Arabic terms instead of using loanwords when translating computing terminology. However, in a minority of cases, *taʿrīb* is preferred over the other three mechanisms in the translation of computing terminology into Arabic. This is because the terms rendered by *taʿrīb* are more commonly used in the language as equivalents for specific terms, or have a more accurate meaning, than the terms rendered by the other mechanisms. For example, the term ‘code’ is rendered in the Cairo Academy dictionary by *taʿrīb* as *kūd* rather than by *majāz* as *shifra*. In certain cases, the same mechanism is applied with preference given to the terms that comply with the Cairo Academy dictionary as they can be more commonly used in the language. For example, it is preferable for the term ‘browser’ to be rendered by *ishtiqāq* as *mutaṣaffiḥ* rather than *mustaʿriḍ*, according to the Academy. In certain cases, more than one term complies with the Cairo Academy dictionary, which can be rendered through more than one mechanism. For example, the term ‘hardware’ is rendered according to the Academy by *majāz* as *al-ʿatād* and by *tarkīb* as *al-mukawwināt al-mādiyya*. Such terms are used interchangeably in the Cairo Academy dictionary in order to cover all possible common terms used as equivalents for the single terms.

5.11 Overlapping Terminology Discussion

In this section, comparisons across and between the dictionaries, across and between the magazines, and between the selected dictionaries and magazines in terms of the overlapping computing terminology they contain are discussed. Also, comparisons among the mechanisms and categories used, in terms of the overlapping computing terminology in the corpora/sub-corpora, are discussed. This discussion presents the levels of agreement and similarities between the compared corpora/sub-corpora and explains the trends that can be observed. It also assesses the competence of the selected computer dictionaries at producing computing terminology, and the level of consultation of these dictionaries by the computer magazines in the study. This discussion depends mainly on the results presented in the previous chapter.

While the selected dictionaries are specialised computer dictionaries, the number of computing terminology entries extracted is relatively small in comparison with the total number of entries in each dictionary.

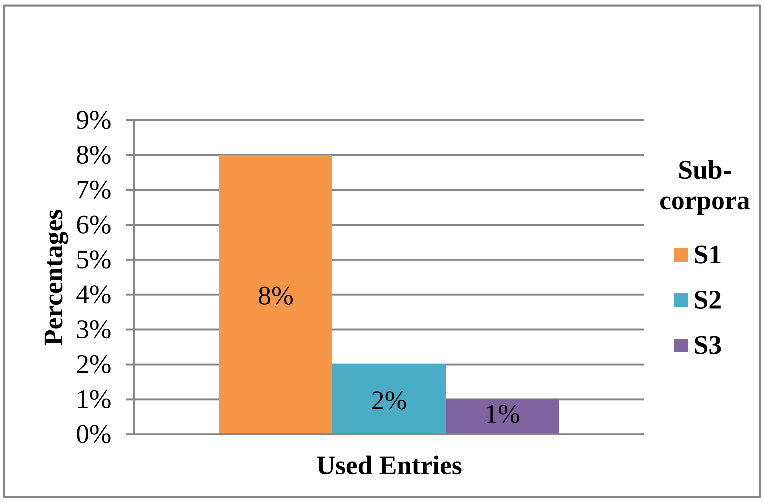

Figure 5.10: Percentage of Entries Extracted From the Selected Dictionaries

The relatively low percentage of the computing terminology entries extracted from the dictionaries could indicate that the dictionaries do not fulfil their purpose. Therefore, they arguably might not be very efficient or sufficiently competent at computing terminology creation. However, a number of factors need to be taken into consideration as possible reasons for a relatively small number of computing terminology entries being extracted from each dictionary. Among these factors is the fact that the dictionaries contain many irrelevant or non-computing terms, proper nouns, trade names, and so on. Examples of irrelevant or non-computing terms are: *dharra* (atom) and *khaliyya* (cell), which are evident in all three dictionaries. An example of a proper noun or trade name is *ʾadūb ʾakrūbāt* (Adobe Acrobat), which is also evident in all three dictionaries. Furthermore, the dictionaries contain many repeated computing terms which have been counted as tokens; for example, *ʾintarnit* (internet), which has 337 tokens in S2, 39 tokens in S3, and 26 tokens in S1. Moreover, as dictionaries are primary sources of terminology, they mainly include credible terms in their area of specialization and do not permit current terms until they are approved.

In order to understand whether or not the selected dictionaries are consulted and reflect actual usage by the selected magazines, the levels of the overlapping computing terminology between the dictionaries and magazines will be discussed. As mentioned earlier, there are three corpora in the study: the first two corpora contain the dictionaries, and the third corpus contains the magazines.

There is a very low level of agreement between the three corpora as shown by the (6%) overlap percentage across them. Also, there is a low level of agreement between each of the two dictionary corpora and the magazine corpus. There is a low level of agreement (11% overlap) between C1 and C3, and between C2 and C3 (13% overlap). These low overlap percentages between each of the dictionary corpora and the magazine corpus in relation to computing terminology could indicate that the dictionaries are not consulted sufficiently, reflecting low levels of actual usage by the magazines.

There are various reasons that can explain why the dictionaries are not consulted sufficiently by the magazines, which can also explain the low overlap percentages across and between the corpora. One of the main reasons is that in most cases there are differences between the dictionaries and the magazines in terms of the Arabic word formation mechanisms used for translating single computing terms. If terms in the magazines do not occur in the dictionaries, it is mostly because the magazines use the *taʿrīb* mechanism when rendering specific terms, whereas the dictionaries use the other mechanisms of *ishtiqāq*, *majāz* or *tarkīb*. For example, the terms *skānar* (scanner) and *rāwtar* (router) are used in the magazines as transliterations of the English terms using the *taʿrīb* mechanism, whereas in the dictionaries they are translated by other mechanisms, which are *ishtiqāq* to produce *māsiḥ* (wiper), and *majāz* to produce *muwajjih* (controller or instructor), respectively. Another reason is that in certain cases the magazines use more than one form of a single term which are often rendered through two or more mechanisms, whereas the dictionaries tend to use only one form. For example, the term 'server' is translated by the *majāz* mechanism in the dictionaries and the magazines as *khādim*, but it is also rendered in the magazines by the *taʿrīb* mechanism as *sayrfar*. This means that there is an overlap between the dictionary and magazine corpora in the case of *khādim*, but not for the other form, *sayrfar*. Terminological confusion and inconsistency can also be included among these reasons.

The main results of the overlaps between any two sub-corpora consisting of a dictionary and a magazine will be discussed to show which two sub-corpora have a higher or lower percentage of overlap. This could also indicate the extent to which each of the three dictionaries is used by the magazines. In relation to the overlaps, the S2 dictionary and the S6 magazine have the highest overlap percentage at (22%). This means that these two sub-corpora have a moderate level of agreement between them. One of the reasons that could explain this level of agreement is that S6 has the highest number of terms among the sub-corpora (307 terms), which might provide a better chance for overlap with S2 which has 212 terms. A more likely reason could be that S6 is the most subject to overlaps (78%) among the sub-corpora and that S2 is the most subject to overlaps among the dictionaries (54%). As a result, it can be concluded that S2 has the highest actual usage among the dictionaries by any of the magazines.

In contrast, the S3 dictionary and the S4 magazine have the lowest overlap percentage at (15%). This means that these two sub-corpora have a relatively low level of agreement between them. One of the reasons that could explain this level of agreement is that S3 has the lowest number of terms among the dictionaries (206 terms), which might provide a lower chance for overlap with S4 which has 243 terms. A more likely reason could be that S3 is the least subject to overlaps among the sub-corpora (44%) and that S4 is the second least subject to overlaps among the magazines (56%). As a result, it can be concluded that S3 has the lowest actual usage among the dictionaries by any of the magazines.

In terms of the overlaps across all three dictionaries, the total overlap percentage is (9%), which means that there is a very low level of agreement between them. This can be attributed to a number of reasons. One of the reasons is the high level of variation between the dictionaries in the number of computing entries extracted from each, as S1 contains 250 terms, S2 contains 212 terms, and S3 contains 206 terms, leading to a low overlap percentage between them. Terminological confusion and inconsistency in using the *taʿrīb* mechanism by the dictionaries is a further reason. The dictionaries occasionally use different transliterations for a single foreign term which results in the terms not overlapping with each other. For example, the term ‘transistor’ is transliterated in two of the dictionaries with a short vowel [i] as in *trānsistūr*, while in the other dictionary it is transliterated with a long vowel [ī] as in *trānsīstūr*. Another common reason that can explain the low overlap percentages of computing terminology in the corpora/sub-corpora in general is the use of different Arabic word formation mechanisms in the process of translating a single term. A foreign term is occasionally translated by different mechanisms in the dictionaries, resulting in various equivalents of the same term. For example, the term 'hardware' is translated in S1 by the *tarkīb* mechanism as *al-mukawwināt al-mādiyya* (physical components), in S1 and S3 by the *majāz* mechanism as *al-ʿatād* (materials), and in S2 by the *tarkīb* mechanism as *al-mukawwināt al-ṣulba* (concrete components) and by the *taʿrīb* mechanism as *al-hārdwayr* (hardware).

The discussion now turns to comparing the three dictionaries in the corpora. These are compared in terms of the overlap percentages between each group of two to show the levels of agreement between them and to explain the trends that can be observed.

In terms of the overlaps between any two dictionaries in the corpora, the highest total overlap percentage occurs between S2 and S3 (23%), followed by S1 and S2 (20%), and finally S1 and S3 (17%). In relation to the mechanisms, the highest overlap percentage in terms of *taʿrīb* occurs between S1 and S2 (42%), followed by S1 and S3 (38%), and then S2 and S3 (33%). The highest overlap percentage in terms of *ishtiqāq* occurs between S2 and S3 (21%), followed by S1 and S3 (18%), and finally S1 and S2 (13%). The highest overlap percentage in terms of *majāz* occurs between S1 and S3 (25%), followed by S1 and S2 (22%), and then S2 and S3 (21%). The highest overlap percentage in terms of *tarkīb* occurs between S2 and S3 (25%), followed by S1 and S2 (23%), and finally S1 and S3 (19%). In relation to the categories, the highest overlap percentage in CAT1 occurs between S2 and S3 (39%), followed by S1 and S3 (38%), and then S1 and S2 (35%). The highest overlap percentage in CAT2 occurs between S1 and S2 and between S1 and S3 equally (55%), and followed by S2 and S3 (52%). The highest overlap percentage in CAT3 occurs between S1 and S2 (10%), followed by S2 and S3 (9%), and finally S1 and S3 (8%).

It can be concluded that S2 and S3 have the greatest similarity among the dictionaries, while S1 and S3 are the least similar. S1 and S2 are the most similar in the use of *taʿrīb*, while S2 and S3 are the least similar. S2 and S3 are the most similar in the use of *ishtiqāq*, while S1 and S2 are the least similar. S1 and S3 are the most similar in the use of *majāz*, while S2 and S3 are the least similar. S2 and S3 are the most similar in the use of *tarkīb*, while S1 and S3 are the least similar. S2 and S3 are the most similar in CAT1, while S1 and S2 are the least similar. S1 and S2, and S1 and S3 are equally more similar in CAT2, while S2 and S3 are the least similar. S1 and S2 are the most similar in CAT3, while S1 and S3 are the least similar.

As a result, it can be said that the two dictionaries S2 and S3 in C2 have greater levels of overlapping terminology between them than is the case with S1 in C1. This means that S2 and S3 are the most related dictionaries, and that they have greater similarities in terminology usage. This could be because S1 is a dictionary produced by a language academy, which is an official source of the language, whereas S2 and S3 are produced by individual lexicographers. Another reason is that S2 and S3 are more similar to each other than to S1 in terms of *ishtiqāq* and *tarkīb*, which are two of the four word formation mechanisms used.

As mentioned earlier, there are three magazines in the third corpus, which will be compared in terms of the overlap percentages across the magazines and between each pair to show the levels of agreement between them and to explain the trends that can be observed.

In terms of the overlaps across all three magazines, the total overlap percentage is (14%), which means that there is a low level of agreement between them. This can be attributed to a number of reasons. One of the reasons is that there are significant differences between the magazines in the number of computing terms extracted from each as S4 contains 243 terms, S5 contains 172 terms, and S6 contains 307 terms. Another reason is that they are produced in three different countries, S4 in Syria, S5 in Egypt, and S6 in Saudi Arabia, and as a result are probably affected by their language varieties.

In terms of the overlaps between any two magazines in the corpora, the highest total overlap percentage occurs between S5 and S6 (30%), followed by S4 and S6 (27%), and finally S4 and S5 (24%). In relation to the mechanisms, the highest overlap percentage in the use of *taʿrīb* occurs between S5 and S6 (65%), followed by S4 and S6 (64%), and finally S4 and S5 (61%). The highest overlap percentage in the use of *ishtiqāq* occurs between S4 and S5 (19%), followed by S4 and S6, and S5 and S6 (15% each). The highest overlap percentage in the use of *majāz* occurs between S4 and S5, and S4 and S6 (15% each), followed by S5 and S6 (13%). The highest overlap percentage in the use of *tarkīb* occurs between S5 and S6 (7%), followed by S4 and S5, and S4 and S6 (5% each). In relation to the categories, the highest overlap percentage in CAT1 occurs between S4 and S6 (39%), followed by S4 and S5 (37%), and finally S5 and S6 (36%). The highest overlap percentage in CAT2 occurs between S4 and S5, and S4 and S6 (51% each), followed by S5 and S6 (47%). The highest overlap percentage in CAT3 occurs between S5 and S6 (17%), followed by S4 and S5 (12%), and finally S4 and S6 (10%).

It can be concluded that S5 and S6 have the greatest similarity among the magazines, while S4 and S5 are the least similar. S5 and S6 are the most similar in the use of *taʿrīb*, while S4 and S5 are the least similar. S4 and S5 are the most similar in the use of *ishtiqāq*, while S4 and S6, and S5 and S6 are equally less similar. S4 and S5, and S4 and S6 are equally more similar in the use of *majāz*, while S5 and S6 are the least similar. S5 and S6 are the most similar in the use of *tarkīb*, while S4 and S5, and S4 and S6 are equally less similar. S4 and S6 are the most similar in CAT1, while S5 and S6 are the least similar. S4 and S5, and S4 and S6 are equally more similar in CAT2, while S5 and S6 are the least similar. S5 and S6 are the most similar in CAT3, while S4 and S6 are the least similar.

Overall, the two magazines S5 and S6 have more overlapping terminology between them than there is between S4 and S5 and between S4 and S6. This means that S5 and S6 are the most related magazines, and that they have more similarities in their computing terminology usage. Thus, the Egyptian and Saudi magazines have more similarities between them in terms of computing terminology usage than is the case with the Syrian magazine. In contrast, the Syrian and Egyptian magazines have the least similarities in terms of computing terminology usage, which means that they are the two least similar magazines in the third corpus.

5.11.1 Mechanism Overlaps

Taʿrīb has the highest overlap percentage among the mechanisms (57%), followed by *tarkīb* (18%), then *ishtiqāq* (13%), and finally *majāz* (12%). This means that *taʿrīb* is the most subject to overlaps among the mechanisms, while *majāz* is the least subject to overlaps. The reason for these percentages is that *taʿrīb* has the highest number of terms among the mechanisms (769), followed by *tarkīb* with 286, then *ishtiqāq* (169), and finally *majāz* (166).

5.11.1.1 Corpora Mechanism Overlaps

This section offers a discussion of the overlaps across and between the corpora according to the four Arabic word formation mechanisms in the study.

As mentioned previously, *taʿrīb* is the most common mechanism in terms of the overlaps across and between the corpora. Therefore, the most common aspect shared by the corpora according to the mechanism overlaps is the use of the mechanism of *taʿrīb*. This could be because *taʿrīb* has the highest number of terms in the corpora in comparison with the other three mechanisms. It could also be because *taʿrīb* is the only mechanism among the four mechanisms to occur in all the three categories used (i.e. hardware, software, units of measurement), whereas the other three mechanisms occur only in the two categories of hardware and software, which means that *taʿrīb* has a higher chance of having more overlaps.

5.11.2 Category Overlaps

CAT2 has the highest overlap percentage among the categories (47%), followed by CAT1 (39%), and finally CAT3 (14%). This means that CAT2 is the most subject to overlaps among the categories, while CAT3 is the least subject to overlaps. The reason for these percentages is that CAT2 has the highest number of terms among the categories (715), followed by CAT1 (509), and finally CAT3 (166).

5.11.2.1 Corpora Category Overlaps

This section discusses the overlaps across and between the corpora according to the three categories in the study.

As mentioned previously, software is the most common category in terms of the overlaps across and between the corpora. Therefore, the most common aspect shared by the corpora according to the category overlaps is the use of the software category. This could be because the category of software has the highest number of terms in the corpora in comparison with the other two categories. It could also be because the categories of software and hardware contain terms produced by each of the four mechanisms used, which gives them a higher chance to contain more overlaps, while the units of measurement category contains terms that are only produced by the mechanism of *taʿrīb*.

5.11.3 Overlapping Terminology Concluding Remarks

The selected computer dictionaries may arguably not be very efficient dictionaries or sufficiently competent at computing terminology creation because of the low percentages of the computing terminology entries extracted from them. It is also noted that, based on the low percentages of the overlapping computing terminology across and between the dictionary and magazine corpora, the selected dictionaries are not consulted sufficiently and have low levels of usage by the selected magazines. It can also be concluded that S2 is the dictionary that has the highest actual usage of the dictionaries by any of the magazines as it has the highest level of overlaps among the dictionaries. In contrast, S3 is the dictionary that has the lowest actual usage by any of the magazines as it has the lowest level of overlaps among the sub-corpora.

In terms of the overlaps across all three dictionaries, it can be concluded that there is a very low level of agreement between them. In terms of the overlaps between any two dictionaries, S2 and S3 are the most related dictionaries in that they have more similarities in terminology usage, while S1 and S3 are the least similar. In terms of the overlaps across all three magazines, it can be concluded that there is a low level of agreement between them. In terms of the overlaps between any two magazines, S5 and S6 are the most related magazines as they have more similarities in terminology usage, while S4 and S5 are the least similar.

In terms of the mechanisms, *taʿrīb* is the most subject to overlaps, while *majāz* is the least subject to overlaps. In terms of the categories, CAT2 is the most subject to overlaps, while CAT3 is the least subject to overlaps. Therefore, it can be concluded that the most common aspect shared by the corpora according to the mechanism overlaps is the use of the mechanism of *taʿrīb*, and the most common shared aspect in relation to the category overlaps is the use of the software category.

5.12 Conclusion

In conclusion, *taʿrīb* is the most used Arabic word formation mechanism in computing terminology creation (accounting for 55% of the total number of terms), followed by *tarkīb* (21%), and then *ishtiqāq* and *majāz* (12% each). This means that *taʿrīb* is an Arabic word formation mechanism that has a major impact on and is of great importance to Arabic in terms of computing terminology creation. Furthermore, software is the most popular category for computing terminology, containing (52% of the total terms), followed by hardware (37%), and finally units of measurement (12%). This means that the software category is more commonly used than the other categories for Arabic computing terminology.

It is argued that the selected computer dictionaries might not be very efficient dictionaries or sufficiently competent at computing terminology creation. It is also noted that the selected dictionaries are not sufficiently consulted as there are low levels of actual usage by the selected magazines. It is noted that *taʿrīb* is the most subject to overlaps among the mechanisms, while *majāz* is the least subject to overlaps; and software is the most subject to overlaps among the categories, while units of measurement is the least subject to overlaps. As a result, it is concluded that the most common aspect shared by the corpora in terms of the mechanisms is the use of the mechanism of *taʿrīb*; and in terms of the categories the most common shared aspect is the use of the software category.

It is concluded that acronym borrowing is less influential as a mechanism of *taʿrīb*. It is noted that Arabic computing loanwords in the study are mostly nouns, and occasionally adjectives. It is concluded that there is a moderate tendency to naturalize Arabic computing loanwords; and there is a relatively low tendency for Arabic computing loanwords to be inflectionally active. It is noted that the singular Arabic computing loanwords are mostly masculine, but occasionally feminine. In addition, it is pointed out that the magazines in the study use more variant loanword spellings than the dictionaries do.

Furthermore, it is noted that Arabic patterns are applicable to 89 derived words (53% of the 169 derived words) in the study. There was a total of 21 Arabic patterns applied to the derived words (24% of the derived words where Arabic patterns are applicable). In addition, it is concluded that *ʾiḍāfa* is the most common Arabic compounding form in the study, followed by *naʿt*, then the hybrid form, and finally the prefixed negative particle form. Thus, the *ʾiḍāfa* and *naʿt* are very significant compounding forms for Arabic computing compounds, while the hybrid and the prefixed negative particle forms are insignificant. It is also concluded that *nisba* is a relatively important mechanism of *tarkīb* in the study but not as important to *ishtiqāq*.

Moreover, it is noted that *tarkīb* is clearly the most used mechanism for the terms appearing in both Arabic and Latin scripts, followed by *majāz*, then *ishtiqāq* and finally *taʿrīb*, both of which are used infrequently. Furthermore, it is concluded that the sound plural form is used more frequently than the broken plural form in Arabic computing terminology. *Taʿrīb* comprises the highest percentage of sound plurals and the lowest percentage of broken plurals among the mechanisms. Furthermore, the feminine sound plural form is by far more common than the masculine sound plural form for Arabic computing terminology, and masculine loanwords regularly use feminine sound plurals rather than masculine sound plurals.

In the next chapter, a summary of the study results and findings, and conclusions for the research are presented.

Chapter Six: Conclusion

6.1 Introduction

This chapter aims to highlight the main findings of the thesis and address the research questions presented in chapter one. Moreover, it presents the specific contributions of this research to the field of study, the limitations of the research, and provides recommendations for future research.

6.2 Findings of the Study

Chapter two focused on the Arabic word formation mechanism of *taʿrīb* (lexical borrowing). It discussed various aspects of the mechanism of *taʿrīb*. This discussion included a general introduction to the mechanism of ‘lexical borrowing’, and a discussion of the hierarchies and scales of borrowability. Moreover, it presented an introduction to *taʿrīb*, and its history and importance in Classical and Modern Arabic. It highlighted the debates around *taʿrīb*. Scholars are divided into three groups according to their views towards this process: one group opposes *taʿrīb*, a second group supports it, and the third merges the two opposing views. The chapter discussed the main reasons leading to *taʿrīb*, including the need for equivalents of foreign nouns, nationalism, the simplicity of using loanwords, modernization and the lack of equivalent Arabic terminology, social prestige and the attractiveness of loanwords, and euphemisms. It also presented the methods of *taʿrīb* with reference to classical scholarship as pointed out by Sībawayh, as well as modern scholars. It highlighted the constraints and obstacles precluding the use of *taʿrīb*, and offered a criterion to differentiate between Arabic loanwords and native Arabic words.

Chapter two also presented a chronological discussion of the history of lexical borrowing in Arabic, which is divided into two main periods: the Classical Period (until the 19th century), and the Modern Period. The Classical Period is divided into three parts: pre-Islamic times, lexical borrowing in the Qur'an, and the first Translation Movement (9th-11th c.). The Modern Period comprises two parts: the 19th century, and from the 20th century until the present time. The chapter included a discussion of six major Arabic language academies: the Damascus Academy, the Cairo Academy, the Baghdad Academy, the Permanent Bureau of Coordination (Rabat), the Union of Arab Academies, and the Amman Academy. Moreover, it provided background information on the Arabic word formation mechanisms of *ishtiqāq* (derivation), *majāz* (semantic extension), *tarkīb* (compounding) and *naḥt* (blending), and commented on their use in terms of technical and computing terminology creation.

Chapter three included a description of the research methodology, which explained the motivations behind the choice of this particular study, presented general information on the sources of the data used, highlighted the reasons behind the choice of the corpora/sub-corpora used and provided a general description of them. The data in this study are based on three corpora; the first corpus is made up of an English-Arabic computer dictionary produced by the Cairo Academy; the second corpus consists of two general English-Arabic computer dictionaries; and the third corpus consists of three different Arabic computer magazines. In addition, this chapter demonstrated the methods applied in the data collection and analysis, and gave an overview of the process of analysing the data, the results and findings of the study. The analysed data were classified into the four Arabic word formation mechanisms—

taʿrīb, *ishtiqāq*, *majāz* and *tarkīb*—as well as the three terminological categories—hardware, software and units of measurement.

The results and findings in chapter five show that *taʿrīb* is generally the most used Arabic word formation mechanism in terms of computing terminology creation, (accounting for 55% of terms), followed by *tarkīb* as the second most used mechanism (accounting for 21% of terms), and then *ishtiqāq* and *majāz* which are the least used mechanisms (accounting for 12% of terms each). This means that *taʿrīb* is an Arabic word formation mechanism which clearly has a major impact on and is of great importance to Arabic in terms of computing terminology creation as it is the most used mechanism in the creation of this type of terminology. Moreover, the results in chapter four showed that *taʿrīb* is the most used mechanism in all the corpora/sub-corpora except for the second corpus and the Al-Kilani Dictionary sub-corpus, which have *tarkīb* as the most used mechanism. This also indicates the major impact on and importance of *taʿrīb* as a mechanism of computing terminology creation in the Arabic language.

In relation to the percentages of computing terms produced by the mechanisms within the sub-corpora, the results and findings in chapter four show that Mahmoud's Dictionary has the highest percentage of *ishtiqāq* within the sub-corpora (which accounts for 19% of its terms). Mahmoud's Dictionary and the Al-Kilani Dictionary share the highest percentage of *majāz* within the sub-corpora (which accounts for 14% of the terms in both dictionaries). The Al-Kilani Dictionary has the highest percentage of *tarkīb* within the sub-corpora (which accounts for 41% of its terms), and the lowest percentage of *taʿrīb* (which accounts for 31% of its terms). NetworkSet magazine has the highest percentage of *taʿrīb* within the sub-corpora (which accounts for 74% of its terms), and the lowest percentages of *ishtiqāq* and *majāz* (which each account for 9% of its terms), and *tarkīb* (which accounts for 7% of its terms).

Moreover, in the case of the percentages of computing terms produced by the mechanisms within the corpora, the results show that the second corpus has the highest percentages of *tarkīb* within the corpora (which accounts for 35% of its terms), *ishtiqāq* (which accounts for 16% of its terms), *majāz* (which accounts for 14% of its terms), and the lowest percentage of *taʿrīb* (which accounts for 34% of its terms). The third corpus has the highest percentage of *taʿrīb* within the corpora (which accounts for 66% of its terms), and the lowest percentages of *tarkīb* (which accounts for 12% of its terms), and *majāz* (which accounts for 11% of its terms). The first corpus has the lowest percentage of *ishtiqāq* within the corpora (which accounts for 10% of its terms). Therefore, it is concluded that the computer dictionaries tend to utilise the word formation mechanisms of *ishtiqāq*, *majāz* and *tarkīb*, which produce native Arabic terms, more frequently than the computer magazines do. In contrast, the computer magazines tend to rely on *taʿrīb*, as they prefer using more Arabic loanwords than the computer dictionaries do. This demonstrates the differences between the dictionaries and magazines in the use of the Arabic word formation mechanisms in producing computing terminology.

The results in chapter four show that software is the most used category for computing terminology in the study, (accounting for 52% of the total terms), followed by hardware (37%), and finally units of measurement (12%). This demonstrates that most computing terms are related to software terminology, which means that this category is used more extensively than the other categories for Arabic computing terminology.

Regarding the percentages of computing terms produced by the mechanisms in relation to the categories, the results and findings in chapter five reveal that the highest percentages of *taʿrīb*, *ishtiqāq* and *tarkīb* occur in the software category, while the highest percentage of *majāz* occurs in the hardware category. This means that most of the *taʿrīb*, *ishtiqāq*, and *tarkīb* terms are software terms, and that most of the *majāz* terms are hardware terms. In contrast, the units of measurement category has no occurrences of *ishtiqāq*, *majāz* and *tarkīb*, which means that *taʿrīb* is the only mechanism producing units of measurement terms. In terms of the percentages of computing terms in the categories according to the mechanisms, the results reveal that the hardware and software categories occur in all four mechanisms, while the units of measurement category occurs only in *taʿrīb*. It is also concluded that software is the most used category in three of the four mechanisms, *taʿrīb*, *ishtiqāq* and *tarkīb*, hardware is the most used category in one of the four mechanisms, *majāz*, and the units of measurement category only uses the mechanism of *taʿrīb*.

Regarding the percentages of overlapping computing terminology in the corpora/sub-corpora, mechanisms and categories, the results in chapter four show that the number of overlapping terms is 290 (21% of the total number of terms). In relation to the sub-corpora, *Majallat Wāḥat al-Ḥāsib* is the most subject to overlaps with (78%) of the total number of overlaps, while the Al-Kilani Dictionary is the least subject to overlaps with (44%). In relation to the corpora, the third corpus (the magazine corpus) is the most subject to overlaps with (62%) of the total number of overlaps, while the first corpus (the Cairo Academy dictionary) is the least subject to overlaps with (46%). In relation to the mechanisms, *taʿrīb* is the most subject to overlaps with (57%) of the total number of overlaps, while *majāz* is the least subject to overlaps with (12%). In relation to the categories, software is the most subject to overlaps with (47%) of the total number of overlaps, while units of measurement is the least subject to overlaps with (14%). It was concluded that the most common aspect shared by the corpora according to the mechanism overlaps is the use of the mechanism of *taʿrīb*, and according to the category overlaps the most common shared aspect is the use of the software category.

The results and findings in chapter five indicate that the selected computer dictionaries might not be very efficient or sufficiently competent at computing terminology creation. Each dictionary has a low percentage of computing terminology entries extracted from it: around (8%) for *Muʿjam al-Ḥāsibāt*, (2%) for Mahmoud's Dictionary, and (1%) for the Al-Kilani Dictionary.

Moreover, the results indicate that the selected dictionaries are not sufficiently consulted as there are low actual usage levels by the selected magazines. The evidence for this conclusion is based on the low overlap percentages between each of the dictionary corpora and the magazine corpus in terms of the computing terminology used. This means that there is a low level of agreement between each of the two dictionary corpora and the magazine corpus. This is noticeable from the low level of agreement between the first and third corpora (11% of the total overlaps), and between the second and third corpora (13% of the total overlaps). It is also concluded that the Al-Kilani Dictionary has the highest usage of the dictionaries by any of the magazines, while Mahmoud's Dictionary has the lowest usage by any of the magazines.

The results and findings in chapter five also reveal that the total overlap percentage across all three dictionaries is (9%), which means that there is a very low level of agreement between them in the use of computing terminology. In terms of the overlaps between any two dictionaries, the Al-Kilani Dictionary and Mahmoud's

Dictionary are the most related dictionaries with an overlap percentage of (23%), while *Muʿjam al-Ḥāsibāt* and Mahmoud's Dictionary are the least similar with an overlap percentage of (17%). The results also reveal that the total overlap percentage across all three magazines is (14%), which means that there is a low level of agreement between them in the use of computing terminology. In terms of the overlaps between any two magazines, *Majallat Sūq al-ʿAṣr* and *Majallat Wāḥat al-Ḥāsib* are the most related magazines, with an overlap percentage of (30%), while NetworkSet magazine and *Majallat Sūq al-ʿAṣr* are the least similar with an overlap percentage of (24%).

Similarly, according to the overlap percentages presented in chapter four, in general, there are very low to moderate levels of agreement in the corpora/sub-corpora in the use of computing terminology. There is a very low level of agreement across the corpora (6%), and across the sub-corpora (3%). Furthermore, there is a low level of agreement between the first and second corpora (16%), between the second and third corpora (13%), and between the first and third corpora (11%).

The results and findings in chapter five indicate that acronym borrowing is less influential as a mechanism of *taʿrīb* as loan acronyms comprise (12%) of the computing terminology produced by *taʿrīb*. The results also reveal that English is the language from which Arabic has borrowed most of its technical terms in recent times. In the case of the word classes which comprise the Arabic computing loanwords in the study, nouns comprise the majority of loanwords (93%), while adjectives comprise only (7%), which means that Arabic computing loanwords are mostly nouns, and only occasionally adjectives. Moreover, the results reveal that the Arabic computing noun loanwords are mostly software terms, followed by hardware terms and then units of measurement terms. In contrast, the Arabic computing adjective loanwords are only software terms, and never hardware or units of measurement terms.

The results and findings in chapter five reveal that the naturalized loanwords comprise (45%) of the total number of loanwords, which means that there is a moderate tendency to naturalize Arabic computing loanwords. It also indicates that the software terms are the most naturalized Arabic computing loanwords, followed by hardware terms and then units of measurement terms. Moreover, the results highlight that the inflectionally active loanwords comprise (20%) of the total number of loanwords, which means there is a relatively low tendency for Arabic computing loanwords to be inflectionally active. It also shows that the software terms are the most inflectionally active Arabic computing loanwords, and to a much lesser extent the hardware terms, but never the units of measurement terms.

Moreover, the findings highlight the fact that the singular Arabic computing loanwords are mostly masculine, and occasionally feminine. It notes that feminine loanwords can be identified by one of the three feminine signs, identified by Arabs as feminine, or by using them with feminine adjectives. In addition, the results reveal that the magazines in the study are much more subject to variant loanword spellings than the dictionaries, which could be due to the different editors involved in producing the magazines in comparison with a much lower number of lexicographers producing the dictionaries. Also, it could be due to the magazines being less professional and not as dependable as dictionaries in terms of the lexical terms they use or produce.

The results and findings in chapter five show that Arabic patterns are applicable to 89 derived words (53% of the 169 derived words) in the study. There was a total of 21 Arabic patterns applied to the derived words (24% of the derived words where Arabic patterns are applicable). The number of patterns is divided between the category of software (accounting for 67% of the Arabic patterns), hardware (accounting for 19% of the Arabic patterns), and those shared by both categories (accounting for 14% of the Arabic patterns).

In terms of the four Arabic compounding forms in the study, *ʾiḍāfa* has the highest percentage occurrence (accounting for 53% of *tarkīb* terms), followed by *naʿt* (37%), then the hybrid form (7%), and finally the prefixed negative particle form (3%). This shows that *ʾiḍāfa* is the most common Arabic compounding form, followed by *naʿt*, then the hybrid form, which is significantly less common, and finally the prefixed negative particle form. The findings also highlight that *ʾiḍāfa* is generally the most dominant compounding form in the dictionary sub-corpora, while *naʿt* is the most dominant in the magazine sub-corpora. Therefore, it can be concluded that in terms of the sub-corpora, most of the dictionaries tend to rely on the compounding form of *ʾiḍāfa*, and all the magazines tend to rely on *naʿt*, while the hybrid and the prefixed negative particle compounding forms are not heavily relied upon. As the *ʾiḍāfa* and *naʿt* compounding forms comprise the majority of Arabic compounds, this means that they are highly significant forms for Arabic computing compounds, but the hybrid and the prefixed negative particle forms are insignificant.

The findings also indicate that the Arabic compounding form of *naʿt* applies to all Arabic compounds containing an adjective ending with the *nisba* suffix (*ī* or *iyya* for masculine and feminine adjectives, respectively). The number of *tarkīb* terms subject to *nisba* is 84 (29% of the 286 *tarkīb* terms); and the number of *ishtiqāq* terms subject to *nisba* is 11 (7% of the 169 *ishtiqāq* terms). This means that *nisba* is a relatively important mechanism of *tarkīb*, but not an important mechanism of *ishtiqāq*.

Moreover, the findings reveal that the terms appearing in the study either in Latin script only, or in both Arabic and Latin scripts occur only in the magazine sub-corpora as the magazines are not as professional as the dictionaries in terminology creation. The total number of terms appearing in both Arabic and Latin scripts in the study is 35 terms. This number is divided among the four Arabic word formation mechanisms with 23 terms (66% of the total terms appearing in both Arabic and Latin scripts) produced by *tarkīb*, seven terms (20%) produced by *majāz*, three terms (9%) produced by *ishtiqāq*, and two terms (6%) produced by *taʿrīb*. This means that *tarkīb* is clearly the most used mechanism for the terms appearing in both Arabic and Latin scripts, followed by *majāz*, then *ishtiqāq* and finally *taʿrīb*, both of which are used infrequently.

The results and findings in chapter five show that plurals comprise (19%) of the total number of terms. The sound plurals comprise (67%) of the total number of plurals and the broken plurals comprise (33%), which shows that the sound plural form is used more frequently than the broken plural form in Arabic computing terminology. The findings also reveal that the sound plural is the most used plural form for the mechanisms of *taʿrīb*, *ishtiqāq* and *tarkīb*, while the broken plural is used slightly more frequently than the sound plural for the mechanism of *majāz*. Moreover, *taʿrīb* comprises the highest percentage of sound plurals and the lowest percentage of broken plurals among the mechanisms. This is because loanwords usually do not fit the Arabic phonological system which results in them taking a sound plural form rather than a broken plural form; it is more common for such terms to take the sound plural form in Arabic. The results also indicate that the feminine sound plural form is far more common than the masculine sound plural form in Arabic computing terminology, and that masculine loanwords regularly use feminine sound plurals rather than masculine sound plurals. It concludes that loanwords which do not fit the Arabic phonological system use feminine sound plurals, whereas ones that fit the Arabic phonological system can use broken plurals.

6.3 Contributions

This research provides a statistical analysis of the frequency of the computing terms produced by each of the four Arabic word formation mechanisms in order to demonstrate and compare the extent of their usage in technical computing terminology. It demonstrates the impact and importance of *taʿrīb* as a mechanism of computing terminology creation in the Arabic language, and presents alternative Arabic word formation mechanisms that can be used to replace loanwords with native Arabic words in order to help to preserve the language. It also provides an analysis which deals with the lexicographical treatments of the computing terms produced through the Arabic word formation mechanisms, with special consideration given to the terms produced through *taʿrīb* as the main mechanism under discussion. The research presents three computer dictionary and magazine corpora containing 1,390 Arabic computing terms along with their English counterparts, compiled by the researcher in order to analyse the Arabic computing terms in relation to the Arabic word formation mechanisms. It assesses the competence of the selected computer dictionaries in terms of computing terminology creation, evaluates the level of consultation of the computer dictionaries by the computer magazines, and the levels of agreement and similarities between the corpora/sub-corpora in the use of Arabic computing terminology.

As a result of the terminological confusion and inconsistency in the translation of single technical computing terms into Arabic, and the inconsistency in the use of the Arabic word formation mechanisms in this translation, in chapter five this research presented a model for computing terminology translation. The model is derived from the four mechanisms used in the study and is based on the guidelines and the computing terminology produced by the Arabic Language Academy of Cairo in the corpus/sub-corpus of *Muʿjam al-Ḥāsibāt*. The aim of the model is to produce standardized terminology, and more accurate and proper Arabic equivalents of the original terms. It also aims to enable the creation or use of native Arabic terms instead of borrowing terms from other languages. This will increase the dependability of the Arabic lexicon and limit the use of loanwords, in order to restore the purity of the language. The research also presents a recommended usage for loanword spellings as a guide for the production of unified loanword spellings for single donor words instead of using variant loanword spellings.

6.4 Limitations and Recommendations

As with any research, this study suffers from a number of shortcomings. First, it is mainly focused on the Arabic word formation mechanism of *taʿrīb* and its impact on and importance in the Arabic language as a mechanism of computing terminology creation. Therefore, it is recommended to investigate the other Arabic word formation mechanisms of *ishtiqāq*, *majāz* and *tarkīb* in a similar detailed manner.

Second, the data in this research was restricted to technical computing terminology; therefore, more terms could be collected if the data included other fields of technology such as electronics, robotics and energy. It is, therefore, highly recommended that the data be collected from other fields of technology and the results be compared with the results in this study, in order to develop a deeper understanding and also compare the use of Arabic word formation mechanisms in other fields of technology.

Third, it is recommended that further research consider more variety of computing terminology sources, and use more computer dictionaries and magazines from various Arab countries, in order to deepen the investigation into the use of Arabic word formation mechanisms.

Fourth, it is noted that most academies lack publications about new fields of study such as technical computing terminology, which is the subject of this study. Thus, the data in this research was restricted to the technical computing terminology produced by the Cairo Academy which was the only available academy with recent specialized publications on computing terminology. It is, therefore, recommended that publications by the other academies are used as additional sources for this type of study in order to access other primary sources of the language. These can be compared with each other in order to organise the production of unified dictionaries in such new fields.

Fifth, as a result of the Arab Spring and the ongoing political disturbance in the Arab world, many Arabic language academies have been suspended for a number of years and their publications disrupted. Two of the most popular Arabic academies, the Cairo Academy and the Damascus Academy, have stopped working for long periods of time as a consequence of this political situation. This is also disrupting the role of the academies in maintaining the integrity of the Arabic language and fulfilling their responsibilities towards it. Moreover, this makes it impossible to contact the academies, which results in difficulties in obtaining their publications.

References

English References

Abderrahman, W. (1981) *The role of derivation in the process of Neologisation in modern literary Arabic.* Unpublished. PhD thesis. University of London.

Abdel-Rahman, W. (1991) ‘A critical linguistic study of lexical borrowing in Arabic and English’, *Arts*, 3 (1), pp. 33-66.

Abdur-Rasheed, A. (2008) *The guidance in 'Arabic grammar: a compilation of the rules of 'Arabic syntax.* Madani E-Publications. Available at: http://www.al-islam.org/sites/default/files/singles/639-Hidayah.pdf (Accessed: 31 January 2015).

Abu-Chacra, F. (2007) *Arabic: an essential grammar.* London and New York: Routledge.

Aikhenvald, A. and Dixon, R. (ed.) (2006) *Areal diffusion and genetic inheritance.* Oxford: Oxford University Press.

Ali, A. (1987) *A linguistic study of the development of scientific vocabulary in Standard Arabic*. London: Kegan Paul International.

Alnaser, M. (2010) *Multi-word items in dictionaries from a translator’s perspective.* Unpublished PhD thesis. Durham University.

Amer, W. and Menacere, K. (2013) ‘The challenges of translating English compounds into Arabic, for better or for worse’, *Babel,* 59 (2), pp. 224–243.

Brill Online (2010) *Encyclopaedia of Islam*. Available at: http://www.brillonline.nl.ezphost.dur.ac.uk/subscriber/uid=1522/?authstatuscode=202 (Accessed: 31 January 2015).

Campbell, L. (1999) *Historical linguistics: an introduction*. Edinburgh: Edinburgh University Press.

Cannon, G. (1994) *The Arabic contributions to the English language*. Wiesbaden: Harrassowitz.

Chekayri, A. (2001) ‘Ištiqāq’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/istiqaq-EALL_COM_vol2_0058 (Accessed: 25 March 2014).

Emery, P. (1988) ‘Compound words in modern standard Arabic’, *Journal of Arabic Linguistics*, XIX, pp. 32–43.

Field, F. (1998) *Borrowing and borrowability*. Unpublished. PhD thesis. University of Southern California.

Fleisch, H. (2012) ‘Ishtiḳāḳ’, in Bearman, P., Bianquis, Th., Bosworth, C.E., van Donzel, E. and Heinrichs, W.P. (eds.) *Encyclopaedia of Islam*. 2nd edn. Brill Online (2013) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-2/ishtikak-COM_0383 (Accessed: 25 March 2014).

Gutas, D. (1998) *Greek thought, Arab culture: the Graeco-Arabic translation movement in Baghdad and early ‘Abbāsid society (2nd-4th/8th-10th centuries).* London: Routledge.

Gutas, D. and van Bladel, K. (2011) ‘Bayt al-Ḥikma’, in Krämer, G., Matringe, D., Nawas, J., and Rowson, E. (eds.) *Encyclopaedia of Islam*. Vol. 3. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-3/bayt-al-hikma-COM_22882 (Accessed: 26 March 2014).

Haspelmath, M. and Tadmor, U. (eds.) (2009) *Loanwords in the world's languages: a comparative handbook.* Berlin: De Gruyter Mouton.

Hassaine, Z. (1984) *The Spanish and French influence in Western Algeria: a case of borrowing*. Unpublished PhD thesis. University of Bath.

Haugen, E. (1950) ‘The analysis of linguistic borrowing’, *Language*, 26 (2), pp. 210-231.

Haugen, E. (1950) ‘Problems of bilingualism’, *Lingua*, II (3), pp. 271-90.

Hayes, J. (2003) *Inflectional morphology and compounding in English: A single route, associative memory based account.* Unpublished PhD thesis, University of Hertfordshire.

Hope, T. (1971) *Lexical borrowing in the romance languages*. Oxford: Basil Blackwell.

Al-Hussaini, A. (2009) *The Arabic language and the arabization of borrowed words.* Available at: http://unstats.un.org/unsd/geoinfo/25th-GEGN-Docs/WP%20papers/WP47-Item11-Lebanon.pdf (Accessed: 29 December 2009).

Jeffery, A. (1938) *The foreign vocabulary of the Qur'an*. Hertford: Stephen Austin & Sons, Ltd.

Jespersen, O. (1912) *Growth and structure of the English language*. Leipzig: B.G.Teubner.

Jinzhi, S. (2008) *Language contact and morphosyntactic borrowing: the case study of Hong Kong written Chinese*. Unpublished PhD thesis. The Hong Kong Polytechnic University.

Kalmbach, H. (2012) ‘Dār al-ʿUlūm’, in Fleet, K., Krämer, G., Matringe, D., Nawas, J. and Everett, R. (eds.), *Encyclopaedia of Islam*. Vol. 3. Brill Online (2015) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-3/da-r-al-ulu-m-COM_25869 (Accessed: 24 January 2015).

El-Khafaifi, H. (1985) *The role of the Cairo academy in coining Arabic scientific terminology: A historical and linguistic evaluation*. Unpublished PhD thesis. University of Utah..

AI-Kharabsheh, A. (2003) *The translation of different types of technico-Scientific compounds from English into Arabic.* Unpublished PhD thesis. University of Salford.

Kharma, N. and Hajjaj, A. (1997) *Errors in English among Arabic speakers: analysis and remedy*. Beirut: Librairie du Liban.

Al-Khatib, M. and Farghal, M. (1999) ‘English borrowings in Jordanian Arabic: distribution, functions, and attitudes’, *Grazer Linguistische Studien*, 52, pp. 1-18.

Kopf, L. (1976) *Studies in Arabic and Hebrew lexicography*. Jerusalem: Magnes Press, Hebrew University.

von Kügelgen, A. (2007) ‘ʿAbduh, Muḥammad’, in Fleet, K., Krämer, G., Matringe, D., Nawas, J. and Everett, R. (eds.), *Encyclopaedia of Islam*. Vol. 3. Brill Online (2015) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-3/abduh-muh-ammad-COM_0103 (Accessed: 24 January 2015).

Marian, V. and Kaushanskaya, M. (2007) ‘Cross-linguistic transfer and borrowing in bilinguals’, *Applied Psycholinguistics*, 28 (2), pp. 369-390.

Martin, R. (ed.) (2004) *Encyclopedia of Islam and the Muslim world*. New York: Macmillan Reference.

Meakins, F. (2008) *Case-marking in contact: the development and function of case morphology in Gurindji Kriol, an Australian mixed language.* Unpublished PhD thesis. University of Melbourne.

Moravcsik, E. (1978) ‘Language Contact’, in Greenberg, J., Ferguson, C. et al. (eds.), *Universals of human language*. Vol. 1. Stanford: Stanford University Press, pp. 93-123.

El-Mouloudi, A. (1986) *Arabic language planning: the case of lexical modernization*. Unpublished PhD thesis. Georgetown University.

Munday, J (2008) *Introducing Translation Studies: Theories and Application*. 2nd edn. London/New York: Routledge.

Newman, D. (2002) ‘The European influence on Arabic during the Nahda: lexical borrowing from European languages (ta’rib) in 19th-century literature’, *Arabic Language and Literature*, 5, pp. 1-32.

Newman, D. (2002) ‘The phonetic status of Arabic within the world’s languages: the uniqueness of the lughat al-daad’, *Antwerp Papers in Linguistics*, 100, pp. 65-75.

Nunnemann, E. (n.d.) *Borrowing in the English language.* Available at: http://www.eva.nunnemann.com/wp-content/borrowing-in-english3.pdf (Accessed: 29 December 2009).

Al-Qahtani, S. (2000) *Arabization in written discourse in Saudi Arabia*. Unpublished PhD thesis. Indiana, Ball State University.

Redouane, R. (2001) *The use of modern standard Arabic word formation processes by English-speaking and French-speaking adult L2 learners and native speakers*. Unpublished PhD thesis. University of Toronto.

Rendón, J. (2008) *Typological and social constraints on language contact: Amerindian languages in contact with Spanish*. Vol. 1. Utrecht: LOT.

Ringbom, H. (1983) ‘Borrowing and lexical transfer’, *Applied Linguistics*, 4 (3), pp. 207-212.

Ryding, K. (2005) *A reference grammar of modern standard Arabic.* Cambridge: Cambridge University Press.

Ṣaḥeeḥ International, (2004) *The Qur’an English meanings.* Jeddah: Almuntada Al-Islami.

Sa'id, M. (1967) *Lexical innovation through borrowing in modern standard Arabic*. New Jersey: Princeton University.

Sapir, E. (1921) *Language, an introduction to the study of speech.* New York: Harcourt, Brace and Company.

Sawaie, M. (2000) ‘Rifāʿa Rāfiʿ al-Ṭahṭāwī and his contribution to the lexical development of modern literary Arabic’, *International Journal of Middle East Studies*, 32 (3), pp. 395-410.

Sawaie, M. (2011) ‘Language academies’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic Language and Linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/language-academies-EALL_COM_vol2_0082 (Accessed: 25 March 2014).

Seidel, U. (2010) *The usage and integration of English loanwords in German: a corpus-based study of Anglicisms in Der Spiegel magazine*. Unpublished MA dissertation. University of Alabama.

Stetkevych, J. (1970) *The modern Arabic literary language: lexical and stylistic developments*. Chicago: The University of Chicago Press.

Thomason, S. and Kaufman, T. (1988) *Language contact, creolization, and genetic linguistics*. Berkeley: University of California Press.

Versteegh, K. (1997) *The Arabic language*. Edinburgh: Edinburgh University Press.

Weinreich, U. (1970) *Languages in contact: findings and problems*. Paris: Mouton.

Weiss, B. (1974) 'Medieval Muslim discussions of the origin of language', *Zeitschrift der Deutschen Morgenlandischen Gesellschaft,* 124, (1), pp. 33-41.

Whitney, W. (1881) 'On mixture in language', *Transactions of the American Philological Association* (1869-1896), 12, pp. 5-26. Available at: http://www.jstor.org/stable/2935666 (Accessed: 08 March 2012).

Arabic References

ʿAbd alʿAzīz, M. (1990) *al-Taʿrīb fī al-qadīm wa al-ḥadīth.* Cairo: Dār al-Fikr al-ʿArabī.

Abū al-ʿAbbās al-Jawharī. Available at: http://www.marefa.org/index.php/%D8%A3%D8%A8%D9%88_%D8%A7%D9%84%D8%B9%D8%A8%D8%A7%D8%B3_%D8%A7%D9%84%D8%AC%D9%88%D9%87%D8%B1%D9%8A (Accessed: 13 June 2010).

Abū Manṣūr Mawhūb al-Jawālīqī. Available at: http://mousou3a.educdz.com/%D8%A7%D9%84%D8%AC%D9%88%D8%A7%D9%84%D9%8A%D9%82%D9%8A/ (Accessed: 13 June 2010).

al-ʿAlamī, E. (2001) *Fī al-taʿrīb*. Casablanca: Maṭbaʿat al-Najāḥ al-Jadīda.

ʿAli, J. (1993) *al-Mufaṣṣal fī tārīkh al-ʿArab qabl al-ʾIslām*. 2nd edn, Vol. 6. Baghdād: Jāmiʿat Baghdād.

Ḍayf, Sh. (1984) *Majmaʿ al-lugha al-ʿarabiyya fī khamsīn ʿāmā*. Cairo: Majmaʿ al-Lugha al-ʿArabiyya.

al-Ḥamad, M. (2005) *Fiqh al-lugha*. Riyadh: Dār Ibn Khuzaiyma.

al-Ḥamzāwī, M. (1988) *ʾAʿmāl majmaʿ al-lugha al-ʿarabiyya bi-al-qāhira*. Beirut: Dār al-Gharb al-ʾIslāmī.

Ḥijāzī, M. (1993) *al-ʿUsus al-lughawiyya li-ʿilm al-muṣṭalaḥ*. Cairo: Maktabat Gharīb.

al-Ḥudaiythī, Kh. (1965) *ʾAbnyat al-ṣarf fī kitāb Sībawayh.* Baghdad: Maktabat al-Nahḍa.

al-Jawālīqī, M. (ed.) (1995) *al-Muʿarrab min al-kalām al-aʿjamī ʿalā ḥurūf al-muʿjam*. Cairo: Dār al-Kutub al-Miṣriyya.

al-Jazāʾirī, Ṭ. (1918) *al-Taqrīb li-ʾuṣūl al-taʿrīb*. Cairo: al-Maṭbaʿa al-Salafiyya.

al-Kārūrī, ʿA. (1986) *al-Taʿrīb fī ḍawʾ ʿilm al-lugha al-muʿāṣir*. Khartoum: Dār Jāmiʿat al-Kharrṭūm lil-Nashr.

al-Qazzāz, A. (1981) *al-Dirāsāt al-lugahwiyya fī al-ʿIrāq.* Baghdad: Dār al-Rashīd.

al-Shaiyyāl, J.(1951) *Tārīkh al-tarjama wa al-ḥaraka al-thaqāfiiyya fi ʿaṣr Muḥammad ʿAlī.* Miṣr: Dār al-Fikr al-ʿArabī.

al-Shihābī, M. (1965) *al-Muṣṭalaḥāt al-ʿilmiyya fī al-lugha al-ʿarabiyya fī al-qadīm wa al-ḥadīth*. Damascus: al-Majmaʿ al-ʿIlmī al-ʿArabī.

Shīr, A. (1988) *al-Alfāẓ al-fārisiyya al-muʿarraba*. 2nd edn. Cairo: Dār al-ʿArab.

Sībawayh, ʿA. (ed.) (1982) *Kitāb Sībawayh*. 2nd edn, Vol. 4. Cairo: Maktabat al-Khānjī.

al-Suyūṭī, J. (1907) *al-Muzhir*. Cairo: Maṭbaʿat al-Saʿāda.

al-Suyūṭī, J. (n.d.) *al-Muhadhdhab fīmā waqaʿa fī al-qurʾān min al-muʿarrab*. al-Muḥammadiyya: Maṭbaʿat Faḍāla.

al-Ṭahṭāwī, R. (2012) *Takhlīṣ al-ʾibrīz fī talkhīṣ bārīz*. Cairo: Kalimāt ʿArabiyya li al-Tarjama wa al-Nashr.

al-Thaʿālibī, ʿA. (ed.) (2000) *Fiqh al-lugha wa ʾasrār al-ʿarabiyya,* 2nd edn, Beirut: al-Maktaba al-ʿAṣriyya.

al-Yasūʿī, R. (1986) *Gharāʾib al-lugh al-ʿarabiyya.* Beirut: Dār al-Mashriq.

al-Zarrkān, M. (1998) *al-Juhūd al-lughawiyya fī al-muṣṭalaḥ al-ʿilmī al-ḥadīth*. Damascus: Ittiḥād al-Kuttāb al-ʿArab.

Data Collection Sources

Al-Kilani, T. (2004) *The Al-Kilani dictionary of computer and internet terminology: English-English-Arabic*. Beirut: Librairie du Liban Publishers.

Mahmoud, M. (2010) *Dictionary of computer and internet English-Arabic*. Cairo: al-Dār al-Miṣriyya lil-Kitāb.

Majallat Sūq al-ʿAṣr (ICT Market Magazine) (2010-2011). Sussex: Specialized Arbic Co. (SAPC) Limited.

Majallat Wāḥat al-Ḥāsib (2008-2011). Riyadh: Nādī al-Ḥāsib alʾĀlī.

Majmaʿ al-Lugha al-ʿArabiyya (2012) *Muʿjam al-Ḥāsibāt (Dictionary of computers): English-Arabic*. 4th edn. Cairo: the Academy of Arabic Language.

NetworkSet. E-Magazine. Available online at: http://www.networkset.net (Accessed 31 January 2015)

Bibliography

English Bibliography

Abderrahman, W. (1995) ‘A linguistic study of the impact of English on Arabic word formation’, *Islamic Studies*, 34 (2), pp. 223-31.

Abdu, H. (1988) Italian loanwords in colloquial Libyan Arabic as spoken in the Tripoli region. Unpublished PhD thesis. University of Arizona.

Abu-Absi, S. (1986) ‘The modernization of Arabic: problems and prospects’, *Anthropological Linguistics,* 28 (3), pp. 337-348. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/30027961 (Accessed: 24 September 2009).

Abu Humeid, A. and Altai, A. (2013) ‘Errors in English and Arabic acronyms made by Iraqi university students of translation’, *International Journal of Humanities and Social Science,* 3 (6), pp. 169-182.

Abu-Melhim, A. (1992) *Communication across Arabic dialects: code-switching and linguistic accommodation in informal conversational interactions.* Unpublished PhD thesis.Taxes A&M University.

Alenzi, F. (2001) *Formal constraints on Arabic/English code-switching: a lexically-based approach*. Unpublished PhD thesis. University of Kansas.

Anani, M. (1983) ‘Some differences between Arabic and English comparative structures’, *Papers and Studies in Contrastive Linguistics,* 17, pp. 74-79.

Anderson, J. (1998) *Arabizing the internet.* Abu Dhabi: The Emiratis Center for Strategic Studies and Research (ECSSR).

Araj, S. (1993) *Foreign words in the Arabic press: A study of the impact of western languages on Arabic*. Unpublished PhD thesis. University of Taxes at Austin.

Asbaghi, A. (n.d.) ‘Persian loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/persian-loanwords-EALL_COM_vol3_0254 (Accessed: 25 March 2014).

Atawneh, A. (n.d.) English loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/english-loanwords-EALL_COM_vol2_0006 (Accessed: 25 March 2014).

Ayalon, A. (1987) *Language and change in the Arab Middle East: the evolution of modern political discourse*. New York: Oxford University Press.

Ayalon, A. (1989) ‘Dimuqratiyya, hurriyya, jumhuriyya: the modernization of the Arabic political vocabulary’, *Asian and African Studies*, 23 (2), pp. 23-42.

Ayres, D. (1985) *English words from Latin and Greek elements.* Arizona: The University of Arizona Press.

Aziz, Y. (1968) *The influence of English grammar, syntax, idiom and style upon contemporary literary Arabic*. Unpublished PhD thesis. University of St Andrews.

Aziz, Y. (1983) ‘Transliteration of English proper nouns into Arabic’, *Meta: Journal des Traducteurs/Meta: Translators' Journal*, 28 (1), pp. 70-84.

Bahumaid, S. (1990) *Lexical interference of English in colloquial Aden Arabic*. Unpublished. PhD thesis. University of Exeter.

Bauer, L. (1983) *English word-formation.* Cambridge: Cambridge University Press.

Bauer, L. and Renouf, A. (2001) 'A corpus-based study of compounding in English', *Journal of English Linguistics*, 29, pp. 101-123.

Bearman, P., Bianquis, T., et al. (2010) *Encyclopaedia of Islam*. Brill Online. Durham University Library. Available at: http://referenceworks.brillonline.com/cluster/Encyclopaedia%20of%20Islam?s.num=0 (Accessed: 31 January 2015).

Beeston, A. (1970) *The Arabic language today*. London: Hutchinson University Library.

Bishai, W. (1960) 'Notes on the Coptic substratum in Egyptian Arabic', *Journal of the American Oriental Society*, 80 (3), pp. 225-229.

Bishai, W. (1961) 'Nature and extent of Coptic phonological influence on Egyptian Arabic', *Journal of Semitic Studies*, 6 (2), pp. 175-182.

Bishai, W. (1964) 'Coptic lexical influence on Egyptian Arabic', *Journal of Near Eastern Studies*, 23 (1), pp. 39-47.

Blau, J. (1973) 'Remarks on some syntactic trends in modern standard Arabic', *Israel Oriental Studies*, III, pp. 127-231.

Blau, J. (1976) 'Some additional observations on syntactic trends in modern standard Arabic', *Israel Oriental Studies*, VI, pp. 158-90.

Boussofara-Omar, N. (1999) *Arabic diglossic switching in Tunisia: applying Myers-Scotton's frame model*. Unpublished PhD thesis, University of Texas at Austin.

Bowker, L. (ed.) (2006) *Lexicography, terminology, and translation: text-based studies in honour of Ingrid Meyer.* Ottawa: University of Ottawa Press.

Butros, A. (1963) *English loanwords in the colloquial Arabic of Palestine (1917-1948) and Jordan (1948–1962).* Unpublished PhD thesis. Columbia University.

Butros, A. (1973) 'Turkish, Italian and French loanwords in the colloquial Arabic of Palestine and Jordan', *Studies in Linguistics,* 23, pp. 87-104.

Cabré, T. (1999) *Terminology: theory, methods, and applications.* Amsterdam: J. Benjamins Pub. Co.

Catford, J., Palmer, J., McCarus, E., Moray, E. and Snider, S. (1974) *A contrastive study of English and Arabic.* Michigan: The Defense Language Institute.

Chalabi, S. (1984) 'Modern Arabic terminology and bilingual lexicography: activities and problems', in Swales, J. and Mustapha, H. (ed.), *English for specific purposes in the Arabic world*. Aston, UK: University of Aston Press, pp. 280-291.

Cifoletti, G. (n.d.) 'Italian loanwords', in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic Language and Linguistics*. Brill Online (2014). (Online). Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/italian-loanwords-EALL_SIM_vol2_0037 (Accessed: 25 March 2014).

Dillon, M. (1945) 'Linguistic borrowing and historical evidence', *Language,* 21 (1), pp. 12-17.

Dobrisan, N. (1978) 'Assimilation of word borrowings from European languages into the Arabic language', *Romano-Arabica*, II, pp. 53-9.

Drozdik, L. (1979) 'Lexical innovation through borrowing as presented by Arab scholars', *Asian and African Studies,* XV, pp. 21-9.

Drozdik, L. (1981) ‘Semantic aspects of lexical borrowing in Arabic’, *Asian and African Studies*, 5 (1), pp. 23-40.

Dyke, C. (1992) ‘Old words for new worlds: modern scientific and technological word-formation’, *American Speech,* 67 (4), pp. 383-405.

Ferguson, C. (1959) ‘Diglossia’, *Word*, 15, pp. 325-40.

Ferguson, C. (1959b) ‘The Arabic koine’, *Language,* 35 (4), pp. 616-630.

Fishman, J. (1967) ‘Bilingualism with and without diglossia; diglossia with and without bilingualism’, *Journal of Social Issues,* XXIII (2), pp. 29-39.

Gairdner, W. (1925) *The phonetics of Arabic.* England: Oxford University Press.

Green, A. (1983) *A practical Arabic grammar*. Oxford: Oxford University Press.

Gutas, D. (n.d.) ‘Greek loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic Language and Linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/greek-loanwords-EALL_SIM_vol2_0010 (Accessed: 25 March 2014).

Haddad, W. (1971) ‘Nature and language of scientific terms in the Arabic press of the Middle East’, *The Journal of Educational Research*, 64 (10), pp. 465-474. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/27536186 (Accessed: 10 February 2011).

Hannaoui, A. (1987) *Diglossia, medial Arabic, and language policy in Morocco.* Unpublished PhD thesis. State University of New York at Stony Brook.

Hashmi, S. (2010) ‘*Taʿrīb*’, in Bearman, P., Bianquis, Th., Bosworth, C.E., van Donzel, E. and Heinrichs, W.P., *Encyclopaedia of Islam*. Second Edition. Brill Online (2014). Available at: http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-2/tarib-COM_1459 (Accessed: 26 March 2014).

Haugen, E. (1966) ‘Dialect, language, nation’, *American Anthropologist*, 68 (4), pp. 922-35.

Hawkins, P. (1983) ‘Diglossia revisited’, *Language and Communication*, 3 (3), pp. 219-32.

Hazaymeh, O. (2004) ‘The impact of bilingualism on ELT in Jordan’, *South Asian Language Review,* XIV (1&2), pp. 24-32.

Heath, J. (1989) *From code-switching to borrowing: foreign and diglossic mixing in Moroccan Arabic.* London: KPI.

Heyworth-Dunne, J. (1939) *An introduction to the history of education in modern Egypt.* London: Luzac and Company.

Holes, C. (1995) *Modern Arabic structures, functions and varieties*. New York: Longman.

Holes, C. (2004) *Modern Arabic: structures, functions, and varieties*, Washington DC: Georgetown University Press.

Holes, C. (2006) ‘The Arabic dialects of Arabia’, *Proceedings of the seminar for Arabian Studies*. Vol. 36. Papers from the thirty-ninth meeting of the Seminar for Arabian Studies held in London, 21-23 July 2005 (2006), pp. 25-34. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/41223878 (Accessed: 11 September 2013).

Hope, T. (1971) *Lexical borrowing in the romance languages*. Oxford: Basil Blackwell.

Hudson, G. (1986) ‘Arabic root and pattern morphology without tiers’, *Journal of Linguistics*, 22 (1), pp. 85-122. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/4175819 (Accessed: 11 September 2013).

Ibn Warraq. (1998) *The origins of the Koran: classic essays on Islam's holy book*. Amherst, N.Y: Prometheus Books.

Ibrahim, M. (1986) ‘standard and prestige language: a problem in Arabic socio-linguistics’, *Anthropological Linguistics*, 28(1), pp. 115-126.

Issawi, C. (1967) ‘European loan-words in contemporary Arabic writing: a case in modernization’, *Middle Eastern Studies*, 3 (2), pp. 110-133.

Jarrah, A. (2013) ‘English loan words spoken by Madinah Hijazi Arabic speakers’, *Arab World English Journal, AWEJ Special Issue on Translation*, 2, pp. 67-85.

al-Jawadi, K. (1972) *A linguistic analysis of borrowing from English into modern Arabic*. Unpublished PhD thesis. University of Liverpool.

Kaye, A. (2001) ‘Diglossia: the state of the art’, *International Journal of the Sociology of Language*, 152, pp. 117-29.

Kopczyński, A. and Mellani, R (1993) ‘The vowels of Arabic and English’, *Papers and Studies in Contrastive Linguistics*, XXVII, pp. 183-193.

Kopczyński, A. and Mellani, R (1993) ‘The consonants of Arabic and English’, *Papers and Studies in Contrastive Linguistics*, XXVII, pp. 193-203.

LaCharité, D. and Paradis, C. (2005) ‘Category preservation and proximity versus phonetic approximation in loanword adaptation’, *Linguistic Inquiry*, 36 (2), pp. 223-258. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/4179319 (Accessed: 06 April 2012).

Larcher, P. (n.d.) ‘Derivation’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/derivation-EALL_COM_0082 (Accessed: 25 March 2014).

Lyle, C. (1999) *Historical linguistics: an introduction.* Edinburgh: Edinburgh University Press.

MacKay, P. (1990) *Computers and the Arabic language. Proceedings of the Arab school on science and technology*. New York: Hemisphere Pub. Corp.

McCarthy, K. (1970) *The linguistic adaption of loanwords in modern standard Turkish*. Unpublished PhD thesis. University of Carolina.

McCarthy, A. (2002) *An introduction to English morphology: words and their structure.* Edinburgh: Edinburgh University Press Ltd.

Meyer, I. and Bowker, L. (2006) *Lexicography, terminology, and translation: text-based studies in honour of Ingrid Meyer*. Ottawa: University of Ottawa Press.

Newman, D. (2008) ‘Modern phonetic terminology in Arabic: translation and equivalence’, *Campus Review,* 9, pp. 52-60.

Owens, J. (2006) *A linguistic history of Arabic*. Oxford: Oxford University Press.

Paradis, C. (n.d.) ‘French loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/french-loanwords-EALL_COM_vol2_0020 (Accessed: 25 March 2014).

Al-Qenaie, S. (2011) *Kuwaiti Arabic: A socio-phonological perspective*. Unpublished PhD thesis. Durham University.

al-Qinai, J. (2000) ‘Morphophonemics of loanwords in Arabic’, *Studies in the Linguistic Sciences,* 30 (2), pp. 1-26.
al-Qinai, J. (2007) ‘Abbreviation and acronymy in English Arabic translation’, *Meta: Journal des Traducteurs/Meta: Translators' Journal,* 52 (2), pp. 376-389.
Retsö. J. (n.d.) ‘Aramaic/Syriac loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014). [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/aramaic-syriac-loanwords-EALL_COM_0024 (Accessed: 25 March 2014).
Roach, P. (2005) ‘Illustrations of the IPA British English: received pronunciation’, *Journal of The International Phonetic Association,* 34 (2), pp. 239-245.
Roach, P. (2009) *English phonetics and phonology: a practical course*. 4th edn. Cambridge: Cambridge University Press.
Rouchdy, A. (ed.) (2002) *Language contact and language conflict in Arabic*. London: Routledge Curzon.
Saugera, V. (2007) *Lexical borrowing in a French-English email corpus integration of English words in the electronic discourse of French immigrants in America*. Unpublished PhD thesis. Indiana University.
Shahîd, I. (n.d.) ‘Latin loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic language and linguistics*. Brill Online (2014) [Online]. Available at:. http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/latin-loanwords-EALL_SIM_vol2_0046 (Accessed: 25 March 2014).
Shraybom-Shivtiel, S. (1993) ‘Methods of terminological innovation used by the Cairo Language Academy’, *The Arabist,* 6/7, pp. 195-202.
Sieny, M. (1985) ‘Scientific terminology in the Arab world: production, co-ordination, and dissemination’, *Meta: Journal des Traducteurs/Meta: Translators' Journal,* 30 (2), pp. 155-160.
Sitrak, S. (1981) *A phonological description of modern standard Arabic.* Unpublished MLitt dissertation. University of St Andrews.
Smeaton, H. (1973) *Lexical expansion due to technical change as illustrated by the Arabic of Al-Hasa, Saudi Arabia* (Indiana University Language Science Monographs, 10). Bloomington: Indiana University.
Spiro, S. (1985) *An Arabic-English vocabulary of the colloquial Arabic of Egypt, containing the vernacular idioms and expressions, slang phrases, etc. etc., used by the native Egyptians*. Cairo: Al-Mokattam Printing Office.
Stockwell, R. and Minkova, D. (2001) *English words: history and structure*. Cambridge: Cambridge University Press.
Swanson, D. (1958) ‘English loanwords in modern Greek’, *Word*, 14 (1), pp. 26-46.
The International Phonetic Association (1999) *Handbook of the International Phonetic Association: a guide to the use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press.
Thomason, S. and Kaufman, T. (1988) *Language contact, creolization, and genetic linguistics*. Berkeley: University of California Press.
Thomason, S. (n.d.) *Arabic in contact witih other languages.* University of Michigan. Available at: http://www-personal.umich.edu/~thomason/temp/arabic.pdf (Accessed: 06 November 2014).
Thornburg, L. (1980) ‘Arabic loan phonology: the assimilation of English lexical items’, *Linguistics*, 18, pp. 523-542.

Vagelpohl, U. ‘Arabic tradition, translation’, in Giannakis, G.K. (ed.), *Encyclopedia of Ancient Greek language and linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-ancient-greek-language-and-linguistics/arabic-tradition-translation-EAGLL_COM_00000380 (Accessed: 26 March 2014).

Veltri, G. (2002) ‘Greek loanwords in the Palestinian Talmud: some new suggestions’, *Journal of Semitic Studies*, 47 (1), pp. 237-240.

Versteegh, K. (2001) ‘Linguistic contacts between Arabic and other languages’, *Arabica*, 48 (4), pp. 470-508. *JSTOR* [Online]. Available at: http://www.jstor.org/stable/4057668 (Accessed: 17 November 2009).

Versteegh, K., Eid, M. et al. (2006-9) *Encyclopedia of Arabic language and linguistics*, 5 vols. Leiden: Brill.

Watson, J. (2007) *The phonology and morphology of Arabic*. Oxford: Oxford University Press.

Weninger, S. (n.d.) ‘Ethiopic loanwords’, in Edzard, L. and de Jong, R. (eds.), *Encyclopedia of Arabic Language and Linguistics*. Brill Online (2014) [Online]. Available at: http://referenceworks.brillonline.com/entries/encyclopedia-of-arabic-language-and-linguistics/ethiopic-loanwords-EALL_SIM_vol2_0004 (Accessed: 25 March 2014).

Whitney, W. (1874) *Language and the study of language*. New York: Scribnee, Armstrong & Co.

Williams, J. (1975) *Origins of the English language: a social and linguistic history*. New York: The Free Press.

Wilson, B. (1961) ‘Nature and extent of Coptic phonological influence on Egyptian Arabic’, *Journal of Semitic Studies*, 6 (2), pp. 175-182. *JSTOR* [Online]. Available at: http://jss.oxfordjournals.org (Accessed: 27 April 2010).

Zammit, M. (2002) *A comparative lexical study of Qurʾanic Arabic*. Leiden: Brill.

Al-Ziarah, A. (1953) *The English loan-words in the Arabic language of Iraq*. Unpublished. M.A. dissertation. University of Texas.

Zughoul, M. (1980) ‘Diglossia in Arabic: investigating solutions’, *Anthropological Linguistics*, 22 (5), pp. 201-217.

Arabic Bibliography

ʿAbdullah, ʿA. (1975) *al-Taʿrīb wa mustaqbal al-lugha al-ʿarabiyya*. Cairo: Dār al-Shaʿb.

al-ʾAffghānī, S. (1969) *al-Mūjaz fī qawāʻid al-lugha al-ʿarabiyya*. Beirut: Dār al-Fikr.

Aḥmad, N. (1986) *al-Taʿrīb wa al-qawmiyya al-ʿarabiyya fī al-mghrib al-ʿarabī*. Beirut: Markaz Dirāsāt al-Wiḥda al-ʿArabiyya.

ʿAllām, M. (1966) *Majmaʿ al-lugha al-ʿarabiyya fī thalāthīn ʿāmā*. Cairo: al-Maṭābiʿ al-ʾAmīriyya.

al-Dāḥdāḥ, ʾA. (1989) *Muʿjam qawāʿid al-lugha al-ʿarabiyya fi jadāwil wa lawḥāt.* Beirut: Maktabat Libnān.

Fahmī, H. (1958) *al-Marjiʿ fī taʿrib al-muṣṭalahāt al-ʿilmiyya wa al-fanniyya wa al-handasiyya*. Cairo: Maktabat al-Nahḍa al-Miṣriyya.

Frayḥa, A. (1955) *Naḥwa ʿarabiyya muyassara*. Beirut: Dār al-Thaqāfa.

Ḥāfiẓ, M. (1997) *Qaḍiyyat al-taʿrīb fī Miṣr*. Cairo: Majmaʿ al-Lugha al-ʿArabiyya.

al-Ḥamalāwī, ʾA. (1957) *Shadha al-ʿurf fī fan al-ṣarf*. 12th edn. Riyadh: Dār al-Kayān.

al-Hayyʾa al-ʿĀmma li-Shuʾūn al-Maṭabiʿ al-ʾAmīriyya. (1967) *Muʿjam al-muṣṭalaḥāt al-fanniyya injilīzī ʿarabī*. Cairo: al-Hayyʾa al-ʿĀmma li-Shuʾūn al-Maṭabiʿ al-ʾAmīriyya.
Ibn Durayd, A. (1991) *al-Ishtiqāq*. Beirut: Dār al-Jīl.
Ibn Jinnī, ʿU, (1955) *al-Khaṣāʾiṣ*. Miṣr: al-Maktaba al-ʿIlmiyya.
ʾIbrāhīm, Ḥ. (2011) *Muʿjam al-ʾawzān al-ṣarfiyya li kalimāt al-qurān al-karīm.* Cairo: Maktabat Ibn Tayymiyya.
Jabboury, A., Kassab, L. and Sinno Mehio, H. (2000) *al-Mufīd translation text book (English–Arabic/Arabi –English).* Beirut: Dar El-Ilm Lilmalayin.
Al-Jarf, R. (2011) 'Teaching English word-formation process to translation students', *Komunikacija I Kultura online,* II (2), pp. 160-174.
al-Jīlālī, Ḥ. (1999) *Taqniyāt al-ttaʿrīf fī al-maʿājim al-ʿarabiyya al-muʿāṣira.* Damascus: Arab Writers Union.
Khasāra, M. (1994) *al-Taʿrīb wa al-tanmiya al-lughwaiyya.* Damascus: al-ʾAhālī lil-Ṭibāʿa wa al-Nashr wa al-Tawzīʿ.
Khiḍr, M. (1992) *Taʿrīb miṣr al-siyāsī.* Cairo: Maktabat Madbūlī.
al-Maghrabī, ʿA. (1908) *Kitāb al-ishtiqāq wa al-taʿrīb*. Miṣr: Maṭbaʿat al-Hilāl.
al-Maghrabī, ʿA. (1935) '*Taʿrīb* al-ʾasālīb', *Majallat Majmaʿ al-Lugha al-ʿArabiyya*. Vol. 1. Cairo: al-Maṭbaʿa al-ʾAmīriyya.
Majallat Majmaʿ al-Lugha al-ʿArabiyya (1934) Vol. 1. Cairo: Majmaʿ al-Lugha al-ʿArabiyya.
Maẓhar, I. (n.d.) *Tajdīd al-ʿarabiyya*. Cairo: Maktabat al-Nahḍah al-Miṣriyya.
al-Musfir, Y. (1999) *Masrad muṣṭalaḥāt al-ʾintarnit ʾinjilīzī ʿarabī ʿarabī*. Kuwait: Maʿhad al-Kuwayt lil-Abḥāth al-ʿIlmiyya.
Niʿma, F. (1998) *Mulakhkhaṣ qawāʿid al-lugha al-ʿarabiyya.* Cairo: al-Maktab al-ʿIlmī li al-Tʾalīf wa al-Tarjama.
Sāyigh, F. and ʿAql, J. (1993) *Awḍaḥ al-ʾasālīb fī al-tarrjama wa al-taʿrīb*. Beirut: Maktabat Lubnān Nāshirūn.
al-Ṣayyādī, M. (1980) *al-Taʿrīb wa tansīquh fī al-waṭan al-ʿarabī*. Beirut: Markaz Dirāsāt al-Wiḥda al-ʿArabiyya.
al-Shāmī, A. and Ḥasaballah, S. (2001) *al-Mawsūʿa al-ʿarabiyya li-muṣṭalaḥāt ʿulūm al-maktabāt wa al-maʿlūmāt wa al-ḥāsibāt ʾinjilīzī ʿarabī*, 3 vols. Ad Duqqi: al-Maktaba al-Akādīmiyya.
al-Swaydān, N. (1992) *Taʿrīb muṣṭalaḥāt al-maktabāt wa al-maʿlūmāt wa tawḥīdihā.* Riyadh: Maktabt al-Malik Fahad al-Waṭaniyya.
Yaʿqūb. A. (1993) *Muʿjam al-ʾawzān al-ṣarfiyya*. Beirut: ʿAālm al-Kutub.

Dictionaries

- **English-Arabic Bilingual Dictionaries**

Ali, F. (1986) *English-Arabic dictionary of computer terms*. London: Arnold.
al-ʿallāq, B. (2006) *Qāmūs dār al-ʿIlm al-tiknūlūjī lil-maʿlūmāt wa al-ʾittiṣālāt (English–Arabic).* Beirut: Dar El-Ilm Lilmalayin.
Arabic computer dictionary (English–Arabic/Arabic–English) (1986). Multi-Lingual International Publishers Ltd. London and New York: Routledge & Kegan Paul.
Darwish, M. (2008) *Al Irshad dictionary of computer & internet terms (English–Arabic/Arabic–English).* Homs: Al Irshad Publishing House.
Elzohairy, N. (1996) *Encyclopedic dictionary of computer technology: English-Arabic.* Beirut: Librairie du Liban Publishers.
Ghanayem, M. (1986) *Arabic computer dictionary: English-Arabic*. Texas: International House Publications.
Hammad, A. (1986) *Encyclopedia of computer terms: English-Arabic*. USA: Amer Global Publishing.
al-Khatib, A. (2009) *A new dictionary of scientific and technical terms updated: English-Arabic with illustrations.* Beirut: Librairie du Liban Publishers.
Oxford wordpower dictionary (English-English-Arabic), 6th edn, (2001) Oxford: Oxford University Press.
Research & Studies Centre (2004) *The dictionary (English–Arabic)*. Beirut: Dar Al-Kutub al-Ilmiya.
Wehr, H. (ed.) (1976) *A dictionary of modern written Arabic.* New York: Spoken Language Services, Inc.

- **Arabic-English Bilingual Dictionaries**

Baalbaki, R. (2007) *al-Mawrid*. 21st edn. Beirut: Dar El-Ilm Lilmalayin.
Hafiz, A. (2004) *Al-Hafiz Arabic* collocations *dictionary (Arabic – English).* Beirut: Librairie du Liban Publishers.
Maktab al-dirāsāt wa al-buḥūth (2002) *al-Qāmūs (ʿarabī - ʾinjlīzī).* Beirut: Dar Al-Kutub al-Ilmiya.
al-Tamīmī,ʾA. (2006) *Muʿjam muṣṭalaḥāt al-ʾinternet wa al-ḥāsūb.* Amman: Dār Osāma lil-Nashr wa al-Tawzīʿ wa Dār al-Mashriq al-Thaqāfī.

- **Arabic-English-French Trilingual Dictionaries**

al-Munaẓẓama al-ʿArabiyya lil-ʿUlūm al-ʾIdāriyya. (1981) *al-Muʿjam al-ʿarabī al-muwaḥḥad li-muṣṭalaḥāt al-ḥāsibāt al-ʾiliktrūniyya ʿarabī ʾinjilīzī faransī.* Amman,: al-Munaẓẓama al-ʿArabiyya lil-ʿUlūm al-ʾIdāriyya.

- **English Specialised Dictionaries**

Macmillan English dictionary for advanced learners. 2nd edn. (2007) Oxford: Macmillan Education.

- **Arabic Specialised Dictionaries**

Ibn Manẓūr, M. (ed.) (1981) *Lisān al-ʿarab.* Cairo: Dār al-Maʿārif.

al-Khafājī, Sh. (ed.) (1865) *Shifāʾ al-ghalīl fīmā fī kalām al-ʿarab min al-dakhīl.* Cairo: al-Maṭbaʿa al-Wahbiyya.

al-Maany Dictionary. Available online at: http://www.almaany.com

Majmaʿ al-Lugha al-ʿArabiyya (2004) *al-Muʿjam al-wasīṭ*. 4th edn. Cairo: Shorouk International Bookshop.

Massʿūd, J. (1992) *al-Rāʾid*. 7th edn. Beirut: Dar El Ilm Lilmalayin.

Appendices

Appendix A: Sub-Corpora Tables

I. *Muʿjam al-Ḥāsibāt*

English	Arabic	No. of Tokens	M1	M2	M3	M4
Hardware						
ATA = advanced technology attachment	أتا	1	X			
ATAPI = advanced technology attachment packet interface	أتابي	1	X			
Drum/Cylinder	أسطوانة	4			X	
ASIC = application specific integrated circuit	أسيك	1	X			
ACIA = asynchronous communication interface adapter	أكيا	1	X			
ultrafiche	الترافيش	1	X			
EPROM = erasable programmable read only memory	إيبروم	3	X			
EDO RAM = extended data out random access memory	إيدورام	1	X			
EEROM = electrically erasable read-only memory	إيروم	1	X			
PROM = programmable read only memory	بروم	9	X			
battery	بطارية (it)	4	X			
batteries	بطاريات (it)	1	X			
PC = personal computer	بي سي	1	X			
	حاسوب شخصي	2				X
transistor	ترانزستور	6	X			
transistors	ترانزستورات	5	X			
computer	حاسب	1		X		
	حاسوب	61		X		
computers	حواسيب	5		X		
server	حاسوب خادم	1				X
	خادم	8			X	
microcomputer	حاسوب دقيق	2				X
minicomputer	حاسوب صغير	1				X
palmtop computer	حاسوب كفي	1				X
laptop	حاسوب محمول	2				X
	لاب توب	1	X			
laptops	حواسيب خلوية	1				X
cartridge	خرطوشة (fr)	3	X			
DAT =	داتٍ =	3	X			

digital audio tape	شريط صوتي رقمي	2				X
dongle	دُنجل	2	X			
memory	ذاكرة	46			X	
cache/ cash	كاش	7	X			
flash memory	ذاكرة ومضية	1				X
RAM = random access memory	رام = ذاكرة التوصل العشوائي	23 2	X			 X
chip	رقاقة	4			X	
ROM = read only memory	روم = ذاكرة قراءة فقط	6 1	X			 X
RAID = redundant arrays of inexpensive disks	ريد	3	X			
RISC = reduced instruction set computing	ريسك	3	X			
headphones	سماعة رأس	1				X
CD = compact disk	سي دي = قرص مدمج	17 2	X			 X
CMOS = COSMOS = complementary metal oxide semiconductor	سيموس = كوزموس	1 1	X X			
screen/ monitor/ display	شاشة	17		X		
tape	شريط	9			X	
tapes	شرائط	1			X	
printer	طابعة	11		X		
ink-jet printer	طابعة نفاثة	1				X
hardware	العتاد	3			X	
	المكونات المادية	2				X
mouse	فأرة	2			X	
	ماوس	1	X			
FireWire	فاير واير	1	X			
FRAM	فرام	1	X			
FET = field effect transistor	فيت	1	X			
disk/ disc	قرص	18			X	
HD = hard disk	قرص صلب	2				X
camera	كاميرا	2	X			
cameras	كاميرات	2	X			
cable	كبل	8	X			
cables	كبلات	2	X			
kiosk	كُشك	1	X			
console	كونسول	3	X			
	كونصول	1	X			
board/ pad/ tablet	لوحة	13			X	
tablet	لوحة إدخال	1				X
motherboard	اللوحة الأم	1				X
	اللوحة الرئيسية	1				X
touchpad	لوحة لمس	1				X
keyboard	لوحة المفاتيح	2				X
scanner	ماسح	3		X		
	ماسحة	3			X	
	ماسح ضوئي	5				X
microfiche	مايكروفيش	1	X			
	ميكروفيش	1	X			
controller	متحكم	7		X		
processor	معالج	6			X	

key	مفتاح	5			X	
port	منفذ	8			X	
router	مُوجِّه	4			X	
modem	مودم	8	X			
hub	موزع مركزي	3				X
MOSFET = metal oxide semiconductor field effect transistor	موسفت	4	X			
microform	ميكروفورم	2	X			
microfilm	ميكروفيلم	2	X			
copying machine	ناسخة	1		X		
WORM = write-once read many	ورم	3	X			
UVEPROM = ultra-violet erasable programmable read only memory	يو في إي بروم	1	X			
UART = universal asynchronous receiver transmitter	يوارت	1	X			
Software						
static	استاتي	1	X			
	استاتية	1	X			
hosting	استضافة	1			X	
script	اسكريبت	1	X			
username	اسم المستخدم	1				X
frame	إطار	4			X	
restart	إعادة بدء	2				X
	إعادة تشغيل	1				X
avatar	أفاتار	1	X			
	تشخيص	1			X	
extranet	اكسترانت	1	X			
electronic	إلكتروني	12	X			
	إلكترونية	12	X			
electronics	إلكترونيات	2	X			
command	أمر	2		X		
security	أمن	3		X		
	تأمين	2		X		
NFS = network file system	إن إف إس = نظام ملف الشبكة	1	X			X
intranet	انترانت	1	X			
internet	إنترنت	26	X			
automation	أوتمه	2	X			
automatic	أوتوماتي	14	X			
	أتوماتي	1	X			
	أوتوماتية	2	X			
EMM = enhanced memory management	إي. إم. إم	1	X			
ethernet	إيثرنت	9	X			
e-zine =	إى زين	1	X			
zine = electronic magazine	زاين	1	X			
icon	أيقونة	2	X			
icons	أيقونات	2	X			
BISYNC = binary synchronous communications	بايسنك	2	X			

BIOS = basic input/output system	بايوز	4	X			
	بايوس	2	X			
	النظام الأساسي للإدخال والإخراج	2				X
programs	برامج	11	X			
software	برمجيات	4	X			
programming	برمجة	19	X			
program	برنامج	44	X			
protocol	بروتوكول	21	X			
protocols	بروتوكولات	9	X			
proxy	بروكسي	1	X			
computer mail	بريد الحاسوب	1				X
PING = packet internet groper	بنج	1	X			
bluetooth	بلوتوث	1	X			
graphics	رسوم	13		X		
	رسومات	11		X		
BSC = binary symmetric channel	بي.إس.سي	1	X			
PPP = point to point protocol = SLIP = serial in line internet protocol	بى بى بى	2	X			
	سليب	4	X			
logout = logoff	تسجيل خروج	2				X
login	تسجيل دخول	2				X
application	تطبيق	4			X	
technology	تقنية	1		X		
	تكنولوجيا	6	X			
technologies	تكنولوجيات	2	X			
telnet	تلنت	1	X			
format	تهيئة	1			X	
	صيغة	7		X		
form						
gadget	جادجت	2	X			
JANET = joint academic network	جانت	1	X			
firewall	حاجز حماية	3				X
packet	حزمة	5			X	
DSL = digital subscriber line	خط اشتراك رقمي	1				X
chat	دردشة (tr)	5	X			
DOS = disk operating system	دوس = نظام تشغيل قرصي	5 2	X			X
dynamic	دينامي	7	X			
	دينامية	6	X			
	ديناميكي	1	X			
digital	رقمي	23		X		
	رقمية	12		X		
zoom	زوم	1	X			
spline	سبلاين	1	X			
steganography	ستيجانوجرافيا	1	X			
bandwidth	سعة الاتصال	1				X
SMBA = shared memory bus architecture	سمبا	1	X			
semaphore	سيمافور	2	X			

network/ net	شبكة	37			X	
networks	شبكات	1			X	
mailbox	صندوق بريد	1				X
data compression	ضغط البيانات	1				X
HD = high definition	عالي الوضوح	2				X
off-line	غير مباشر	1				X
FLOP = floating point operation	فلوب	1	X			
photo	فوتو	1	X			
font	فونط	9	X			
video	فيديو	39	X			
	فيديوية	2	X			
virus	فيروس	5	X			
viruses	فيروسات	10	X			
database	قاعدة بيانات	7				X
piracy	قرصنة	1			X	
channel	قناة	10			X	
CAT = computer aided testing	ك أ ت	3	X			
CAD = computer aided design	ك أ د	3	X			
CAL = computer assisted learning	ك أ ل	3	X			
CAM = computer aided manufacturing	ك أ م	3	X			
CAI = computer aided instruction	ك أ ي	2	X			
encapsulation	كبسلة	1	X			
cryptology	كربتولوجيا	1	X			
password	كلمة السر	3				X
code	كود	18	X			
codes	أكواد	4	X			
codec	كودك	1	X			
wireless	لاسلكي	2				X
on-line	مباشر	1			X	
programmer	مبرمج	3	X			
browser	متصفح	2		X		
folder	مجلد	2			X	
folders	مجلدات	1			X	
converter	محول	6		X		
attachment	مرفق	1		X		
data processing	معالجة البيانات	1				X
text processing = word processing	معالجة النصوص = معالجة الكلمات	2 3				X X
file	ملف	34		X		
backup	نسخ احتياطي	1				X
broadband	نطاق عريض	1				X
system	نظام	67			X	
systems	أنظمة	1			X	
	نظم	10		X		
double click	نقر مزدوج	1				X
click	نقرة	1		X		
mode	نمط	11		X		
NOS = network operating system	نوس = نظام أداء الشبكات	5 1	X			X
holographic	هولجرافية	1	X			
WAP =	واب	1	X			

wireless application protocol						
multimedia	وسائط متعددة	3				X
widget	ويدجت	2	X			
web	ويب	3	X			
WIMP = windows – icons – menus - pointing devices	ويمب	1	X			
Units of Measurement						
exa	إكسا	1	X			
parameter	بارامتر	1	X			
byte	بايت	14	X			
bytes	بايتات	4	X			
pixel	بكسل	1	X			
baud	بود	4	X			
petaflops	بيتافلوبس	1	X			
bit	بيتة	13	X			
bits	بيتات	17	X			
pica	بيكا	1	X			
pico	بيكو	1	X			
googol	جوجول	1	X			
gibi	جي بي	1	X			
giga	جيجا	1	X			
femto	فيمتو	1	X			
kilo	كيلو	1	X			
kilobyte	كيلوبايت	1	X			
macro	ماكرو	1	X			
milli	ملي	1	X			
mega	ميجا	1	X			
megabyte	ميجابايت	3	X			
megapixel	ميجابكسل	3	X			
micro	ميكرو	1	X			
nano	نانو	3	X			
hertz	هرتز	1	X			

Mechanism	M1	M2	M3	M4	Total
No. of Terms	146	24	30	50	250
%	58%	10%	12%	20%	100%

No. of Loan Acronym Terms	44
%	30%
No. of Loanword Terms	102
%	70%

Mechanism	M1	M2	M3	M4	Total
No. of CAT1 Terms	46	8	15	23	92
%	32%	33%	50%	46%	37%
No. of CAT2 Terms	75	16	15	27	133
%	51%	67%	50%	54%	53%
No. of CAT3 Terms	25	0	0	0	25
%	17%	0%	0%	0%	10%

II. Dictionary of Computer and Internet Terms

English	Arabic	No. of Tokens	M1	M2	M3	M4
Hardware						
cylinder	أسطوانة	2			X	
battery	بطارية (it)	14	X			
plotter	بلوتر	1	X			
transistor	ترانزيستور	1	X			
jumper	جامبر	1	X			
computer	حاسب	6		X		
	حاسب آلي	56				X
	حاسوب	6		X		
	كمبيوتر	10	X			
computers	حاسبات	1		X		
PC (personal computer)	الحاسب الشخصي	3				X
microcomputer	الحاسبات الدقيقة	1				X
server	الخادم	16			X	
	خادم الشبكة	1				X
	ملقم	3			X	
cartridge	خرطوشة (fr)	2	X			
cartridges	خراطيش (fr)	1	X			
memory	ذاكرة	60			X	
ROM (read-only memory)	ذاكرة القراءة فقط	2				X
RAM (random access memory)	ذاكرة الوصول العشوائي	1				X
chip	رقاقة	2			X	
	شريحة	2			X	
cable/ wire	سلك	24		X		
wires	أسلاك	1		X		
headphone	سماعة رأس	1				X
drive	سوّاقة	4		X		
screen/ monitor	شاشة	19		X		
screens/ monitors	شاشات	3		X		
tape	شريط	33			X	
DAT (digital audio tape)	شريط صوتي رقمي	1				X
printer	الطابعة	41		X		
printers	الطابعات	5		X		
mouse	فأرة	2			X	
	ماوس	8	X			
filters	فلاتر	1	X			
CD player	قارئ الأقراص المضغوطة	1				X
disk/disc	قرص	63			X	
hard disk	القرص الصلب	1				X
CD (compact disk)	القرص المدمج	1				X
	القرص المضغوط	1				X
floppy disk	القرص المرن	1				X
startup disk	قرص بدء التشغيل	1				X
external hard disk	قرص صلب خارجي	1				X
cable	كابل	6	X			
	كبل	20	X			
	كيبل	1	X			
cables	كابلات	1	X			
	كوابل	1	X			

card	كارت	5	X			
	كرت	7	X			
camera	كاميرا	4	X			
cameras	كاميرات	3	X			
laptop	لاب توب	1	X			
tablet/pad/ board/panel	لوحة	19			X	
boards/panels	لوحات	2			X	
keyboard/keypad	لوحة المفاتيح	54				X
control board	لوحة تحكم	2				X
scanner	ماسح	1		X		
	الماسح الضوئي	1				X
	ناسخ	2			X	
microphone	مايكروفون	1	X			
drive	محرك أقراص	2				X
drives	محركات أقراص	1				X
processor	معالج	9			X	
graphics processor	معالج الرسوميات	1				X
processors	معالجات	1		X		
speakers	مكبرات صوت	1				X
hardware	المكونات الصلبة	1				X
	الهاردوير	2	X			
port	منفذ	9			X	
router	مُوَجِّه	4			X	
routers	المُوَجِّهات	4			X	
modem	مودم	17	X			
microfilm	ميكروفيلم	1	X			
hub	هب	1	X			
Software						
automation	أتمتة	2	X			
ethernet	اثرنت	1	X			
tools	أدوات	1		X		
recovery	استرجاع	1		X		
restore	استعادة	1		X		
user name	اسم المستخدم	6				X
show files	إظهار الملفات	1				X
restart	إعادة تشغيل	2				X
extranet	اكسترانت	1	X			
electronic	إلكتروني	10	X			
	إلكترونية	6	X			
automatic	آلي	11		X		
	آلية	3		X		
security	أمان	2		X		
intranet	انترانت	1	X			
internet	إنترنت	337	X			
shut down	إيقاف التشغيل	5				X
icon	ايقون	1	X			
startup	بدء التشغيل	12				X
programs	برامج	4	X			
software	البرمجيات	3	X			
programming	برمجة	12	X			
program	برنامج	48	X			
protocol	بروتوكول	32	X			
proxy	بروكسي	6	X			
bluetooth	بلوتوث	1	X			
boot	بوت	1	X			
PING (packet internet groper)	البينج	1	X			

BIOS	البيوس	1	X			
update/upgrade	تحديث	21		X		
upgrades	تحديثات	1		X		
downloading	التحميل	1		X		
log out = logoff	تسجيل الخروج	4				X
log in = logon	تسجيل الدخول	10				X
application	تطبيق	16			X	
applications	تطبيقات	3		X		
technology	تقنية	6		X		
	تكنولوجيا	1	X			
technologies	تقنيات	1		X		
zoom	تكبير	2		X		
	تصغير	2		X		
telnet	تلينت	1	X			
setup	تنصيب	2			X	
format	التهيئة	1			X	
	الفورمات	1	X			
disk format	تهيئة القرص	1				X
temp	التيمب	1	X			
graphic	جرافيك	1	X			
folder	حافظة	17		X		
	مجلد	9			X	
folders	حافظات	8		X		
	مجلدات	9			X	
save as	حفظ بإسم	3				X
digital subscriber line (DSL)	خط المشترك الرقمي	2				X
background = wallpaper	خلفية	3		X		
	خلفية الشاشة	1				X
backgrounds	الخلفيات	1		X		
delta	دلتا	2	X			
DOS (disk operating system)	الدوس =	7	X			
	نظام تشغيل القرص	1				X
offline	دون اتصال	1				X
demo	ديمو	1	X			
dynamic	دينامي	5	X			
	ديناميكي	7	X			
desktop	سطح المكتب	6				X
recycle bin	سلة المحذوفات	2				X
screensaver	شاشة التوقف	2				X
screensavers	شاشات التوقف	2				X
network/ web	شبكة	67			X	
networks/ webs	شبكات	5			X	
wireless network	شبكة لاسلكية	1				X
toolbar	شريط الأدوات	1				X
code	شفرة	1			X	
	كود	3	X			
mailbox	صندوق البريد	4				X
	علبة البريد	1				X
form	صيغة	3		X		
data compression	ضغط البيانات	1				X
outbox	علبة الصادر	1				X
filtering	فلترة	1	X			
video	فيديو	38	X			
videos	فيديوات	2	X			
virus	فيروس	5	X			
piracy	قرصنة	3			X	

database	قاعدة البيانات	5				X
channel	قناة	9			X	
crack	كراك	1	X			
password	كلمة سر	10				X
	كلمة مرور	12				X
passwords	كلمات المرور	1				X
wireless	لاسلكي	9				X
programmer	مبرمج	1	X			
navigator	متصفح	5		X		
browser						
	مستعرض	2		X		
online	متصل	2		X		
convertor	محول	5		X		
attachment	مرفق	3		X		
attachments	المرفقات	3		X		
word processor	معالج الكلمات	1				X
processing	معالجة	13			X	
data processing	معالجة البيانات	1				X
word processing	معالجة الكلمات	1				X
text processing	معالجة النصوص	1				X
file	ملف	62		X		
files	ملفات	27		X		
attached file	ملف مرفق	1				X
zip file	ملف مضغوط	2				X
temporary files	الملفات المؤقتة	1				X
back up	نسخ احتياطي	2				X
back up files	نسخ احتياطي للملفات	1				X
system	نظام	120			X	
systems	أنظمة	14			X	
	نظم	1		X		
operating system	نظام التشغيل	4				X
operating systems	أنظمة تشغيل	1				X
NFS (network file system)	نظام ملفات الشبكة	1				X
hacker	الهاكر	2	X			
web	ويب	17	X			
Units of Measurement						
exabyte	اكسابايت	1	X			
byte	بايت	2	X			
bit	بت	2	X			
pixel	بكسل	1	X			
peta	بيتا	1	X			
pica	بيكا	1	X			
tera	تيرا	1	X			
teracycle	تيراسيكل	1	X			
giga	جيجا	1	X			
gigabyte	جيجابايت	1	X			
kilo	كيلو	3	X			
kilobyte	كيلوبايت	1	X			
kilovolt	كيلوفولت	1	X			
kilohertz	كيلوهيرتز	1	X			
mega	ميجا	1	X			
megabyte	ميجابايت	1	X			
hertz	هرتز	1	X			
	هيرتز	1	X			
watt	واط	1	X			

Mechanism	M1	M2	M3	M4	Total
No. of Terms	80	40	29	63	212
%	38%	19%	14%	30%	100%

No. of Loan Acronym Terms	3
%	4%
No. of Loanword Terms	77
%	96%

Mechanism	M1	M2	M3	M4	Total
No. of CAT1 Terms	24	12	16	23	75
%	30%	30%	55%	37%	35%
No. of CAT2 Terms	37	28	13	40	118
%	46%	70%	45%	63%	56%
No. of CAT3 Terms	19	0	0	0	19
%	24%	0%	0%	0%	9%

III. The Al-Kilani Dictionary of Computer and Internet Terminology

English	Arabic	No. of Tokens	M1	M2	M3	M4
Hardware						
Drum	أسطوانة	1			X	
ENIAC = electronic numerical integrator and calculator	إينياك	1	X			
transistor	ترانزستور	5	X			
computer	حاسب	97		X		
	حاسوب	1		X		
	كمبيوتر	113	X			
computers	حاسبات	5		X		
automatic computer	حاسب آلي	3				X
laptop computer	حاسب شخصي صغير	1				X
server	خادم	30			X	
cartridge	خرطوشة (fr)	2	X			
	كارتريدج	1	X			
memory	ذاكرة	167			X	
memories	ذاكرات	3		X		
computer memory	ذاكرة الحاسب	1				X
internal memory	ذاكرة داخلية	2				X
ROM (read-only memory)	ذاكرة القراءة فقط	3				X
disk memory	ذاكرة القرص	1				X
external memory	ذاكرة خارجية	1				X
flash memory	ذاكرة وميضية	1				X
RAM (random access memory)	ذاكرة الوصول العشوائي	2				X
chip	رقاقة	7			X	
	شريحة	4			X	
cable	سلك	13		X		
	كبل	5	X			
	كيبل	8	X			
wires	أسلاك	1		X		
fiberoptic cable	سلك الألياف الضوئية	1				X
drive	سوّاقة	6		X		
screen/display/ monitor	شاشة	17		X		
display screen	شاشة العرض	4				X
flat screen	شاشة مسطحة	3				X
tape	شريط	158			X	
magnetic tape	شريط ممغنط	2				X
printer	طابعة	100		X		
printers	طابعات	1		X		
colour printer	طابعة ملونة	1				X
hardware	العتاد	1			X	
mouse	فأرة	12			X	
videograph	فيديوغراف	1	X			
fiche	فيش	1	X			
diskette/disk/disc	قرص	71			X	
discs	أقراص	1			X	
bootable disk	قرص إقلاع	1				X
startup disk	قرص التشغيل	1				X
floppy disk	قرص مرن	2				X
	الأقراص المرنة	3				X

external hard disk	قرص صلب خارجي	1				X
optical disk	قرص ضوئي	1				X
compressed disk	قرص مضغوط	1				X
disk = magnetic disk	قرص ممغنط	3				X
kiosk	كشك	1	X			
console	كونسول	2	X			
tablet/ pad/ board/ panel	لوحة	14			X	
motherboard	اللوحة الأم	1				X
	اللوحة الأساسية	1				X
console/ control board/ control panel	لوحة التحكم	21				X
keyboard	لوحة المفاتيح	42				X
scanner	ماسح	14		X		
	ماسحة	10			X	
scanners	ماسحات	1			X	
visual scanner	ماسح مرئي	1				X
microfilm	مايكروفيلم	3	X			
	ميكروفيلم	4	X			
microcomputer	مايكروكمبيوتر	1	X			
	ميكروكمبيوتر	2	X			
controller	متحكم	1		X		
disk driver	مشغل القرص	1				X
disk drive	سواقة الأسطوانات	5				X
	سواقة الأقراص	1				X
	مشغل الأقراص	1				X
processor	معالج	40			X	
processors	معالجات	1		X		
enter key	مفتاح الإدخال	1				X
spacebar	مفتاح المسافة	1				X
computer accessories	ملحقات الحاسب	1				X
port	منفذ	2			X	
router	مُوجِّه	1			X	
modem	مودم	29	X			
modems	مودمات	1	X			
Software						
automation	أتمتة	5	X			
ethernet	إثرنت	4	X			
file recovery	استرجاع الملف	1				X
system recovery	استعادة النظام	1				X
username	اسم المستخدم	1				X
reboot	إعادة إقلاع	1				X
boot	إقلاع	1			X	
	بدء التشغيل	1				X
uninstall	إلغاء التنصيب	1				X
electronic	إلكتروني	5	X			
	إلكترونية	6	X			
automatic	آلي	4		X		
	آلية	3		X		
	أوتوماتيكي	6	X			
	أوتوماتيكية	3	X			
fiber optics	الألياف الضوئية	3				X
command	الأمر	8		X		
commands	أوامر	1		X		
internet	إنترنت	39	X			
icon	أيقونة	3	X			
offline	بدون اتصال	1				X
programs	برامج	21	X			

protocol	برتوكول	2	X			
	بروتوكول	32	X			
programming	برمجة	56	X			
program	برنامج	275	X			
profile	بروفيل	3	X			
computerized mail	البريد الحاسبي	1				X
peek	بيك	1	X			
poke	بوك	1	X			
partition	تجزئة	1		X		
disk partition	تجزئة القرص	1				X
file conversion	تحويل ملف	1				X
logout = log off	تسجيل الخروج	2				X
login = logon	تسجيل الدخول	2				X
minimize	تصغير	1		X		
application	تطبيق	1			X	
tech/techie/ technological	تقني	3		X		
technology	تقنية	4		X		
	تكنولوجيا	5	X			
installation	تنصيب	2			X	
DSL = digital subscriber line	خط المشترك الرقمي	2				X
DOS = disk operating system	دوس = نظام تشغيل الأقراص	1 1	X			 X
dynamic	دينامي	1	X			
	ديناميكي	21	X			
	ديناميكية	11	X			
digital	رقمي	9		X		
	رقمية	12		X		
SPOOL = simultaneous peripheral operation on-line	سبول	1	X			
desktop	سطح المكتب	2				X
memory capacity	سعة الذاكرة	2				X
disk capacity	سعة القرص	1				X
recycle bin	سلة المهملات	1				X
startup screen	شاشة البدء	1				X
full-screen	الشاشة الكاملة	3				X
network/net	شبكة	94			X	
networks	شبكات	2			X	
toolbar	شريط الأدوات	1				X
menu bar	شريط القوائم	1				X
taskbar	شريط المهام	1				X
title bar	شريط عنوان	1				X
code	شيفرة	7			X	
binary code	شيفرة ثنائية	1				X
background image	صورة خلفية	1				X
data compression	ضغط البيانات	1				X
file compression	ضغط الملف	1				X
mail box	علبة البريد	1				X
chat room	غرفة المحادثة	1				X
unzib	فك الضغط	3				X
video	فيديو	25	X			
virus	فيروس	6	X			
data base	قاعدة البيانات	13				X
piracy	قرصنة	2			X	
channel	قناة	38			X	
channels	قنوات	2			X	

CAD = computer aided design	كاد	1	X			
CADMAT = computer aided design manufacture and test	كادمات	1	X			
CAM = computer-aided manufacturing	كام	1	X			
password	كلمة السر	7				X
	كلمة العبور	1				X
wireless	لاسلكي	1				X
programmer	مبرمج	18	X			
browser	المتصفح	3		X		
	مستعرض	2		X		
chat	محادثة	1			X	
search engine	محرك البحث	1				X
converter	محول	4		X		
spelling checker	مدقق الإملاء	1				X
grammar checker	المدقق النحوي	1				X
processing	معالجة	113			X	
data processing	معالجة البيانات	17				X
word processing	معالجة الكلمات	3				X
text processing	معالجة النصوص	1				X
shortcut key	مفتاح الاختصار	1				X
file	ملف	8		X		
audio file	ملف صوتي	1				X
mouse pointer	مؤشر الفأرة	1				X
backup and restore	النسخ الاحتياطي والاستعادة	1				X
disk copy	نسخ القرص	2				X
broadband	النطاق الواسع	2				X
system	نظام	208			X	
systems	أنظمة	2			X	
	نظم	24		X		
operating system	نظام التشغيل	2				X
computer system	نظام الحاسب	1				X
multimedia	الوسائط المتعددة	1				X
web	ويب	13	X			
Units of Measurement						
exabyte	إكسابايت	1	X			
byte	بايت	13	X			
bytes	بايتات	1	X			
bit	بت	30	X			
baud	بود	2	X			
peta	بيتا	4	X			
tera	تيرا	1	X			
terabyte	تيرابايت	1	X			
giga	جيجا	1	X			
	جيغا	1	X			
gigabyte	جيجابايت	1	X			
gigabit	جيغابت	1	X			
kilo	كيلو	2	X			
kilobaud	كيلوبود	1	X			
mega	ميغا	1	X			
megahertz	ميغاهيرتز	1	X			
hertz	هرتز	1	X			
	هيرتز	1	X			

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**

No. of Terms	64	28	29	85	206
%	31%	14%	14%	41%	100%

No. of Loan Acronym Terms	6	
%	9%	
No. of Loanword Terms	58	
%	91%	

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	17	13	16	34	80
%	27%	46%	55%	40%	39%
No. of CAT2 Terms	29	15	13	51	108
%	45%	54%	45%	60%	52%
No. of CAT3 Terms	18	0	0	0	18
%	28%	0%	0%	0%	9%

IV. NetworkSet Magazine

English	Arabic	No. of Tokens	M1	M2	M3	M4	Latin Script
Hardware							
disc	أسطوانة	1			X		
	دسك	5	X				
	ديسك	1	X				
	قرص	8			X		
discs	أقراص	18			X		
hard disk	القرص الصلب	12				X	
interface	إنترفيس	3	X				
processor	بروسيسور	2	X				
	معالج	27			X		
		1					*
processors	بروسيسورات	1	X				
	معالجات	8		X			
battery	بطارية (it)	3	X				
batteries	بطاريات (it)	2	X				
port	بورت	31	X				
	منفذ	59			X		
		7					*
ports	بورتات	11	X				
	منافذ	30			X		
computer	حاسب	17		X			
	حاسوب	5		X			
	كمبيوتر	87	X				
	كومبيوتر	7	X				
		1					*
computers	حاسبات	4		X			
	حواسيب	5		X			
	كمبيوترات	4	X				
server	خادم	11			X		
		1					**
	سرفر	5	X				
	سيرفر	214	X				
	سيرفير	1	X				
		7					*
servers	خوادم	9		X			
	سرفرات	1	X				
	سيرفرات	48	X				
		5					*
DVD	دي في دي	1	X				
		1					*
memory	ذاكرة	53			X		
		1					**
		1					*
memories	ذواكر	2		X			
RAM =	رام	5	X				
		8					*
RAM (random access memory)		1					*
RAMs	رامات	4	X				
router	راوتر	102	X				
	روتر	201	X				
	مُوجِّه	2			X		**
		18					*

routers	راوترات	33	X				
	رواتر	1	X				
	رواترات	1	X				
	روترات	43	X				
		8					*
chip	رقاقة	1			X		
chips	رقائق	4			X		
		2					**
	شرائح	1			X		
scanner	سكانر	1	X				
wire	سلك	6		X			
wires	أسلاك	39		X			
switch	سوتش	2	X				
	سويتش	79	X				
		17					*
switches	سويتشات	59	X				
		8					*
CDs	سيديات	1	X				
screen	شاشة	8		X			
screens	شاشات	1		X			
printer	طابعة	7		X			
printers	طابعات	9		X			
frame	فريم	24	X				
frames	فريمات	3	X				
filter	فلتر	2	X				
filters	فلاتر	1	X				
cable	كابل	76	X				
	كبل	11	X				
	كيبل	6	X				
		4					*
cables	كابلات	195	X				
	كوابل	25	X				
	كيابل	1	X				
	كيبلات	2	X				
		2					*
cache	كاش	1	X				
		4					*
camera	كاميرا	4	X				
cameras	كاميرات	5	X				
card	كارت	2	X				
cards	كروت	5	X				
controller	كنترولر	28	X				
console	كونسول	5	X				
		5					*
keyboard	كيبورد	3	X				
	لوحة المفاتيح	10				X	
		2					*
keyboards	لوحات المفاتيح	2				X	
mouse	ماوس	2	X				
modem	مودم	17	X				
access point	موزع الإشارة اللاسلكية	1				X	**
		8					*
hardware	هاردوير	43	X				
		2					*
hub	هب	1	X				
		5					*

CD		3					*
CPU		5					*
DHCP server		19					*
DNS (domain name server) =		2					*
DNS server		4					*
faulty network cable		1					*
FD (floppy disk)		1					*
FTP server		6					*
HDD (hard disk drive)		1					*
hotspot		2					*
HTTP server		1					*
laptop-PC		1					*
mail server		1					*
network card		1					*
PC		4					*
print server		1					*
USB		6					*
USB stick		2					*
Software							
automatic	أتوماتيك	1	X				
	أوتوماتيكي	13	X				
	أوتوماتيكية	3	X				
ethernet	إثرنت	1	X				
	إيثرنت	16	X				
		14					*
admin	أدمن	1	X				
		4					*
username	اسم المستخدم	5				X	
		1					*
electronic	إلكتروني	23	X				
	إلكترونية	34	X				
electronics	إلكترونيات	16	X				
fiber optics	الألياف الضوئية	1				X	**
internet	إنترنت	257	X				
		2					*
wireless management systems	أنظمة إدارة الشبكة اللاسلكية	1				X	**
icon	أيقونة	1	X				
icons	ايقونات	6	X				
email	إيميل	11	X				
		6					*
emails	إيميلات	1	X				
password	باسورد	9	X				
	باسوورد	3	X				
	كلمة المرور	4				X	
		1					*
backup	باكب	1	X				
	نسخة احتياطية	1				X	**
		1					*
bandwidth	باندويث	2	X				
		24					*
programs	برامج	115	X				
	برمجيات	25	X				

protocol	برتوكول	1	X				
	بروتكول	5	X				
	بروتوكول	250	X				
protocols	بروتكولات	1	X				
	بروتوكولات	126	X				
programming	برمجة	24	X				
program	برنامج	165	X				
proxy	بروكسي	1	X				
buffer	بفر	10	X				
bluetooth	بلوتوث	38	X				
		3					*
piconet	بيكونت	8	X				
PING	بينج	3	X				
		7					*
downloading	التحميل	9		X			
traffic	ترافيك	84	X				
		3					*
update	ترقية	1		X			**
trojan	تروجان	1	X				
application	تطبيق	12			X		
		13					*
applications	تطبيقات	81		X			
		1					**
technology	تقنية	206		X			
	تكنلوجيا	5	X				
	تكنولوجيا	66	X				
techniques	تقنيات	72		X			
technologies	تكنولوجيات	3	X				
technological	تكنولوجي	4	X				
	تكنولوجية	3	X				
telnet	تلنت	5	X				
		2					*
torrent	تورنت	1	X				
firewall	جدار ناري	6				X	
		1					**
	فايرول	3	X				
	فايرowول	7	X				
	فيرول	1	X				
		12					*
firewalls	الجداران النارية	3				X	
graphic	جرافيك	1	X				
bridges	جسور لاسلكية	1				X	**
download	داونلود	1	X				
		1					*
DOS	دوس	1	X				
domain	دومين	3	X				
DSL	دي إس إل	1	X				
		4					*
dynamic	ديناميكي	5	X				
	ديناميكية	1	X				
routing	رواتينج	1	X				
	روتنج	4	X				
		3					*
restart	ريستارت	1	X				
	ريسترت	1	X				
desktop	سطح المكتب	3				X	
		3					*

script	سكربت	2	X				
	سكريبت	2	X				
scripts	سكربتات	2	X				
security	سكيورتي	2	X				
	سيكورتي	1	X				
	سيكيورتي	1	X				
	سيكيوريتي	1	X				
software	سوفتوير	6	X				
		2					*
switching	سويتشنج	3	X				
		1					*
serial	سيريال	2	X				
system	سيستم	1	X				
	نظام	161			X		
		1					**
		1					*
systems	أنظمة	69			X		
	نظم	2		X			
network	شبكة	682			X		
	نتورك	1	X				
		9					*
networks	شبكات	617			X		
wired networks	الشبكات السلكية	6				X	
wireless networks	الشبكات اللاسلكية	35				X	
virus	فايروس	10	X				
	فيروس	1	X				
viruses	فيروسات	7	X				
filtering	فلترة	5	X				
VoIP	فويب	1	X				
		14					*
video	فيديو	33	X				
videos	فيديوهات	11	X				
piracy	قرصنة	1			X		
channel	قناة	17			X		
		2					*
channels	قنوات	11			X		
client	كلاينت	28	X				
	كلينت	2	X				
		10					*
code	كود	6	X				
codes	أكواد	1	X				
command	كومند	2	X				
configuration	كونفيجرشين	1	X				
		1					*
link	لنك	1	X				
	لينك	7	X				
links	لينكات	1	X				
loop	لوب	1	X				
	لووب	1	X				
login	لوجن	1	X				
		3					*
MAC	ماك	23	X				
programmer	مبرمج	3	X				
programmers	مبرمجون	1	X				
browser	متصفح	13		X			
browsers	متصفحات	4		X			
folder	مجلد	1			X		

folders	مجلدات	2			X		
processing	معالجة	1			X		
multimedia	ملتيميديا	1	X				
file	ملف	41		X			
files	ملفات	65		X			
mode	مود	1	X				
net	نت	5	X				
broad band	نطاق عريض	1				X	**
operating system	نظام تشغيل	7				X	
operating systems	أنظمة تشغيل	10				X	
hypervisor	هايبرفايسر	1	X				
hacker	هكر	8	X				
		3					*
hackers	هاكرز	7	X				
host	هوست	7	X				
header	هيدر	6	X				
WAP	واب	1	X				
wireless	وايرلس	5	X				
	وايرليس	2	X				
	ويرلس	4	X				
		7					*
web	ويب	20	X				
		1					*
antispam		1					*
antivirus		1					*
backup system		1					*
broadband		1					*
clients		7					*
cloud computing		2					*
content filtering		1					*
default gateway		2					*
demo		2					*
DHCP =		17					*
DHCP (dynamic host configuration protocol)		1					*
DHCP client		12					*
DNS =		15					*
DNS (domain name system)		1					*
domains		1					*
extension		1					*
FTP		12					*
FTP clients		1					*
gateway		2					*
HTTP		6					*
HTTPS		4					*
ISO		2					*
keylogger		34					*
LAN		3					*
lower case		2					*
MAC address		2					*
malware		1					*
offline		1					*
online		2					*
online demo		1					*
PAN (personal area network)		1					*

PDF		1					*
plug-in		1					*
PNP		2					*
PPP (point-to-point protocol)		1					*
quarantined folder		1					*
recycle bin		1					*
restore		3					*
TCP		3					*
UDP		2					*
upload		1					*
upper case		1					*
URLs		1					*
VPN =		9					*
virtual private network =		1					*
VPN (virtual private network)		1					*
VPN gateway		6					*
WAN		3					*
web application servers		1					*
web browser		1					*
web mail		1					*
web server		2					*
web server ping		1					*
WLAN		1					*
WLAN (local area network)		1					*
WPS		1					*
Units of Measurement							
byte	بايت	17	X				
bytes	بايتات	2	X				
bit	بت	13	X				
terahertz	تيراهيرتز	1	X				
giga	جيجا	9	X				
	غيغا	4	X				
gigabyte	جيجابايت	2	X				
	غيغابايت	1	X				
gigahertz	جيجاهيرتز	1	X				
	غيغاهرتز	3	X				
volt	فولت	1	X				
kilo	كيلو	4	X				
kilobyte	كيلوبايت	3	X				
kilobit	كيلوبت	9	X				
mega	ميجا	7	X				
	ميغا	6	X				
megabyte	ميجابايت	3	X				
	ميغابايت	1	X				
megabit	ميجابت	6	X				
	ميغابت	18	X				
megahertz	ميجاهرتز	1	X				
hertz	هرتز	3	X				
watt	وات	3	X				

Mechanism	M1	M2	M3	M4	Total
No. of Terms	179	23	23	18	243

%	74%	9%	9%	7%	100%
No. of Loan Acronym Terms	9				
%	5%				
No. of Loanword Terms	170				
%	95%				
No. of Arabic and Latin Scripts Terms	0	2	5	7	14
%	0%	14%	36%	50%	6%
No. of only Latin Script Terms					125
Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	54	13	12	4	83
%	30%	57%	52%	22%	34%
No. of CAT2 Terms	102	10	11	14	137
%	57%	43%	48%	78%	56%
No. of CAT3 Terms	23	0	0	0	23
%	13%	0%	0%	0%	9%

V. *Majallat Sūq al-ʿAṣr*

English	Arabic	No. of Tokens	M1	M2	M3	M4	Latin Script
Hardware							
HDMI	إتش دي إم آي	1	X				
		2					*
SD	إس دي	4	X				
wires	أسلاك	1		X			
battery	بطارية (it)	6	X				
tablet	تابلت	2	X				
	تابليت	2	X				
transistor	ترانزستور	1	X				
gyroscope	جيروسكوب	1	X				
computer	حاسب	17		X			
	حاسوب	20		X			
	كمبيوتر	258	X				
	كومبيوتر	8	X				
computers	حاسبات	16		X			
	حواسب	16		X			
	حواسيب	7		X			
	كمبيوترات	15	X				
	كومبيوترات	1	X				
personal computer	حاسب شخصي	3				X	
tablets	الحواسب اللوحية	3				X	
server	خادم	6			X		
	سيرفر	5	X				
servers	خادمات	1			X		
	خوادم	14		X			
DVD	دي في دي	1	X				
		1					*
memory	ذاكرة	29			X		
memories	ذواكر	2		X			
RAM	رام	1	X				
router	راوتر	1	X				
chips	رقائق	3			X		
ROM	روم	1	X				
screen	شاشة	27		X			
screens	شاشات	5		X			
printer	طابعة	9		X			
printers	طابعات	12		X			
VGA	فيجيا	1	X				
	في جي أيه	1	X				
		2					*
disc	قرص	4			X		
discs	أقراص	10			X		
hard disk	قرص صلب	7				X	
hard disks	أقراص صلبة	4				X	
cable	كابل	3	X				
cables	كابلات	9	X				
	كوابل	1	X				
cartridge	كارتريدج	2	X				
camera	كاميرا	1	X				
cards	كروت	1	X				
laptop	لابتوب	2	X				
	لاب توب	1	X				
scanner	ماسحة	3			X		

mouse	ماوس	3	X				
		1					*
processor	معالج	10			X		
processors	معالجات	23		X			
		1					**
graphics processor	المعالج الرسومي	20				X	
graphics processors	المعالجات الرسومية	28				X	
port	منفذ	1			X		
modem	مودم	3	X				
microphone	ميكروفون	1	X				
microphones	ميكروفونات	1	X				
netbook	نت بوك	2	X				
notebook	نوت بوك	1	X				
board	لوحة	2			X		
control board	لوحة التحكم	1				X	
keyboard	لوحة المفاتيح	12				X	
		1					*
hardware	هاردوير	1	X				
USB =	يو أس بي	9	X				
Universal Serial Bus		11					*
CD		1					*
DSL		1					*
micro-SD		2					*
PC		1					*
tablet		1					*
Software							
HD	إتش دي	1	X				
automation	أتمتة	3	X				
username	اسم المستخدم	9				X	
extranet	اكسترانت	1	X				
electronic	إلكتروني	183	X				
	إليكتروني	40	X				
	إلكترونية	188	X				
	إليكترونية	27	X				
electronics	إلكترونيات	46	X				
	إليكترونيات	6	X				
MP3	أم بي ثري	2	X				
intranet	انترانت	2	X				
internet	إنترنت	365	X				
automatic	أوتوماتيكي	2	X				
	أوتوماتيكية	1	X				
online	أون لاين	4	X				
icon	أيقونة	6	X				
icons	أيقونات	2	X				
email	إيميل	1	X				
programs	برامج	105	X				
	برمجيات	172	X				
programming	برمجة	7	X				
program	برنامج	41	X				
protocol	بروتوكول	5	X				
broadband	برودباند	11	X				
	برود باند	2	X				
profile	بروفايل	2	X				
bluetooth	بلوتوث	5	X				
blu-ray	بلوراي	2	X				
PETA =	بيتا	1	X				

Power-Efficient Target Array							
PDF	بي دي إف	1	X				
		2					*
application	تطبيق	10			X		
applications	تطبيقات	37		X			
technology	تقنية	59		X			
	تكنلوجيا	1	X				
	تكنولوجيا	493	X				
techniques	تقنيات	29		X			
technologies	تكنولوجيات	2	X				
technological	تكنولوجي	34	X				
	تكنولوجية	45	X				
torrent	تورنت	5	X				
3G	ثري جي	1	X				
graphic	جرافيك	16	X				
could computing	الحوسبة السحابية	2				X	**
dynamic	دينامية	1	X				
chat	شات	3	X				
network	شبكة	61			X		
networks	شبكات	20			X		
folder	فولدر	1	X				
	مجلد	1			X		
video	فيديو	27	X				
videos	فيديوهات	1	X				
virus	فيروس	12	X				
viruses	فيروسات	10	X				
pirates	قراصنة	7			X		
piracy	قرصنة	45			X		
password	كلمة المرور	7				X	
code	كود	8	X				
link	لينك	1	X				
programmer	مبرمج	6	X				
programmers	مبرمجون	5	X				
browser	متصفح	18		X			
	مستعرض	1		X			
attachments	مرفقات	1		X			
processing	معالجة	4			X		
file	ملف	2		X			
files	ملفات	28		X			
social networking sites	مواقع التواصل الاجتماعي	13				X	
net	نت	6	X				
system	نظام	54			X		
systems	أنظمة	17			X		
	نظم	4		X			
operating system	نظام تشغيل	5				X	
hackers	هاكرز	2	X				
wireless	وايرلس	6	X				
	لاسلكي	10				X	
web	ويب	12	X				
freeware		1					*
LAN		1					*
software		1					*
Units of Measurement							
inch	إنش	3	X				
byte	بايت	1	X				

bit	بت	1	X				
	بيت	1	X				
pixel	بكسل	20	X				
	بيكسل	5	X				
pixels	بكسلات	13	X				
	بيكسلات	1	X				
terabyte	تيرابايت	3	X				
terabytes	تيرابايتس	1	X				
giga	جيجا	2	X				
gigabyte	جيجابايت	22	X				
	جيغابايت	4	X				
	غيغابايت	2	X				
gigahertz	جيجاهرتز	1	X				
	غيغاهيرتز	1	X				
gigabit	غيغابت	1	X				
kilo	كيلو	1	X				
kilobit	كيلوبت	2	X				
macro	ماكرو	2	X				
mega	ميجا	2	X				
	ميغا	5	X				
megabyte	ميجابايت	13	X				
	ميغابايت	4	X				
megapixel	ميجابكسل	2	X				
megahertz	ميجاهرتز	1	X				
	ميجاهيرتز	3	X				
	ميغاهيرتز	2	X				
nano	نانو	2	X				
hertz	هيرتز	1	X				

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of Terms	117	22	19	14	172
%	68%	13%	11%	8%	100%

No. of Loan Acronym Terms	13
%	11%
No. of Loanword Terms	104
%	89%

No. of Arabic and Latin Scripts Terms	0	1	0	1	2
%	0%	50%	0%	50%	1%
No. of only Latin Script Terms					15

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	34	13	10	8	65
%	29%	59%	53%	57%	38%
No. of CAT2 Terms	53	9	9	6	77
%	45%	41%	47%	43%	45%
No. of CAT3 Terms	30	0	0	0	30
%	26%	0%	0%	0%	17%

V.I. *Majallat Wāḥat al-Ḥāsib*

English	Arabic	No. of Tokens	M1	M2	M3	M4	Latin Script
Hardware							
SD	إس دي	4	X				
		2					*
disc	أسطوانة	2			X		
	قرص	114			X		
discs	أسطوانات	3			X		
	أقراص	118			X		
LCD	أل سي دي	6	X				
battery	بطارية (it)	52	X				
batteries	بطاريات (it)	5	X				
PC = personal computer	بي سي	4	X				
	حاسوب شخصي	5				X	
transistor	ترانزستور	1	X				
	ترانزيستور	3	X				
transistors	ترانزستورات	2	X				
computer	حاسب	473		X			
	حاسوب	80		X			
	كمبيوتر	485	X				
	كومبيوتر	88	X				
computers	حاسبات	120		X			
	حواسب	7		X			
	حواسيب	31		X			
	كمبيوترات	28	X				
	كومبيوترات	32	X				
tablet	حاسب لوحي	11				X	
	تابلت	3	X				
tablets	الحاسبات اللوحية	21				X	
laptop	حاسب محمول	16				X	
	لابتوب	12	X				
laptops	حاسبات محمولة	21				X	
desktop computer	حاسب مكتبي	5				X	
palmtop computer	الحاسوب كفي	3				X	
server	خادم	15			X		
		2					**
	سيرفر	14	X				
servers	خوادم	11		X			
	سرفرات	1	X				
	سيرفرات	3	X				
fiber optic cables	خطوط الألياف البصرية	2				X	
DDR	دي دي آر	1	X				
DVD	دي في دي	10	X				
		5					*
memory	ذاكرة	156			X		
	ميموري	5	X				
memories	ذاكرات	2		X			
	ذواكر	2		X			
RAM	ذاكرة عشوائية	8				X	
	رام	5	X				
		1					*
RAMs	رامات	1	X				

router	راوتر	2	X				
chip	رقاقة	2			X		
	شريحة	6			X		
chips	رقاقات	10			X		
	رقائق	7			X		
	شرائح	3			X		
ROM	روم	1	X				
scanner	سكانر	1	X				
	ماسح	4		X			
	ماسحة	1			X		
	الماسحة الضوئية	2				X	
scanners	ماسحات	10			X		
wire	سلك	3		X			
wires	أسلاك	7		X			
drive	سوَّاقة	14		X			
drives	سوَّاقات	2		X			
(solid state drive) SDD	سوَّاقة الحالة الصلبة	1				X	**
CD	سي دي	2	X				
screen	شاشة	266		X			
screens	شاشات	39		X			
touchscreens	شاشات اللمس	7				X	
tape	شريط	1			X		
tapes	أشرطة	2			X		
printer	طابعة	25		X			
printers	طابعات	36		X			
wireless printers	الطابعات اللاسلكية	11				X	
mouse	فأرة	32			X		
	ماوس	21	X				
filter	فلتر	4	X				
	فيلتر	2	X				
filters	فلاتر	3	X				
hard disk	القرص الصلب	57				X	
hard disks	أقراص صلبة	68				X	
cable	كابل	3	X				
	كبل	2	X				
	كيبل	1	X				
cables	كابلات	4	X				
	كوابل	2	X				
	كيابل	1	X				
cache	كاش	5	X				
camera	كاميرا	19	X				
cameras	كاميرات	6	X				
card	كرت	1	X				
cards	كروت	1	X				
keyboard	كيبورد	7	X				
	لوحة المفاتيح	80				X	
		1					**
keyboards	لوحات المفاتيح	10				X	
board	لوحة	8			X		
boards	لوحات	3			X		
motherboard	اللوحة الأم	3				X	
motherboards	اللوحات الأم	1				X	**
control board	لوحة التحكم	1				X	
microphone	مايكروفون	1	X				
	ميكروفون	2	X				
microphones	ميكروفونات	1	X				
disk drive	محرك الأقراص	4				X	

disk drives	محركات الأقراص	5				X	
processor	معالج	104			X		
processors	معالجات	50		X			
graphics processor	معالج الرسوميات	35				X	
graphics processors	معالجات الرسوميات	13				X	
port	منفذ	19			X		
ports	منافذ	4			X		
modem	مودم	6	X				
switch	موزع	1			X		**
netbook	نتبوك	3	X				
hardware	هاردوير	1	X				
USB	يو أس بي	17	X				
		1					**
		22					*
blu-ray disc		1					*
displayport		1					*
DVDR		1					*
DVDRW		1					*
HD DVD		4					*
HDD		1					*
HDMI		4					*
SSD		10					*
Software							
automation	أتمتة	4	X				
ethernet	إثرنت	3	X				
		1					**
adware	ادوير	1	X				
username	اسم المستخدم	10				X	
restart	إعادة التشغيل	2				X	**
privacy settings	إعدادات الخصوصية	2				X	**
extranet	اكسترانت	5	X				
electronic	إلكتروني	520	X				
	إليكتروني	7	X				
	إلكترونية	652	X				
	إليكترونية	21	X				
electronics	إلكترونيات	36	X				
intranet	انترانت	4	X				
internet	إنترنت	1279	X				
extension	الامتداد	6			X		
automatic	أوتوماتيكي	16	X				
	أوتوماتيكية	3	X				
icon	أيقونة	11	X				
icons	أيقونات	8	X				
email	إيميل	10	X				
bandwidth	باندويث	2	X				
programming	برمجة	54	X				
program	برنامج	1894	X				
programs	برامج	495	X				
	برمجيات	173	X				
protocol	بروتوكول	12	X				
protocols	بروتوكولات	6	X				
broadband	برودباند	4	X				
profile	بروفايل	2	X				
proxy	بروكسي	8	X				
	البريد التطفلي	10				X	

spam	بريد متطفل	1				X	**
	سبام	2	X				
bluetooth	بلوتوث	79	X				
		1					*
blogger	بلوجر	1	X				
	بلوغر	2	X				
blu-ray	بلوراي	9	X				
		8					*
		6					*
boot	بوت	1	X				
PDF	بي دي أف	9	X				
search history	تاريخ البحث	2				X	**
downloading	التحميل	10		X			
trojan	تروجان	5	X				
login	تسجيل الدخول	4				X	
application	تطبيق	46			X		
	تطبيق حاسوبي	9				X	
applications	التطبيقات	122		X			
	التطبيقات الحاسوبية	14				X	
hard disk partitioning	تقسيم القرص الصلب	4				X	
technology	تقنية	500		X			
	تكنلوجيا	2	X				
	تكنولوجيا	275	X				
techniques	تقنيات	137		X			
technologies	تكنولوجيات	3	X				
technological	تكنولوجي	15	X				
	تكنولوجية	36	X				
information technology	تقنية المعلومات	1				X	**
setup	التنصيب	9			X		
torrent	تورنت	4	X				
3G	ثري جي	1	X				
		1					*
graphic	جرافيك	4	X				
	غرافيك	1	X				
graphics	جرافكس	4	X				
	جرافيكس	16	X				
	جرفيكس	3	X				
	غرافيكس	1	X				
cloud computing	الحوسبة السحابية	5				X	**
DOS	دوس	2	X				
domain	دومين	1	X				
dynamic	ديناميكي	8	X				
	ديناميكية	3	X				
link	رابط	12		X			
	لينك	1	X				
links	روابط	9		X			
download link	رابط التحميل	6				X	
spyware	سبايوير	1	X				
scripts	سكربتات	2	X				
chat	شات	9	X				
network	شبكة	395			X		
networks	شبكات	195			X		
wireless network	الشبكة اللاسلكية	7				X	
wireless networks	الشبكات اللاسلكية	12				X	
browser bar	شريط المتصفح	2				X	

address bar	شريط العنوان	1				X	
inbox	صندوق الرسائل الواردة	2				X	
HD	عالية الدقة واالوضوح	3				X	**
		1					*
virus	فايروس	3	X				
	فيروس	76	X				
viruses	فايروسات	13	X				
	فيروسات	165	X				
firewall	فايroول	1	X				
filtering	فلترة	4	X				
format	فورمات	1	X				
video	فيديو	243	X				
videos	فيديوهات	3	X				
phishing	فيشينج	2	X				
pirates	قراصنة	21			X		
piracy	قرصنة	33			X		
channel	قناة	4			X		
channels	قنوات	9			X		
crack	كراك	1	X				
password	كلمة السر	11				X	
	كلمة المرور	6				X	
code	كود	13	X				
codes	اكواد	9	X				
codec	كودك	5	X				
	كوديك	10	X				
cookies	الكوكيز	5	X				
wireless	لاسلكي	1				X	**
	وايرلس	5	X				
malware	مالوير	3	X				
		1					*
programmer	مبرمج	12	X				
programmers	مبرمجون	22	X				
browser	متصفح	187		X			
	مستعرض	7		X			
browsers	متصفحات	39		X			
	متصفحات الشبكة	8				X	
folder	مجلد	15			X		
folders	مجلدات	18			X		
search engine	محرك بحث	12				X	
attachments	مرفقات	1		X			
processing	معالجة	34			X		
CPU	معالجة مركزية	1				X	**
multimedia	ملتيميديا	8	X				
file	ملف	98		X			
files	ملفات	286		X			
social networking sites	مواقع التواصل الاجتماعي	9				X	
net	نت	59	X				
backup	النسخ الاحتياطي	2				X	
	نسخة احتياطية	3				X	
system	نظام	429			X		
systems	أنظمة	87			X		
	نظم	34		X			
operating system	نظام تشغيل	75				X	
navigation system	نظام تصفح المواقع	1				X	**
click	نقرة	4		X			
hacker	هاكر	4	X				

	هكر	6	X				
hackers	هاكرز	9	X				
WAP	واب	2	X				
web	وب	2	X				
	ويب	125	X				
safe mode	وضع الأمان	1				X	**
	الوضع الآمن	1				X	**
3D		1					*
4G		2					*
AAC		1					*
AMR		1					*
BM		1					*
GIF		1					*
hacking		1					*
JPEG		1					*
MJPEG		4					*
MP3		2					*
RAW		1					*
register now		1					*
restore point		1					*
SVG		1					*
TIF		1					*
tools		1					*
URL		4					*
utility computing		1					*
WMA		1					*
Units of Measurement							
inch	إنش	11	X				
inches	إنشات	2	X				
byte	بايت	5	X				
bit	بت	26	X				
	بيت	1	X				
pixel	بكسل	2	X				
	بيكسل	6	X				
pixels	بيكسلات	3	X				
petabyte	بيتابايت	2	X				
tera	تيرا	1	X				
terabyte	تيرابايت	17	X				
giga	جيجا	12	X				
	جيغا	1	X				
	قيقا	1	X				
gigabyte	جيجابايت	65	X				
	جيغابايت	2	X				
	غيغابايت	39	X				
	قيقابايت	1	X				
gigabit	جيجابت	2	X				
	جيجابيت	2	X				
	غيغابت	1	X				
	غيغابيت	1	X				
gigahertz	جيجاهرتز	7	X				
	جيجاهيرتز	3	X				
	غيغاهرتز	1	X				
	غيغاهيرتز	4	X				
zettabyte	زيتابايت	1	X				
volt	فولت	1	X				
	فولط	1	X				
kilobyte	كيلوبايت	6	X				

kilobytes	كيلوبايتات	1	X					
kilobit	كيلوبت	2	X					
mega	ميجا	3	X					
	ميغا	2	X					
	ميقا	2	X					
megabyte	ميجابايت	8	X					
	ميغابايت	23	X					
	ميقابايت	1	X					
megabit	ميجابيت	1	X					
	ميغابت	7	X					
megapixel	ميجابكسل	3	X					
	ميجابيكسل	2	X					
	ميغابيكسل	2	X					
megahertz	ميجاهيرتز	1	X					
	ميغاهرتز	2	X					
	ميغاهيرتز	2	X					
nano	نانو	17	X					
nanometre	نانومتر	3	X					
nanometres	نانومترات	1	X					
hertz	هيرتز	1	X					
watt	واط	1	X					

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of Terms	183	32	36	56	307
%	60%	10%	12%	18%	100%

No. of Loan Acronym Terms	14
%	8%
No. of Loanword Terms	169
%	92%

No. of Arabic and Latin Scripts Terms	2	0	2	15	19
%	11%	0%	11%	79%	6%
No. of only Latin Script Terms					37

Mechanism	**M1**	**M2**	**M3**	**M4**	**Total**
No. of CAT1 Terms	49	18	22	24	113
%	27%	56%	61%	43%	37%
No. of CAT2 Terms	83	14	14	32	143
%	45%	44%	39%	57%	47%
No. of CAT3 Terms	51	0	0	0	51
%	28%	0%	0%	0%	17%

Appendix B: Overlap Percentages in the Corpora/Sub-corpora

English	Arabic	S1	S2	S3	S4	S5	S6
Taʿrīb							
Hardware							
SD	إس دي					X	X
tablet	تابلت					X	X
transistors	ترانزستورات	X					X
transistor	ترانزيستور		X				X
RAMs	رامات				X		X
servers	سرفرات				X		X
	سيرفرات				X		X
scanner	سكانر				X		X
CD	سي دي	X					X
filter	فلتر				X		X
card	كارت		X		X		
cartridge	كارتريدج			X		X	
card	كرت		X				X
kiosk	كُشك	X		X			
computers	كومبيوترات					X	X
cables	كيابل				X		X
keyboard	كيبورد				X		X
laptop	لابتوب					X	X
microphone	مايكروفون		X				X
microphone	ميكروفون					X	X
microphones	ميكروفونات					X	X
hub	هب		X		X		
USB	يو أس بي					X	X
batteries	بطاريات (it)	X			X		X
PC	بي سي	X			X		X
cartridge	خرطوشة (fr)	X	X	X			
DVD	دي في دي				X	X	X
router	راوتر				X	X	X
ROM	روم	X				X	X
server	سيرفر				X	X	X
filters	فلاتر		X		X		X
cache/cash	كاش	X			X		X
cards	كروت				X	X	X
computers	كمبيوترات				X	X	X
computer	كومبيوتر				X	X	X
console	كونسول	X		X	X		
laptop	لاب توب	X	X			X	
microfilm	ميكروفيلم	X	X	X			
transistor	ترانزستور	X		X		X	X
RAM	رام	X			X	X	X
cable	كابل		X		X	X	X
cables	كابلات		X		X	X	X
	كوابل		X		X	X	X
cameras	كاميرات	X	X		X		X
cable	كيبل		X	X	X		X
hardware	هاردوير		X		X	X	X
battery	بطارية (it)	X	X		X	X	X
camera	كاميرا	X	X		X	X	X
cable	كبل	X	X	X	X		X
computer	كمبيوتر		X	X	X	X	X
mouse	ماوس	X	X		X	X	X
modem	مودم	X	X	X	X	X	X

Software							
codes	أكواد	X			X		
electronic	إليكتروني					X	X
	إليكترونية					X	X
ethernet	إيثرنت	X			X		
bandwidth	باندويث				X		X
protocol	برتوكول			X	X		
broadband	برودباند					X	X
profile	بروفايل					X	X
blu-ray	بلوراي					X	X
boot	بوت		X				X
PING (packet internet groper)	بينج		X		X		
trojan	تروجان				X		X
telnet	تلنت	X			X		
3G	ثري جي					X	X
domain	دومين				X		X
dynamic	دينامية	X				X	
scripts	سكربتات				X		X
chat	شات					X	X
virus	فايروس				X		X
firewall	فايروول				X		X
format	فورمات		X				X
crack	كراك		X				X
codec	كودك	X					X
multimedia	ملتيميديا				X		X
hacker	هاكر		X				X
hacker	هكر				X		X
email	إيميل				X	X	X
protocols	بروتوكولات	X			X		X
technology	تكنلوجيا				X	X	X
technological	تكنولوجي				X	X	X
	تكنولوجية				X	X	X
torrent	تورنت				X	X	X
dynamic	ديناميي	X	X	X			
dynamism	ديناميكية			X	X		X
filtering	فلترة		X		X		X
videos	فيديوهات				X	X	X
link	لينك				X	X	X
programmers	مبرمجون				X	X	X
net	نت				X	X	X
hackers	هاكرز				X	X	X
WAP	واب	X			X		X
automation	أتمتة		X	X		X	X
ethernet	إثرنت		X	X	X		X
extranet	اكسترانت	X	X			X	X
electronics	إلكترونيات	X			X	X	X
intranet	انترانت	X	X			X	X
automatic	أوتوماتيكي			X	X	X	X
automatic	أوتوماتيكية			X	X	X	X
icons	أيقونات	X			X	X	X
proxy	بروكسي	X	X		X		X
technologies	تكنولوجيات	X			X	X	X
graphic	جرافيك		X		X	X	X
viruses	فيروسات	X			X	X	X
icon	أيقونة	X		X	X	X	X
programs	برمجيات	X	X		X	X	X
bluetooth	بلوتوث	X	X		X	X	X

DOS	دوس	X	X	X	X		X
dynamic	ديناميكي	X	X	X	X		X
code	كود	X	X		X	X	X
electronic	إلكتروني	X	X	X	X	X	X
electronic	إلكترونية	X	X	X	X	X	X
internet	إنترنت	X	X	X	X	X	X
programs	برامج	X	X	X	X	X	X
programming	برمجة	X	X	X	X	X	X
program	برنامج	X	X	X	X	X	X
protocol	بروتوكول	X	X	X	X	X	X
technology	تكنولوجيا	X	X	X	X	X	X
video	فيديو	X	X	X	X	X	X
virus	فيروس	X	X	X	X	X	X
programmer	مبرمج	X	X	X	X	X	X
web	ويب	X	X	X	X	X	X
Units of Measurement							
inch	إنش					X	X
baud	بود	X		X			
bit	بيت					X	X
pica	بيكا	X	X				
pixel	بيكسل					X	X
pixels	بيكسلات					X	X
gigahertz	جيجاهرتز					X	X
	غيغاهيرتز					X	X
gigahertz	جيجاهيرتز				X		X
	غيغاهرتز				X		X
giga	جيغا			X			X
gigabyte	جيغابايت					X	X
gigabit	غيغابت					X	X
volt	فولت				X		X
macro	ماكرو	X				X	
megahertz	ميجاهرتز				X	X	
megahertz	ميجاهيرتز					X	X
megabit	ميغابت				X		X
watt	واط		X				X
bytes	بايتات	X		X	X		
peta	بيتا		X	X		X	
tera	تيرا		X	X			X
terabyte	تيرابايت			X		X	X
gigabyte	غيغابايت				X	X	X
kilobit	كيلوبت				X	X	X
megapixel	ميجابكسل	X				X	X
megabyte	ميغابايت				X	X	X
megahertz	ميغاهيرتز			X		X	X
nano	نانو	X				X	X
pixel	بكسل	X	X			X	X
kilobyte	كيلوبايت	X	X		X		X
mega	ميغا			X	X	X	X
hertz	هرتز	X	X	X	X		
hertz	هيرتز		X	X		X	X
bit	بت		X	X	X	X	X
gigabyte	جيجابايت		X	X	X	X	X
kilo	كيلو	X	X	X	X	X	
mega	ميجا	X	X		X	X	X
megabyte	ميجابايت	X	X		X	X	X
byte	بايت	X	X	X	X	X	X
giga	جيجا	X	X	X	X	X	X

Ishtiqāq							
Hardware							
computers	حواسب					X	X
memories	ذاكرات			X			X
controller	متحكم	X		X			
servers	خوادم				X	X	X
memories	ذواكر				X	X	X
drive	سوَّاقة		X	X			X
computers	حواسيب	X			X	X	X
wire	سلك		X	X	X		X
screens	شاشات		X		X	X	X
scanner	ماسح	X	X	X			X
wires	أسلاك		X	X	X	X	X
computers	حاسبات		X	X	X	X	X
printers	طابعات		X	X	X	X	X
processors	معالجات		X	X	X	X	X
computer	حاسب	X	X	X	X	X	X
	حاسوب	X	X	X	X	X	X
screen/ monitor/ display	شاشة	X	X	X	X	X	X
printer	طابعة	X	X	X	X	X	X
Software							
automatic	آلي		X	X			
automatic	آلية		X	X			
command	أمر	X		X			
minimize	تصغير		X	X			
zoom							
digital	رقمي	X		X			
	رقمية	X		X			
form/ format	صيغة	X	X				
browsers	متصفحات				X		X
attachment	مرفق	X	X				
click	نقرة	X					X
downloading	التحميل		X		X		X
converter	محول	X	X	X			
attachments	مرفقات		X			X	X
applications	تطبيقات		X		X	X	X
techniques	تقنيات		X		X	X	X
browser	مستعرض		X	X		X	X
files	ملفات		X		X	X	X
technology	تقنية	X	X	X	X	X	X
browser	متصفح	X	X	X	X	X	X
file	ملف	X	X	X	X	X	X
systems	نظم	X	X	X	X	X	X
Majāz							
Hardware							
chips	شرائح				X		X
hardware	العتاد	X		X			
boards/ panels	لوحات		X				X
scanners	ماسحات			X			X
ports	منافذ				X		X
chips	رقائق				X	X	X
chip	شريحة		X	X			X
discs	أقراص			X	X	X	X
tape	شريط	X	X	X			X
mouse	فأرة	X	X	X			X
scanner	ماسحة	X		X		X	X
router	مُوجِّه	X	X	X	X		

disc/ drum/ cylinder	أسطوانة	X	X	X	X		X
chip	رقاقة	X	X	X	X		X
board/ pad/ panel/ tablet	لوحة	X	X	X		X	X
server	خادم	X	X	X	X	X	X
memory	ذاكرة	X	X	X	X	X	X
disc	قرص	X	X	X	X	X	X
processor	معالج	X	X	X	X	X	X
port	منفذ	X	X	X	X	X	X
Software							
format	تهيئة	X	X				
pirates	قراصنة					X	X
installation/ setup	تنصيب		X	X			X
channels	قنوات			X	X		X
network	شبكة			X	X	X	X
folders	مجلدات	X	X		X		X
channel	قناة	X	X	X	X		X
folder	مجلد	X	X		X	X	X
processing	معالجة		X	X	X	X	X
application	تطبيق	X	X	X	X	X	X
networks	شبكات	X	X	X	X	X	X
piracy	قرصنة	X	X	X	X	X	X
system	نظام	X	X	X	X	X	X
systems	أنظمة	X	X	X	X	X	X
Tarkīb							
Hardware							
hard disks	أقراص صلبة					X	X
computer automatic computer	حاسب آلي		X	X			
PC (personal computer)	حاسب شخصي		X			X	
	حاسوب شخصي	X					X
palmtop computer	حاسوب كفي	X					X
RAM (random access memory)	ذاكرة الوصول العشوائي		X	X			
headphones	سماعة رأس	X	X				
digital audio tape	شريط صوتي رقمي	X	X				
external hard disk	قرص صلب خارجي		X	X			
CD (compact disk)	قرص مدمج	X	X				
floppy disk	قرص مرن		X	X			
CD (compact disk)/ compressed disk	قرص مضغوط		X	X			
keyboards	لوحات المفاتيح				X		X
scanner	ماسح ضوئي	X	X				
drive/disk drive	محرك أقراص		X				X
drives/disk drives	محركات أقراص		X				X
graphics processor	معالج الرسوميات		X				X
ROM (read only memory)	ذاكرة القراءة فقط	X	X	X			
motherboard	اللوحة الأم	X		X			X
control board/ control panel	لوحة التحكم		X	X		X	X
hard disk	قرص صلب	X	X		X	X	X
keyboard	لوحة المفاتيح	X	X	X	X	X	X
Software							
fiber optics	الألياف الضوئية			X	X		
operating systems	أنظمة تشغيل		X		X		
boot/ startup	بدء التشغيل		X	X			
cloud computing	الحوسبة السحابية					X	X
digital subscriber line	خط المشترك الرقمي		X	X			

(DSL)							
wireless network	شبكة لاسلكية		X				X
wireless networks	الشبكات اللاسلكية				X		X
toolbar	شريط الأدوات		X	X			
address bar/title bar	شريط عنوان			X			X
mailbox	صندوق بريد	X	X				
mailbox	علبة البريد		X	X			
search engine	محرك بحث			X			X
social networking sites	مواقع التواصل الاجتماعي					X	X
backup	نسخة احتياطية				X		X
broadband	نطاق عريض	X			X		
multimedia	وسائط متعددة	X		X			
restart	إعادة تشغيل	X	X				X
logout = logoff	تسجيل الخروج	X	X	X			
desktop	سطح المكتب		X	X	X		
data compression	ضغط البيانات	X	X	X			
database	قاعدة بيانات	X	X	X			
data processing	معالجة البيانات	X	X	X			
word processing	معالجة الكلمات	X	X	X			
text processing	معالجة النصوص	X	X	X			
backup	نسخ احتياطي	X	X				X
login	تسجيل الدخول	X	X	X			X
password	كلمة السر	X	X	X			X
password	كلمة المرور		X		X	X	X
wireless	لاسلكي	X	X	X		X	X
username	اسم المستخدم	X	X	X	X	X	X
operating system	نظام التشغيل	X	X	X	X	X	X

Total No of Overlaps	**290**	**%**	**21%**

Sub-corpus	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
No of Overlaps	132	157	127	163	151	227
%	46%	54%	44%	56%	52%	78%

Corpus	**C1**	**C2**	**C3**
AVG No of Overlaps	132	142	180.3
%	46%	49%	62%

Mechanism	**M1**	**M2**	**M3**	**M4**
No of Overlaps	164	39	34	53
%	57%	13%	12%	18%

Category	**CAT1**	**CAT2**	**CAT3**
No of Overlaps	112	137	41
%	39%	47%	14%

Total No of 2 Overlaps	121	**%**	42%
Total No of 3 Overlaps	61	**%**	21%
Total No of 4 Overlaps	44	**%**	15%
Total No of 5 Overlaps	28	**%**	10%
Total No of 6 Overlaps	36	**%**	12%

Appendix C: Sub-Corpora Overlaps Tables

I. Two Sub-Corpora Overlaps Tables

Sub-corpora			S1		S2
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	9	5	11	7	**32**	**35%**
CAT2	20	7	9	14	**50**	**55%**
CAT3	9	0	0	0	**9**	**10%**
Total	**38**	**12**	**20**	**21**	**91**	**20%**
%	**42%**	**13%**	**22%**	**23%**		

Sub-corpora			S1		S3
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	7	6	13	3	**29**	**38%**
CAT2	16	8	6	12	**42**	**55%**
CAT3	6	0	0	0	**6**	**8%**
Total	**29**	**14**	**19**	**15**	**77**	**17%**
%	**38%**	**18%**	**25%**	**19%**		

Sub-corpora			S1		S4
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	11	5	8	2	**26**	**34%**
CAT2	28	4	8	3	**43**	**56%**
CAT3	8	0	0	0	**8**	**10%**
Total	**47**	**9**	**16**	**5**	**77**	**16%**
%	**61%**	**12%**	**21%**	**6%**		

Sub-corpora			S1		S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	8	5	7	2	**22**	**33%**
CAT2	23	4	6	3	**36**	**54%**
CAT3	9	0	0	0	**9**	**13%**
Total	**40**	**9**	**13**	**5**	**67**	**16%**
%	**60%**	**13%**	**19%**	**7%**		

Sub-corpora			S1		S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	14	6	11	5	**36**	**39%**
CAT2	28	5	8	7	**48**	**52%**
CAT3	8	0	0	0	**8**	**9%**
Total	**50**	**11**	**19**	**12**	**92**	**17%**
%	**54%**	**12%**	**21%**	**13%**		

Sub-corpora			S2		S3	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	6	11	12	8	**37**	**39%**
CAT2	16	9	8	16	**49**	**52%**
CAT3	9	0	0	0	**9**	**9%**
Total	**31**	**20**	**20**	**24**	**95**	**23%**
%	**33%**	**21%**	**21%**	**25%**		

Sub-corpora			S2		S4	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	15	10	8	2	**35**	**40%**
CAT2	21	8	9	5	**43**	**49%**
CAT3	9	0	0	0	**9**	**10%**
Total	**45**	**18**	**17**	**7**	**87**	**19%**
%	**52%**	**21%**	**20%**	**8%**		

Sub-corpora			S2		S5	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	10	9	6	4	**29**	**38%**
CAT2	18	9	7	4	**38**	**49%**
CAT3	10	0	0	0	**10**	**13%**
Total	**38**	**18**	**13**	**8**	**77**	**20%**
%	**49%**	**23%**	**17%**	**10%**		

Sub-corpora			S2		S6	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	16	12	12	6	**46**	**41%**
CAT2	27	10	10	9	**56**	**50%**
CAT3	11	0	0	0	**11**	**10%**
Total	**54**	**22**	**22**	**15**	**113**	**22%**
%	**48%**	**19%**	**19%**	**13%**		

Sub-corpora			S3		S4	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	5	9	9	1	**24**	**35%**
CAT2	19	4	9	4	**36**	**53%**
CAT3	8	0	0	0	**8**	**12%**
Total	**32**	**13**	**18**	**5**	**68**	**15%**
%	**47%**	**19%**	**26%**	**7%**		

Sub-corpora			S3		S5	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	8	8	2	**22**	**35%**
CAT2	15	5	7	3	**30**	**48%**
CAT3	10	0	0	0	**10**	**16%**
Total	**29**	**13**	**15**	**5**	**62**	**16%**
%	**47%**	**21%**	**24%**	**8%**		

Sub-corpora			S3		S6	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	5	12	14	3	**34**	**40%**
CAT2	19	5	10	7	**41**	**48%**
CAT3	10	0	0	0	**10**	**12%**
Total	**34**	**17**	**24**	**10**	**85**	**17%**
%	**40%**	**20%**	**28%**	**12%**		

Sub-corpora			S4		S5	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	16	12	7	2	**37**	**37%**
CAT2	33	7	8	3	**51**	**51%**
CAT3	12	0	0	0	**12**	**12%**
Total	**61**	**19**	**15**	**5**	**100**	**24%**
%	**61%**	**19%**	**15%**	**5%**		

Sub-corpora			S4		S6	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	30	13	11	3	**57**	**39%**
CAT2	49	9	11	5	**74**	**51%**
CAT3	15	0	0	0	**15**	**10%**
Total	**94**	**22**	**22**	**8**	**146**	**27%**
%	**64%**	**15%**	**15%**	**5%**		

Sub-corpora			S5		S6	
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	25	13	9	4	**51**	**36%**
CAT2	43	9	9	6	**67**	**47%**
CAT3	25	0	0	0	**25**	**17%**
Total	**93**	**22**	**18**	**10**	**143**	**30%**
%	**65%**	**15%**	**13%**	**7%**		

II. Three Sub-Corpora Overlaps Tables

Sub-corpora		S1		S2	S3
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	5	11	2	**22**	**35%**
CAT2	14	5	6	11	**36**	**58%**
CAT3	4	0	0	0	**4**	**6%**
Total	**22**	**10**	**17**	**13**	**62**	**9%**
%	**35%**	**16%**	**27%**	**21%**		

Sub-corpora		S1		S2	S4
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	6	4	8	2	**20**	**34%**
CAT2	17	4	8	2	**31**	**53%**
CAT3	7	0	0	0	**7**	**12%**
Total	**30**	**8**	**16**	**4**	**58**	**8%**
%	**52%**	**14%**	**28%**	**7%**		

Sub-corpora		S1		S2	S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	5	4	6	2	**17**	**33%**
CAT2	16	4	6	3	**29**	**56%**
CAT3	6	0	0	0	**6**	**12%**
Total	**27**	**8**	**12**	**5**	**52**	**8%**
%	**52%**	**15%**	**23%**	**10%**		

Sub-corpora		S1		S2	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	6	5	10	2	**23**	**34%**
CAT2	19	4	8	7	**38**	**57%**
CAT3	6	0	0	0	**6**	**9%**
Total	**31**	**9**	**18**	**9**	**67**	**9%**
%	**46%**	**13%**	**27%**	**13%**		

Sub-corpora		S1		S3	S4
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	3	4	8	1	**16**	**33%**
CAT2	15	4	6	2	**27**	**56%**
CAT3	5	0	0	0	**5**	**10%**
Total	**23**	**8**	**14**	**3**	**48**	**7%**
%	**48%**	**17%**	**29%**	**6%**		

Sub-corpora			S1	S3	S5
	M1	M2	M3	M4	Total	%
CAT1	2	4	7	1	**14**	**33%**
CAT2	13	4	5	3	**25**	**60%**
CAT3	3	0	0	0	**3**	**7%**
Total	**18**	**8**	**12**	**4**	**42**	**7%**
%	**43%**	**19%**	**29%**	**10%**		

Sub-corpora			S1	S3	S6
	M1	M2	M3	M4	Total	%
CAT1	3	5	11	2	**21**	**40%**
CAT2	15	4	6	5	**30**	**57%**
CAT3	2	0	0	0	**2**	**4%**
Total	**20**	**9**	**17**	**7**	**53**	**7%**
%	**38%**	**17%**	**32%**	**13%**		

Sub-corpora			S1	S4	S5
	M1	M2	M3	M4	Total	%
CAT1	5	5	5	2	**17**	**31%**
CAT2	20	4	6	2	**32**	**59%**
CAT3	5	0	0	0	**5**	**9%**
Total	**30**	**9**	**11**	**4**	**54**	**8%**
%	**56%**	**17%**	**20%**	**7%**		

Sub-corpora			S1	S4	S6
	M1	M2	M3	M4	Total	%
CAT1	10	5	7	2	**24**	**35%**
CAT2	25	4	8	2	**39**	**57%**
CAT3	5	0	0	0	**5**	**7%**
Total	**40**	**9**	**15**	**4**	**68**	**9%**
%	**59%**	**13%**	**22%**	**6%**		

Sub-corpora			S1	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	7	5	7	2	**21**	**33%**
CAT2	22	4	6	3	**35**	**56%**
CAT3	7	0	0	0	**7**	**11%**
Total	**36**	**9**	**13**	**5**	**63**	**9%**
%	**57%**	**14%**	**21%**	**8%**		

Sub-corpora			S2	S3	S4
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	9	8	1	**22**	**39%**
CAT2	14	4	7	3	**28**	**50%**
CAT3	6	0	0	0	**6**	**11%**
Total	**24**	**13**	**15**	**4**	**56**	**8%**
%	**43%**	**23%**	**27%**	**7%**		

Sub-corpora			S2	S3	S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	2	8	6	2	**18**	**35%**
CAT2	12	5	6	3	**26**	**51%**
CAT3	7	0	0	0	**7**	**14%**
Total	**21**	**13**	**12**	**5**	**51**	**9%**
%	**41%**	**25%**	**24%**	**10%**		

Sub-corpora			S2	S3	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	11	11	2	**28**	**42%**
CAT2	15	5	8	5	**33**	**49%**
CAT3	6	0	0	0	**6**	**9%**
Total	**25**	**16**	**19**	**7**	**67**	**9%**
%	**37%**	**24%**	**28%**	**10%**		

Sub-corpora			S2	S4	S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	9	9	5	2	**25**	**39%**
CAT2	15	7	7	3	**32**	**50%**
CAT3	7	0	0	0	**7**	**11%**
Total	**31**	**16**	**12**	**5**	**64**	**10%**
%	**48%**	**25%**	**19%**	**8%**		

Sub-corpora			S2	S4	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	13	10	7	2	**32**	**41%**
CAT2	20	8	9	3	**40**	**51%**
CAT3	7	0	0	0	**7**	**9%**
Total	**40**	**18**	**16**	**5**	**79**	**10%**
%	**51%**	**23%**	**20%**	**6%**		

Sub-corpora			S2	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	9	9	6	3	27	37%
CAT2	18	9	7	4	38	52%
CAT3	8	0	0	0	8	11%
Total	35	18	13	7	73	11%
%	48%	25%	18%	10%		

Sub-corpora			S3	S4	S5
	M1	M2	M3	M4	Total	%
CAT1	2	8	6	1	17	34%
CAT2	14	4	7	2	27	54%
CAT3	6	0	0	0	6	12%
Total	22	12	13	3	50	8%
%	44%	24%	26%	6%		

Sub-corpora			S3	S4	S6
	M1	M2	M3	M4	Total	%
CAT1	4	9	8	1	22	37%
CAT2	18	4	9	2	33	55%
CAT3	5	0	0	0	5	8%
Total	27	13	17	3	60	8%
%	45%	22%	28%	5%		

Sub-corpora			S3	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	3	8	8	2	21	36%
CAT2	15	5	7	3	30	51%
CAT3	8	0	0	0	8	14%
Total	26	13	15	5	59	9%
%	44%	22%	25%	8%		

Sub-corpora			S4	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	16	12	7	2	37	38%
CAT2	33	7	8	3	51	52%
CAT3	10	0	0	0	10	10%
Total	59	19	15	5	98	14%
%	60%	19%	15%	5%		

III. Four Sub-Corpora Overlaps Tables

Sub-corpora	S1	S2		S3	S4
	M1	M2	M3	M4	Total	%
CAT1	2	4	8	1	**15**	**34%**
CAT2	13	4	6	2	**25**	**57%**
CAT3	4	0	0	0	**4**	**9%**
Total	**19**	**8**	**14**	**3**	**44**	**5%**
%	**43%**	**18%**	**32%**	**7%**		

Sub-corpora	S1	S2		S3	S5
	M1	M2	M3	M4	Total	%
CAT1	1	4	6	1	**12**	**32%**
CAT2	11	4	5	3	**23**	**61%**
CAT3	3	0	0	0	**3**	**8%**
Total	**15**	**8**	**11**	**4**	**38**	**5%**
%	**39%**	**21%**	**29%**	**11%**		

Sub-corpora	S1	S2		S3	S6
	M1	M2	M3	M4	Total	%
CAT1	2	5	10	1	**18**	**38%**
CAT2	13	4	6	5	**28**	**58%**
CAT3	2	0	0	0	**2**	**4%**
Total	**17**	**9**	**16**	**6**	**48**	**5%**
%	**35%**	**19%**	**33%**	**13%**		

Sub-corpora	S1	S2		S4	S5
	M1	M2	M3	M4	Total	%
CAT1	4	4	5	2	**15**	**33%**
CAT2	14	4	6	2	**26**	**57%**
CAT3	5	0	0	0	**5**	**11%**
Total	**23**	**8**	**11**	**4**	**46**	**5%**
%	**50%**	**17%**	**24%**	**9%**		

Sub-corpora	S1	S2		S4	S6
	M1	M2	M3	M4	Total	%
CAT1	6	4	7	2	**19**	**35%**
CAT2	17	4	8	2	**31**	**56%**
CAT3	5	0	0	0	**5**	**9%**
Total	**28**	**8**	**15**	**4**	**55**	**5%**
%	**51%**	**15%**	**27%**	**7%**		

Sub-corpora	S1	S2		S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	4	6	2	**16**	**32%**
CAT2	16	4	6	3	**29**	**58%**
CAT3	5	0	0	0	**5**	**10%**
Total	**25**	**8**	**12**	**5**	**50**	**5%**
%	**50%**	**16%**	**24%**	**10%**		

Sub-corpora	S1	S3		S4	S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	1	4	5	1	**11**	**29%**
CAT2	13	4	5	2	**24**	**63%**
CAT3	3	0	0	0	**3**	**8%**
Total	**17**	**8**	**10**	**3**	**38**	**4%**
%	**45%**	**21%**	**26%**	**8%**		

Sub-corpora	S1	S3		S4	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	2	4	7	1	**14**	**33%**
CAT2	15	4	6	2	**27**	**63%**
CAT3	2	0	0	0	**2**	**5%**
Total	**19**	**8**	**13**	**3**	**43**	**4%**
%	**44%**	**19%**	**30%**	**7%**		

Sub-corpora	S1	S3		S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	2	4	7	1	**14**	**34%**
CAT2	13	4	5	3	**25**	**61%**
CAT3	2	0	0	0	**2**	**5%**
Total	**17**	**8**	**12**	**4**	**41**	**4%**
%	**41%**	**20%**	**29%**	**10%**		

Sub-corpora	S1	S4		S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	5	5	5	2	**17**	**32%**
CAT2	20	4	6	2	**32**	**60%**
CAT3	4	0	0	0	**4**	**8%**
Total	**29**	**9**	**11**	**4**	**53**	**5%**
%	**55%**	**17%**	**21%**	**8%**		

Sub-corpora		S2	S3		S4	S5
	M1	M2	M3	M4	Total	%
CAT1	2	8	5	1	16	36%
CAT2	11	4	6	2	23	52%
CAT3	5	0	0	0	5	11%
Total	18	12	11	3	44	5%
%	41%	27%	25%	7%		

Sub-corpora		S2	S3		S4	S6
	M1	M2	M3	M4	Total	%
CAT1	4	9	7	1	21	40%
CAT2	14	4	7	2	27	52%
CAT3	4	0	0	0	4	8%
Total	22	13	14	3	52	5%
%	42%	25%	27%	6%		

Sub-corpora		S2	S3		S5	S6
	M1	M2	M3	M4	Total	%
CAT1	2	8	6	2	18	37%
CAT2	12	5	6	3	26	53%
CAT3	5	0	0	0	5	10%
Total	19	13	12	5	49	5%
%	39%	27%	24%	10%		

Sub-corpora		S2	S4		S5	S6
	M1	M2	M3	M4	Total	%
CAT1	9	8	5	2	24	39%
CAT2	15	7	7	3	32	52%
CAT3	6	0	0	0	6	10%
Total	30	15	12	5	62	7%
%	48%	24%	19%	8%		

Sub-corpora		S3	S4		S5	S6
	M1	M2	M3	M4	Total	%
CAT1	2	8	6	1	17	35%
CAT2	14	4	7	2	27	55%
CAT3	5	0	0	0	5	10%
Total	21	12	13	3	49	5%
%	43%	24%	27%	6%		

IV. Five Sub-Corpora Overlaps Tables

Sub-corpora	S1	S2	S3	S4	S5
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	1	4	5	1	**11**	**31%**
CAT2	11	4	5	2	**22**	**61%**
CAT3	3	0	0	0	**3**	**8%**
Total	**15**	**8**	**10**	**3**	**36**	**3%**
%	**42%**	**22%**	**28%**	**8%**		

Sub-corpora	S1	S2	S3	S4	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	2	4	7	1	**14**	**34%**
CAT2	13	4	6	2	**25**	**61%**
CAT3	2	0	0	0	**2**	**5%**
Total	**17**	**8**	**13**	**3**	**41**	**3%**
%	**41%**	**20%**	**32%**	**7%**		

Sub-corpora	S1	S2	S3	S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	1	4	6	1	**12**	**32%**
CAT2	11	4	5	3	**23**	**62%**
CAT3	2	0	0	0	**2**	**5%**
Total	**14**	**8**	**11**	**4**	**37**	**3%**
%	**38%**	**22%**	**30%**	**11%**		

Sub-corpora	S1	S2	S4	S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	4	4	5	2	**15**	**33%**
CAT2	14	4	6	2	**26**	**58%**
CAT3	4	0	0	0	**4**	**9%**
Total	**22**	**8**	**11**	**4**	**45**	**4%**
%	**49%**	**18%**	**24%**	**9%**		

Sub-corpora	S1	S3	S4	S5	S6
	M1	**M2**	**M3**	**M4**	**Total**	**%**
CAT1	1	4	5	1	**11**	**30%**
CAT2	13	4	5	2	**24**	**65%**
CAT3	2	0	0	0	**2**	**5%**
Total	**16**	**8**	**10**	**3**	**37**	**3%**
%	**43%**	**22%**	**27%**	**8%**		

Sub-corpora	S2	S3	S4	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	2	8	5	1	**16**	**37%**
CAT2	11	4	6	2	**23**	**53%**
CAT3	4	0	0	0	**4**	**9%**
Total	**17**	**12**	**11**	**3**	**43**	**4%**
%	**40%**	**28%**	**26%**	**7%**		

V. Six Sub-Corpora Overlaps Tables

Sub-corpora	S1	S2	S3	S4	S5	S6
	M1	M2	M3	M4	Total	%
CAT1	1	4	5	1	**11**	**31%**
CAT2	11	4	5	2	**22**	**63%**
CAT3	2	0	0	0	**2**	**6%**
Total	**14**	**8**	**10**	**3**	**35**	**3%**
%	**40%**	**23%**	**29%**	**9%**		

Appendix D: Corpora Overlaps Tables

I. Two Corpora Overlaps Tables

Corpora		C1		C2	
	M1	M2	M3	M4	Total	%
CAT1	12	6	13	8	**39**	**37%**
CAT2	22	10	9	15	**56**	**53%**
CAT3	11	0	0	0	**11**	**10%**
Total	**45**	**16**	**22**	**23**	**106**	**16%**
%	**42%**	**15%**	**21%**	**22%**		

Corpora		C1		C3	
	M1	M2	M3	M4	Total	%
CAT1	16	6	12	5	**39**	**38%**
CAT2	32	5	8	8	**53**	**51%**
CAT3	12	0	0	0	**12**	**12%**
Total	**60**	**11**	**20**	**13**	**104**	**11%**
%	**58%**	**11%**	**19%**	**13%**		

Corpora		C2		C3	
	M1	M2	M3	M4	Total	%
CAT1	22	13	16	8	**59**	**40%**
CAT2	33	10	12	14	**69**	**47%**
CAT3	19	0	0	0	**19**	**13%**
Total	**74**	**23**	**28**	**22**	**147**	**13%**
%	**50%**	**16%**	**19%**	**15%**		

II. Three Corpora Overlaps Tables

Corpora	C1		C2		C3	
	M1	M2	M3	M4	Total	%
CAT1	9	6	12	3	**30**	**38%**
CAT2	21	4	8	7	**40**	**51%**
CAT3	9	0	0	0	**9**	**11%**
Total	**39**	**10**	**20**	**10**	**79**	**6%**
%	**49%**	**13%**	**25%**	**13%**		

Appendix E: Sub-corpora Loanwords & Loan Acronyms Results Overview

***Taʿrīb* Total No of Terms**	769
Total No. of Loanwords	680
%	88%
Total No. of Loan Acronyms	89
%	12%

Appendix F: Loanword Trends

I. Overall Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	769			
No. of Loanwords	714	55	344	152
%	93%	7%	45%	20%
CAT1	224	0	123	5
%	31%	0%	36%	3%
CAT2	324	55	177	147
%	45%	100%	51%	97%
CAT3	166	0	44	0
%	23%	0%	13%	0%

II. S1 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	146			
No. of Loanwords	134	12	51	26
%	92%	8%	35%	18%
CAT1	46	0	13	0
%	34%	0%	25%	0%
CAT2	63	12	31	26
%	47%	100%	61%	100%
CAT3	25	0	7	0
%	19%	0%	14%	0%

III. S2 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	80			
No. of Loanwords	75	5	46	21
%	94%	6%	58%	26%
CAT1	24	0	17	1
%	32%	0%	37%	5%
CAT2	32	5	21	20
%	43%	100%	46%	95%
CAT3	19	0	8	0
%	25%	0%	17%	0%

IV. S3 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	64			
No. of Loanwords	57	7	30	16
%	89%	11%	47%	25%
CAT1	17	0	7	0
%	30%	0%	23%	0%
CAT2	22	7	18	16
%	39%	100%	60%	100%
CAT3	18	0	5	0
%	32%	0%	17%	0%

V. S4 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	179			
No. of Loanwords	169	10	72	30
%	94%	6%	40%	17%
CAT1	54	0	30	2
%	32%	0%	42%	7%
CAT2	92	10	36	28
%	54%	100%	50%	93%
CAT3	23	0	6	0
%	14%	0%	8%	0%

VI. S5 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	117			
No. of Loanwords	108	9	61	25
%	92%	8%	52%	21%
CAT1	34	0	22	0
%	31%	0%	36%	0%
CAT2	44	9	32	25
%	41%	100%	52%	100%
CAT3	30	0	7	0
%	28%	0%	11%	0%

VII. S6 Loanword Trends

Loanword Category	Noun	Adjective	Naturalized	Inflectionally Active
Total No. of Loanwords	183			
No. of Loanwords	171	12	84	34
%	93%	7%	46%	19%
CAT1	49	0	34	2
%	29%	0%	40%	6%
CAT2	71	12	39	32
%	42%	100%	46%	94%
CAT3	51	0	11	0
%	30%	0%	13%	0%

Appendix G: Sub-corpora Arabic Compounding Results

I. Sub-corpora Arabic Compounding Overall Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	152	106	20	8
Total No. of Compounds	286			
Compounding Form %	53%	37%	7%	3%

II. S1 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	22	22	4	2
Total No. of Compounds	50			
Compounding Form %	44%	44%	8%	4%

III. S2 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	41	16	4	2
Total No. of Compounds	63			
Compounding Form %	65%	25%	6%	3%

IV. S3 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	53	26	4	2
Total No. of Compounds	85			
Compounding Form %	62%	31%	5%	2%

V. S4 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid
No. of Compounds	7	9	2
Total No. of Compounds	18		
Compounding Form %	39%	50%	11%

VI. S5 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	5	7	1	1
Total No. of Compounds	14			
Compounding Form %	36%	50%	7%	7%

VII. S6 Arabic Compounding Results

Compounding Form	*ʾIḍāfa*	*Naʿt*	Hybrid	Negative
No. of Compounds	24	26	5	1
Total No. of Compounds	56			
Compounding Form %	43%	46%	9%	2%

Appendix H: Overall Results of C3 Mechanisms for Terms Appearing in both Arabic and Latin Scripts

Mechanism	M1	M2	M3	M4
No. of Terms Produced by Mechanism	479	77	78	88
Total No. of Terms	722			
Mechanism %	66%	11%	11%	12%
No. of Arabic and Latin Script Terms	2	3	7	23
Total No. of Terms	35			
Arabic and Latin Scripts %	6%	9%	20%	66%