Design and Frameworks with Experiment for
A Basic Guide of Theoretical Isnad Al-hadith Authenticity Examination

Nuzulha Khilwani Ibrahim[1,2, a], Suhaila Samsuri[2, b], Muhamad Sadry Abu Seman[2, b], Ahmed ElMogtaba Banga Ali[3, b], Mira Kartiwi[2, b], Abd Samad Hasan Basari[1, a]

[1]Department of Intelligent Computing and Analytics (ICA), Faculty of Information and Communication Technology (ICT), Universiti Teknikal Malaysia Melaka (UTeM), Malaysia
[2] Department of Information System (IS), Kuliyyah of Information and Communication Technology, International Islamic University Malaysia, Malaysia
[3] Department of Quran Sunnah (QS), Kuliyyah of Islamic Revelation Knowledge (IRK), International Islamic University Malaysia (IIUM), Malaysia
[a]{nuzulha, abdsamad}@utem.edu.my,
[b]{suhailasamsuri, msadri, elmogtaba, mira}@iium.edu.my

ABSTRACT
These days, there are an increasing number of studies in ICT which has been done on the hadith domain in different levels of knowledge of hadith. Several studies have been conducted in IT to validate the Hadiths where most of them are based on the matching of test Hadiths with the authentic Hadiths in the database. However, there are limited computerized-based studies to authenticate the Hadiths based on scholars' principles. Therefore, in this study, firstly, we need to identify the principles of isnad al-hadith authentication theoretically, which the specific criteria will be proposed based on previous studies and knowledge of Hadith. Secondly, a new mechanism will be developed to achieve the authentication of the new criteria of the isnad al-hadith. This mechanism development includes the integration between Islamic knowledge and Information Technology (IT) which we proposed to develop an algorithm based on existing framework with a new element of facts probing from Islamic knowledge. The accuracy of the authentication process on the knowledge domain of Hadith will be evaluated by domain experts through interviews.
Keywords: *Sahih Hadith evaluation, Isnad Al-hadith principles, authentication framework, computational design, preliminary experiment.*

1.0 INTRODUCTION

Hadith (plural is Ahadith) is what was transmitted on the authority of the prophet (PBUH): his deeds, sayings, tacit approvals, or description of his physical features and moral behaviors. Therefore, preservation of hadith after the death of The Prophet, Peace Be Upon Him (PBUH) is very important especially when the intrusion of fabricated hadith has started. The importance of Hadith preservation is mainly to protect the genuine hadiths from the fabricated ones, as well as to meet the needs for continuation of studies and preservation among scholars (Abdullah & Abdul Manas, 2006; As-Siba'ee, 2013; Zakaria Stapa, Noranizah Yusuf, 2012). Among the challenges to protect hadiths is to distinguish the authentic hadith. Currently there are a number of computer-based studies to validate the hadith where most of them are based on the matching of test data of hadith with the authentic hadith in the database (Bilal & Fit, 2015; Kamsin et al., 2014, 2015; Siddiqui, Saleh, &

Bagais, 2014). Hadith consists of three main things which are: isnad, matn and hukm. Isnad is the chain of transmitters who reported the text. Matn is the body of the hadith, where it reached by the chain. Hukm is the status or grade of the hadith, whether it is sahih, hasan, da'eef, or mawdhoo'. Hadith science is the knowledge or rules and maxims through which we know the conditions of the text and the transmission. Science of hadith is divided into two divisions: Ilm al-riwayah (science of transmission) and Ilm al-Dirayah (science of understanding).

In that case, this study will focus the three objectives which are: (1) the principles and specific criteria of the theoretical authentication of isnad al-hadith, (2) a new mechanism of authentication to be applied onto the criteria and (3) a validation phase including user acceptance test (UAT) and domain expert evaluation. Firstly, we need to identify the principles of isnad al-hadith authentication theoretically, which the specific criteria will be proposed based on previous studies and knowledge of hadith. Secondly, a new mechanism will be developed to achieve the authentication of the new criteria of the isnad al-hadith.

The mechanism development includes integration between Islamic knowledge and Information Technology (IT), in which we proposed to develop an algorithm based on existing framework (Stepney et al., 2005) with new elements of fact probing from Islamic knowledge (Abidin, 2013; Philips, 2005). The theoretical authentication will be adapted into this new mechanism, which inspired from a prophetic strategy, specifically the battle of Badr, on the battlefield. The mechanism produced will be incorporated to the experiments of Isnad Al-hadith authentication which the dataset has been extracted from a traditional book of Hadith narrated by Imam Al-Bukhari namely, Al-Adab Al-Mufrad.

The total number of hadiths in the book is 1,322 while the number of hadith with the status of Isnad is only to 85. Therefore, we are planning to test the 85 Hadiths with the related information of every hadith. There will be a lot of narrators involved in the authentication which will include multiple numbers of students and teachers of the narrators as well. The authentication will be using a common set of principles agreed by the majority of scholars ('Itar, 1988). The output from the authentication experiment will be compared with the manual authentication from the book.

There will be two groups of evaluation at the end of the development and experiments, which will be focused on human usability and authentication accuracy aspects. The system will be evaluated by a group of novices for user acceptance to of the authentication, while the accuracy of the authentication process on the domain of knowledge of hadith will be evaluated by domain experts through interviews.

2.0   PROBLEM DETAILS

2.1 Existing Studies

The computer-based studies in four levels of knowledge of hadith have been summarized as the follows:
- Level 1: Various topics of studies in Information and Communication Technology (ICT), applied to Hadith text
- Level 2: Classification of Hadith text

- Level 3: Authentication of Hadith text without principles
- Level 4: Authentication of Hadith using principles in Hadith science

In Malaysia recently, a big group of researchers has proposed a study to authenticate the text of hadith by matching the test data with the authenticated data in the database (Kamsin et al., 2015) which falls into Level 3. Anyway, the process of this types of authentication do not involve the principles of authentication based on Hadith science. However, there are limited computerized-based studies to authenticate the hadith based on muhaddithun's (scholars of hadith) principles which has been presented in a series of publication (K. A. Aldhaln, 2013; K. A. Aldhaln & Zeki, 2011, 2012; K. Aldhaln, Zeki, Zeki, & Alreshidi, 2012; Aldhlan, Zeki, & Zeki, 2010; Aldhlan, Zeki, Zeki, & Alreshidi, 2013a) little by little which falls into Level 4. Furthermore, the principles among various scholars of hadith (muhadditheen) are slightly different, so it is difficult to claim a model which can represent all principles of them with a good accuracy (K. A. Aldhaln, 2013).

Therefore, this study is intended to propose to narrow down the classification for all categories of Ahadith from the previous study (K. A. Aldhaln, 2013), into a limited authentication of a single part of Hadith. We chose to focus on the chain of hadith (isnad al-hadith) only, without combining with the text of hadith (matn al-hadith) because the studies on the text of hadith would be more difficult or rather impossible to be implemented in a computer-based program using the theoretical principles only. In addition, the studies of text of hadith have been much done in validation of hadith based on the comparison of the hadith request with the original sources in the database, as we referred earlier as a type of study to authenticate the hadith which falls into level 3.

Basically, this study is focusing on the second method of validation using one principles of Isnad al-hadith authentication, from the common agreed principles by the current scholars which been extracted from ('Itar, 1988). The principles then had been implemented into a computerized authentication using a new proposed mechanism with a built-in strategy of authentication which are inspired from the strategy of attack and defense of the prophetic battlefield.

Based on the levels of computer-based studies in hadith produced from this study whose the details can be found in (Ibrahim, Noordin, Samsuri, Seman, & Ali, 2016), this proposed study fall into level 4 in the same group with (K. A. Aldhaln, 2013; Ghazizadeh, Zahedi, Kahani, & Bidgoli, 2008). While another groups of studies of (Kamsin et al., 2014, 2015) fall into level 3. The details of each level attempting are briefly explained as the follows:
- Level 3: Making comparison of text of hadith from the database.
- Level 4: Making authentication to the chain of isnad based on the principles in hadith science.

Therefore, because this study falls into Level 4, we are only focusing on isnad but we go one step deeper than Level 3 as we include the principles of authentication from the science of hadith. On the other hand, there are studies in level 4 which has been explained and justified based on the studies from (K. A. Aldhaln, 2013; K. Aldhaln et al., 2012; Aldhlan et al., 2013a) which they are authenticating the hadith using classifier, or to be more precise they are doing classification using data mining technique which involve both parts of hadith, which are matn al-hadith and isnad a-hadith.

2.2 Proposed Isnad Authentication

As we have discussed briefly, the problem in the earlier section, compared to the existing studies is doing classification of hadith based on chain and text of hadith (K. A. Aldhaln, 2013; Aldhlan, Zeki, Zeki, & Alreshidi, 2013b). Our proposed model will be doing more specific task to authenticate one part of hadith, which is the chain of the hadith (isnad al-hadith) only. In order that the justification to be more specific, authentication on isnad is because to have more focus on one part of hadith, in order to make sure that the study on the focused part to be more thorough and comprehensive. The explanation on thorough and comprehensive model will be described in the next paragraph. A specific model is important in a way to obtain a better accuracy of authentication at the end of the study.

Furthermore, the study is proposing a different set of criteria for isnad authentication compared to the existing studies in (K. A. Aldhaln, 2013; Aldhlan et al., 2013b). The existing criteria is using 4 main principles which have been expanded as (Principle 1) Reliability of the narrators, (Principle 2) Preservation of the narrators, (Principle 3) Defect of the chain of narration, (Principle 4) Connected chain, detailed out as DOD, Student of, Teacher of, and matched student-teacher.

The new proposed set of principles is expected to give the same significance of output in the process to find the authentic hadith. However, the new proposed set of principle can only be simplified this way to find the authentic hadith only, but not applicable to find the other category of hadith such as hasan, da'if or mawdoo'. As another limitation to the result of authentication process, we are not going to test the difference of precision values between two set of authentication principles with combination and separated value. As has been mentioned earlier, the model has been designed to be more comprehensive since we put a thorough analysis on the criteria of the second principle, the connected chain. To be more comprehensive here is specifically to pointing out one new criteria in the principle compared to existing studies in [9], [10], [12], [13], which is the tabaqat, or the generation of narrator. One of the justifications to be more comprehensive is in the way to get more accuracy of the isnad authentication. However, as it has been applied to the first principle, and as another limitation to the result of authentication process, we are not going to test the difference of precision values between two set of authentication principles with and without tabaqat.

3.0   RESEARCH FRAMEWORK

The three objectives of this study are: (1) the principles and specific criteria of the theoretical authentication of isnad al-hadith, (2) a new mechanism of authentication to be applied onto the criteria and (3) a validation phase including user acceptance test (UAT) and domain expert evaluation. Firstly, we need to identify the principles of isnad al-hadith authentication theoretically, which specific criteria will be proposed based on previous studies and knowledge of hadith. Secondly, the new mechanism will be developed to achieve the authentication of the new criteria of the isnad al-hadith.

This mechanism development includes the integration between Islamic knowledge and Information Technology (IT) which we proposed to develop an algorithm based on existing framework (Stepney et al., 2005) with a new elements of fact probing from Islamic knowledge (Abidin, 2013; Philips, 2005).

The theoretical authentication will be adapted into this new mechanism, which inspired from a prophetic strategy, specifically the battle of Badr, on the battlefield. The mechanism produced will be incorporated to the experiments of Isnad Al-hadith authentication which the dataset has been extracted from a traditional book of Hadith narrated by Imam Al-Bukhari namely, Al-Adab Al-Mufrad. The total number of ahadiths in the book is 1, 322 while the ahadith with the status of Isnad availability is only to 85. Therefore, we are planning to test the 85 Hadith with the related information of every hadith.

There will be a lot of narrators involved in the authentication which it will include multiple numbers of students and teachers of the narrators as well. The authentication will be using common principles agreed by the majority of scholars ('Itar, 1988). The output from the authentication experiment will be compared with the manual authentication from the book. There will be two groups of evaluation at the end of the development and experiments, which will be focused on human usability and authentication accuracy aspects. The system will be evaluated by a group of novices for user acceptance to of the authentication, while the accuracy of the authentication process on the domain of knowledge of hadith will be evaluated by domain experts through an interview.

We have proposed a new research framework for this research which comprises literature review as a basic stage of the problem and related studies to it. From the literature review, we identified the problem specifically based on hadith science before we move into two branch of activities. The first branch of the activities is the data collection and manual analysis of the specific problem. The second branch of the activities is focusing on the mechanism development where it includes mechanism identification based on prophetic strategy, mechanism modelling, development of authentication, authentication validation and finalization of isnad al-hadith authentication. Figure 1 illustrates the proposed research framework.
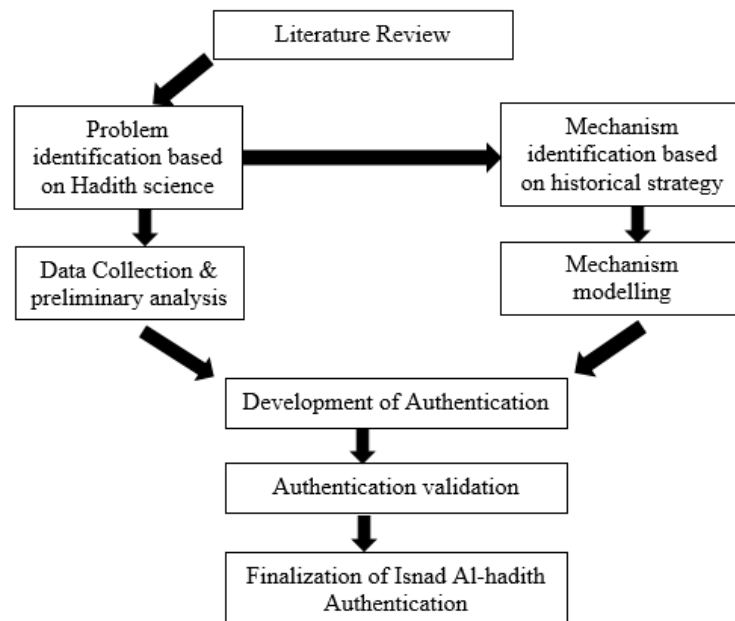

Figure 1. Proposed Research Framework

4.0   ISNAD AUTHENTICATION FRAMEWORK

The first objective of this study is to identify a new set of criteria for isnad al-hadith authentication. The selection of the new set of criteria will be based on principles of authentication theoretically based on science of hadith, as well as the existing studies of hadith authentication from previous research. The proposed authentication includes proposed framework of authentication has been represented in Figure 2.
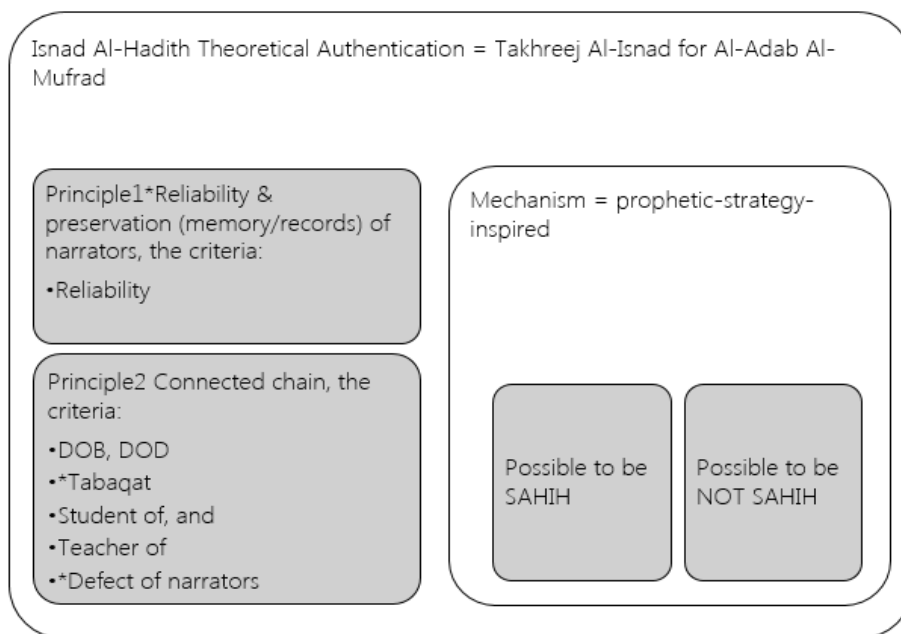

Figure 2. Proposed Framework of Theoretical Isnad Authentication

The proposed steps of authentication which has been represented in Figure 3 has been adapted from the previous study of classification of hadith using the principles of authentication in science of hadith (K. A. Aldhaln, 2013; K. Aldhaln et al., 2012; Aldhlan et al., 2013b).
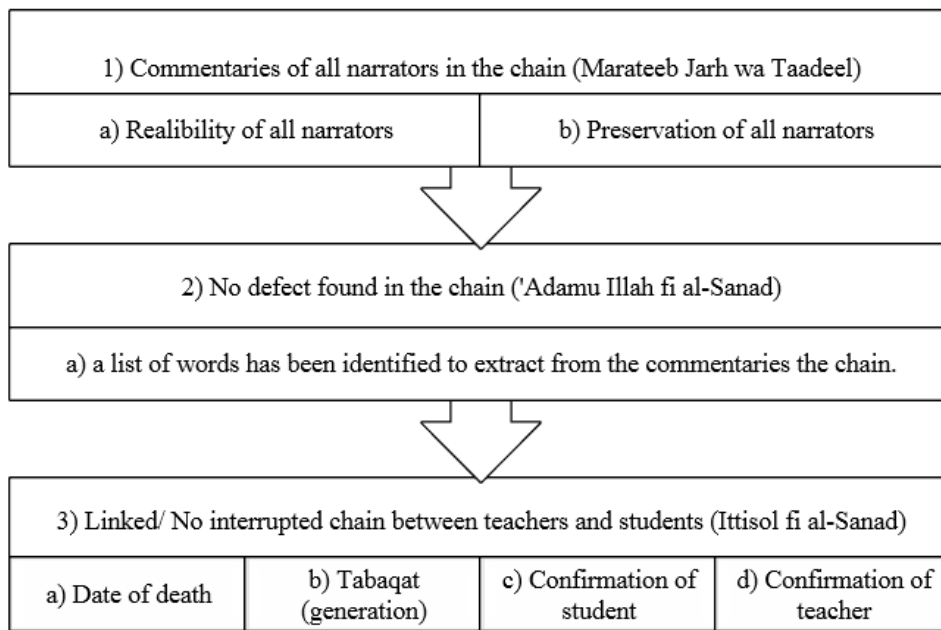
Figure 3. Proposed Framework of Isnad Authentication Steps, adapted from (K. A. Aldhaln, 2013)

Meanwhile, the variables of the study which has been proposed in a framework has been presented in Figure 4.
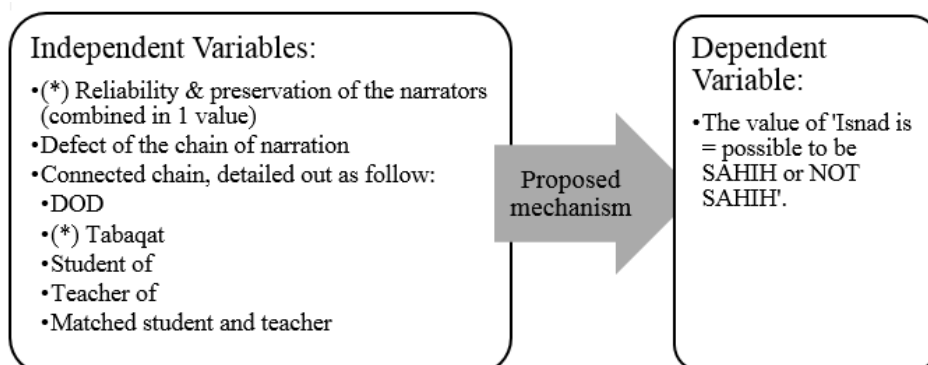
Figure 4. Proposed Framework of Isnad Authentication Variables

The details of our proposed study can also be found in the previous publication (Ibrahim, Noordin, et al., 2016; Ibrahim, Samsuri, Seman, Ali, & Kartiwi, 2016).

5.0   AUTHENTICATION DATA

5.1 Main Source of Data

The main source of the data is a traditional *Hadith* book namely *Al-Adab Al-Mufrad* (Ismail, 1989), narrated by Abu Abdillah Muhammad bin Ismail bin Ibrahim bin Al-Mughirah Al-Bukhari, or well known as *Al-Imam Al-Bukhari*. The book contains matan (text of H*adith*), sanad (chain of narrators of *Hadith*) and status/ *hukm* of *sanad*; *sahih/ hasan/ dhoif*, from a *Takhreej* book ie. *Al-Aadab al-Mufrad BiTaaleeqaat*. The source of data is not only for

selected themes, but based on major requirement which we must have a status/ hukm of sanad for each *Isnad*/ data; where we managed to have only 85 data which satisfies our major requirement from this book.

5.2 The Author: Imam Al-Bukhari

The author of the book Al-Adab al-Mufrad is Abu 'Abdillah Muhammad ibn Ismaa'eel ibn Ibraheem ibn al-Mugheerah ibn Bardizbah al-Ju'fee al-Bukhari (19 July 810-September 870), commonly refered to as Al-Imam Al-Bukhaaree or Imam Bukhaaree. He was a Persian Islamic scholar who was born in Bukhara (the capital in Uzbekistan). He also authored the most regarded authentic hadith collection known as Sahih al-Bukhari.

5.3 Dataset Details

This is a list of themes in the book. So, the data will be extracted from the range of the following themes randomly, based on the availability of the manual authentication by established scholars whose status is '*SAHIH*'. There is a major requirement in data selection process of hadith as it had been mentioned in the scopes of raw data. The requirement is regarding the availability of the status for each isnad al-hadith. Therefore, we are not going to select the hadith based on any theme specifically, as all the themes been presented in Table 1.

Table 1. Themes in Al-Adab Al-Mufrad

Themes in Al-Adab Al-Mufrad		
Bir waalidaani/ Parents	Ties of Kinship	Mawlas
Looking after Girls	Looking after children	Neighbors
Generosity and orphans	Children Dying	Being a Master
Responsibility	Correctness	Dealing with people cheerfully
Consolation	Dealings with people and good character	Cursing and defamation
Praising people	Visiting and guests	The elderly
Children	Mercy	Social behavior
Separation	Advice	Defamation
Extravagance in building	Compassion	Attending to this world
Injustice	Illness and visiting whose who are ill	General behavior
Supplication	Guests and spending	Speech
Names	Kunyah	Poetry
Words	General behavior	Omens
Sneezing and yawning	Gestures	Greeting
Asking permission to enter	People of the book	Letters and greetings
Gatherings	Behavior with people	Sitting and lying down
Mornings and evenings	Sleeping and going to bed	Animals
Midday naps	Circumcision	Betting and similar pastimes
Various	Aspects of behavior	Anger

The sample of raw data is shown in Figure 5.

> (باب تعلموا من أنسابكم ما تصلون به أرحامكم)
>
> 72 ـ حدثنا عمرو بن خالد قال حدثنا عتاب بن بشير عن إسحاق بن راشد عن الزهري قال
> حدثني محمد بن جبير بن مطعم أن جبير بن مطعم أخبره أنه سمع عمر بن الخطاب رضي الله
> عنه يقول على المنبر : تعلموا أنسابكم ثم صلوا أرحامكم والله إنه ليكون بين الرجل وبين
> أخيه الشيء ولو يعلم الذي بينه وبينه من داخلة الرحم لأوزعه ذلك عن انتهاكه
> قال الشيخ الألباني : حسن الإسناد وصح مرفوعا

Figure 5. Sample of raw data from Al-Adab Al-Mufrad

6.0 DATA PRE-PROCESSING

The details of the manual isnad authentication are shown in the following numbered paragraphs while the following table shows a sample of a raw data.

1. What we get from the book: (raw data from Adab Mufrad, and AM Taaleeqaat)
   a. Al-Adab Al-Mufrad is the primary book, to get the following data:
      i. A complete sanad of the hadith.
      ii. ID of hadith in the book, which then will be used as a primary key.
   b. AM Taaleeqaat is a secondary book, to get the following data:
      i. Topic of hadith.
      ii. ID of topic.
      iii. ID of hadith in the book (the primary key of the dataset).
      iv. A complete matn of hadith with tashkeel.
      v. Status/ hukum of sanad from established scholar's authentication.
   c. Source/ name of book where hukum for sanad retrieved from.

> (باب تعلموا من أنسابكم ما تصلون به أرحامكم)
>
> 73 ـ <u>حدثنا أحمد بن يعقوب قال أخبرنا إسحاق بن سعيد بن عمرو أنه سمع أباه يحدث عن بن عباس أنه قال :</u> احفظوا
> انسابكم تصلوا أرحامكم فإنه لا بعد بالرحم إذا قربت وإن كانت بعيدة ولا قرب بها إذا بعدت وإن كانت قريبة وكل رحم
> أتيه يوم القيامة أمام صاحبها تشهد له بصلة إن كان وصلها وعليه بقطيعة إن كان قطعها [ص 40]
> قال الشيخ الألباني : صحيح الإسناد وصح مرفوعا

2. What we store into our database:

Hadith ID	Isnad	Matn	Status/ hukm of isnad al-hadith	Source of status/ hukm
73	حدثنا أحمد بن يعقوب قال أخبرنا إسحاق بن سعيد بن عمرو أنه سمع أباه يحدث عن بن عباس أنه قال :	(احفظوا أنْسَابكُم تصلوا أرحَامَكُم فإنه لا بُعْدَ بالرحم إذَا قَرُبَت وإن كانت بَعيدةً ولا قُرْب بها إذا بُعدَت وإن كانت قريبة ، وكلُّ رحم أَتيةٍ يوم القيامة أمام صاحِبها تشهد له بصلةٍ ، إن كان وصلها ، وعليه بقَطيعةٍ إن كان قطعها)	حسن الإسناد	((السلسلة الصحيحة)) (277)

3. Preparation for list of dataset into a database
   a. List of name of narrators, including: (*Taqreeb Tahzeeb/ Tahzeeb Kamal – Ma Ismuhu/ Tabaqaat al-Mukthireen*)
      i. Real name.
      ii. Father's name (and grandfather's name if relevant)
      iii. Kunyah.
      iv. Laqab.
   b. Martabat of all narrators (2 in 1 = reliability & preservation).
   c. 'Illah for all narrators (to be detected as 'illah for sanad).
   d. Date of death (DOD of all narrators).
   e. Tabaqat of all narrators.
   f. Student of all narrators.
   g. Teachers of all narrators.

4. How do we process in the main program, before using the algorithm (data from pre-processing stage):
   a. Receiving input from request (user) - from a list of pre-processed data.
   b. Tagging isnad and matan. Display to user.
   c. Extracting the narrators' name from the isnad, to check the real name from database.

7.0 PRELIMINARY FINDING FROM INFORMATIONAL DATA

There are several studies which have been conducted on the extraction and retrieval of Hadith's narrators and Arabic character (Aldhlan et al., 2013b; Harrag, 2014; Harrag, Alothaim, Abanmy, Alomaigan, & Alsalehi, 2013; Harrag, Hamdi-cherif, Al-salman, & El-qawasmeh, 2009; Harrag, Hamdi-Cherif, & El-Qawasmeh, 2008; Mustafa & Najeeb, 2016a, 2016b; M. Najeeb, Abdelkader, Al-Zghoul, & Osman, 2015; M. M. Najeeb, 2014, 2015; Noordin & Othman, 2006; Othman & Wahid, 2014; Rahman, Bakar, & Sembok, 2010; Rasyidi, Romadhony, & Wibowo, 2013; Rebhi S. Baraka; Yehya M. Dalloul, 2014; Siddiqui, Saleh, & Bagais, 2014) including our earlier publications in this study (Ibrahim, Noordin, et al., 2016; Ibrahim, Samsuri, et al., 2016).

In this study, the name of the narrators in the following table is extracted from a Shamela program -menu Tarjamah -book namely Ruwaatu Tahzeebeen and a variety sources of Shamela ("Ruwaatu Tahzeebeen, Shamela Program Ver 3.15," 2017, "Shamela Library," n.d., "Shamela Library Software Ver 3.15," n.d., "Shamela Library Software Ver 3.61," n.d.), which has been depicted as the following:

Sequence	Name extracted from sanad	Real name – from secondary source book	ID of narrators
Narrator 0	البخارى	محمد بن إسماعيل بن إبراهيم بن المغيرة الجعفى مولاهم ، أبو عبد الله بن أبى الحسن البخارى الحافظ (صاحب " الصحيح ")	__AB1__
Narrator 4	بن عباس	عبد الله بن عباس بن عبد المطلب بن هاشم بن عبد مناف القرشى الهاشمى أبو العباس المدنى (ابن عم رسول الله صلى الله عليه)	__IA1__

The process of the examination to identify the correct narrator is mentioned in the chain of narrator as follows:

- Tracing the succeeding narrators (students), from The Prophet.
- Tracing the preceding narrators (teachers), from Al-Bukhari.
- Then, the information details with the correct sequence of the narrators which are obtained from tracing the succeeding and preceding narrators (students and teachers).

The purposes of tracing the flow of narrators is to check the following:

- The narrator connected from teacher
- The narrator connected to student
- The correct flow of narrators sequentially
- The information criteria between preceding and succeeding narrators is matched

This process is done manually using a free accessible software, namely *Al-Maktabah Al-Shamelah* (after this will be called Shamela) in our preliminary experiment. The details of the experiment can be found in our coming publication. Tracing the succeeding narrators (students), from The Prophet is presented as below:

1. The subsequent narrator after (student of) The Prophet (PBUH) is Ibn Abbas. There is no list of students available for The Prophet (PBUH) from this menu in Shamela.

2. The student of Ibn Abbas is Sa'id bin 'Amru

3. The student of Sa'id bin 'Amru is Ishaq bin Sa'id

4. The student of Ishaq bin Sa'id is Ahmad bin Ya'kub

5. The student of Ahmad bin Ya'kub is Al-Bukhari

Tracing the preceding narrators (teachers), from Al-Bukhari is presented as below:

1. The teacher of Al-Bukhari is Ahmad bin Ya'kub

2. The teacher of Ahmad bin Ya'kub is Ishaq bin Sa'id

3. The teacher of Ishaaq bin Sa'id is Sa'id bin 'Amru

4. The teacher of Sa'id bin 'Amru is Ibn 'Abbas

5. The teacher of Ibn 'Abbas is The Prophet (PBUH)

Then, the information details with the correct sequence of the narrators which obtained from tracing the succeeding and preceding narrators (students and teachers), is presented as below:

1. The first narrator is 'Abdullah ibn 'Abbas

2. The second narrator is Sa'id bin 'Amru bin Sa'id

3. The third narrator is Ishaq bin Sa'id bin 'Amru

4. The forth narrator is Ahmad bin Ya'kub

5. The fifth narrator is Muhammad bin Isma'il bin Ibrahim, well-known as Al-Bukhari

The following table shows the result from the manual authentication:

Had ith No.	Narr ator in chain	Name in English	Name is Arabic	Tab aqat	Birth (H)	Deat h (H)	Ratib, Ibn Hajar, Taqreeb At-Tahzeeb
AM 73	N0	Al-Bukhari	محمد بن إسماعيل بن إبراهيم بن المغيرة الجعفى مولاهم ، أبو عبد الله بن أبى الحسن البخارى الحافظ (صاحب " الصحيح ")	11	194	256	جبل الحفظ و إمام الدنيا فى فقه الحديث
AM 73	N1	Ahmad bin Ya'kub	أحمد بن يعقوب المسعودى ، أبو يعقوب و يقال أبو عبد الله ، الكوفى	9	NA	200	ثقة
AM 73	N2	Ishaq bin Sa'id bin 'Amru	إسحاق بن سعيد بن عمرو بن سعيد بن العاص بن سعيد بن العاص بن أمية بن عبد شمس القرشى الأموى السعيدى الكوفى (أخو خالد)	7	NA	170	ثقة
AM 73	N3	Sa'id bin 'Amru	سعيد بن عمرو بن سعيد بن العاص بن سعيد بن العاص بن أمية القرشى ، أبو عثمان ، و يقال أبو عنبسة ، الأموى الدمشقى الكوفى	3	NA	120	ثقة
AM 73	N4	Ibn Abbas	عبد الله بن عباس بن عبد المطلب بن هاشم بن عبد مناف القرشى الهاشمى أبو العباس المدنى (ابن عم رسول الله صلى الله عليه)	1	NA	68	صحابى

The next step is to check the attributes of all narrators in the sanad. The list of attributes is as follows:

      a. Real name
      b. Martabat of all narrators (2 in 1 = reliability & preservation)
      c. 'Illah for all narrators (if any= to detect 'Illah for the sanad)
      d. Tabaqat of all narrators
      e. DOD of all narrators
      f. Student of all narrators
      g. Teachers of all narrators

8.0   EXPECTED INPUT AND OUTPUT

8.1   Expected Input

The expected input of the program is a hadith complete with isnad (chain of narrators) and matn (text of hadith). The input should come from the pre-processed dataset within the scopes. Sample of input is shown in the Table 2.

Table 2. Sample input for the proposed authentication.

حدثنا ,أحمد بن يعقوب, قال أخبرنا ,إسحاق بن سعيد بن عمرو, أنه سمع ,أباه, يحدث عن ,بن عباس, أنه قال :

8.2   Expected Output

The expected output of the program is a Boolean value (True/False) as in the Table 3.

Table 3. Sample output for the proposed authentication.

Boolean value (True/ False) : Possible to be Sahih Isnad / possible to be NOT Sahih Isnad	TRUE

However, it is highly important to note here that the output produced from this partial theoretical authentication will not indicate the hukm or status of the isnad al-hadith. This is because the authentication carried out in this study will not include all criteria to be validated for an isnad al-hadith to be authentic, especially the criteria of journey of narrators as well as the possibilities of unconnected chain to be occurred. Therefore, to find the accuracy for this partial theoretical authentication, the authentication value from this study will be slightly inexact if compared to the authentication value from the established scholar in the traditional book.

9.0   CONCLUSION

This paper has been discussing about the method and steps on how to meet the objectives outlined for this study, which are to find the principles and specific criteria of the theoretical authentication of isnad al-hadith. The first and second part of the paper are discussing about the development of authentication and its mechanism. While the last part of the paper includes the expected input and output for the experiment as well as the evaluation strategy, both qualitative and quantitative methods. The details of our proposed study can also be found in the previous publication (Ibrahim, Noordin, et al., 2016; Ibrahim, Samsuri, et al., 2016)

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