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Mapping Study Papers discussed in:

Trust Factors in Healthcare Technology: A Healthcare Professional Perspective

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It contains (a) mapping study review protocol and (b) the list of mapping study papers identified during our research.

Overview

This is the protocol that under-pins the study referenced in "*Trust Factors in Healthcare Technology: A Healthcare Professional Perspective*". In the research literature, we examined the concept of trust in healthcare technology, how the technology is accepted, and what is the criteria for its use. We have employed mapping study guidelines presented by Petersen et al. (2015). Our motivation to undertake a mapping study is to synthesize evidence, and bring about some structure to this research area - *HCT trust factors demonstrated by healthcare professionals*. Considering the broad nature of technological use in healthcare, we argue that stakeholders need to have a set of criteria by which they can assess the level of trustworthiness of a given technology.

The review protocol is divided into sub-sections i.e. population and effect, Search strategy, study selection and information extraction. The details are given below.

1. Population and Effect

The population consist of healthcare professionals or decision-makers who introduce new healthcare technology within the healthcare practice. It will have effect on those healthcare professionals, who use or are going to use healthcare technology by helping them have some criteria about trusting these healthcare technologies.

2. Search Strategy

❖ **Source Selection Criteria:**

Source selection is based on the following criteria:

- High quality sources/peer reviewed sources
- Recommended for systematic review by other studies
- Accessibility to the sources

❖ **Study language**

Study language is English.

❖ **Source Identification**

The first step was the creation of search strings with regards to the research interest specified earlier. The two main keywords in all of the search strings were “healthcare” and “technology”. The “*” symbol was used to retrieve the derived words from the previous prefix for instance the words trustworthy and trustworthiness can be included in the derivation from trust*. These search strings were applied to various scientific bibliographic databases (listed in Table 1) and the sole purpose of this activity was to identify primary studies.

Both automatic and manual searching(snowballing) is done to identify the relevant literature.

- **Automatic Search:** Finding primary studies using the search terms through the defined search sources. Search strings are constructed using Boolean AND’s and OR’s and some of key words based on research questions.
  - **Search Term:** (*"Health care" OR Healthcare OR “Connected Health”) AND (Trust*) AND (Software OR “Information Technology” OR “Information System”)*
- **Manual Search (Snowballing):** Tracking related references from the primary studies which are found by automatic searching.

Table 1: List of Databases and their URL’s

Sr. No.	Name	URL
1	CINHAL	https://www.ebscohost.com/nursing/products/cinahldatabases/cinahl-complete
2	Embase	https://www.embase.com
3	IEEE Xplore	http://ieeexplore.ieee.org
4	Science Direct	http://www.sciencedirect.com
5	Scopus	https://www.scopus.com/home.uri
6	Springer Link	http://www.springerlink.com
7	Web of Science	https://webofknowledge.com

The list of search strings applied in the databases is given below. (Note: There were slight changes made in the search strings, because every database accepts different syntax).

➢ **CINHAL**

TITLE-ABSTR-KEY (("Health care" OR Healthcare OR “Connected Health”) AND (Trust*)) and
TITLE-ABSTR-KEY (Software OR “Information Technology” OR “Information System”)

Number of Results= 844 Search Date: 22/05/2017

➢ **Embase**

TITLE-ABSTR-KEY (("Health care" OR Healthcare OR “Connected Health”) AND (Trust*)) and
TITLE-ABSTR-KEY (Software OR “Information Technology” OR “Information System”)

Number of Results= 4194 Search Date: 23/05/2017

➢ **IEEE Xplore**

(("Health care" OR Healthcare OR “Connected Health”) AND (Trust*) AND (Software OR “Information Technology” OR “Information System”))

Number of Results= 336 Search Date: 16/05/2017

- **Science Direct**

TITLE-ABSTR-KEY (("Health care" OR Healthcare OR “Connected Health”) AND (Trust*)) and TITLE-ABSTR-KEY (Software OR “Information Technology” OR “Information System”)

Number of Results= 116 Search Date: 16/05/2017

- **Scopus**

TITLE-ABS-KEY (("Health care" OR Healthcare OR “Connected Health”) AND (Trust*) AND (Software OR “Information Technology” OR “Information System”))

Number of Results= 1255 Search Date: 18/05/2017

- **Springer Link**

(healthcare) AND trust* AND technology

Number of Results= 671 Search Date: 16/05/2017

- **Web of Science**

(("Health care" OR Healthcare OR "Connected Health") AND (Trust*) AND (Software OR "Information Technology" OR "Information System"))

Number of Results= 263 Search Date: 24/05/2017

3. Studies Selection

The list of inclusion and exclusion criteria are depicted in Table 2.

Table 2: Studies Inclusion(I) and Exclusion(E) Criteria

Inclusion (I) and Exclusion (E) criteria
I1: Original and peer-reviewed research written in English;
I2: Qualitative, quantitative or mixed methods research;
I3: Study on healthcare technology;
I4: Research that suggests/ recommends or contains/defines at least one trust attribute for healthcare technology;
I5: Research aimed at factors that influence trust or the intention to use technology in healthcare practice;
E1: White or grey literature;
E2: Presents research noted in a prior/subsequent paper.

- **Procedures for Study Selection**

This section explains the study refinement process by describing the details of three iterations.

- **First Iteration:**

Titles and abstracts were screened by one researcher [R1]. Out of the total 7,678 studies, 956 studies were removed by EndNote software as they were duplicated.

- **Second Iteration:**

From 6,723 studies, 340 full articles were selected by R1 through applying the inclusion exclusion criteria shown in table 2. For validation purpose, random 44 studies out of 6723 studies were selected and sent to two researchers [R2] [R3]. Where there were conflicts with inclusion of studies, this discrepancy was resolved by arbitration and mutual consent. In next step, again inclusion exclusion criteria were applied by R1 on the remaining 340 articles which resulted in 294 articles being excluded. For validation of the excluded articles, a randomly chosen 40 studies from these 294 articles were reviewed by R2, and agreement was observed. Out of 46 included articles, four were found to be replicated and were removed from our study.

- **Third Iteration:**

In third iteration, using the snowball method, references from included articles were checked to ensure inclusion of relevant studies (where authors published results in two separate venues) which may have been overlooked. Five articles were added resulting in a total of 47 articles presented in this study.

4. Information Extraction

For data extraction, we conducted a careful full-text read of the 47 selected primary papers. The first thing that was identified was the year of publication so that the analysis can be presented chronologically. We extracted and recorded the relevant data from read papers that could be useful in answering the research questions. The method used for the storage of the extracted data was tabulation method described in table 3.

Table 3: Data Extraction Form

Study Code:	
Journal/Conference:	**Data extracted by:**
Year:	**Date of completion:**
Research method:	
Outcomes relevant to the review:	
Framework /Model OR approach name if available	
Description (characteristic) about Trust/Trustworthiness	
Key facilitators/barriers of trust	
Type of HCT described	
Description of HCP if available	
References to Framework /Model if available	

Results from Literature:

The final categorisation of trust factors is presented in Table 4 and Table 5 with the publication they occurred in. Globally, various types of factors (technological, human, and organisational) influenced the success or failure of HCT trust. Factors facilitating HCT trust tended to be mostly related to the perception of the characteristics of the specific HCT application and to organisational aspects.
Barriers were related to HCT characteristics too, but were also found at the individual, professional, and organisational levels. Some of the trust factors identified were 'multilevel' since they could affect more than one level (e.g. ease of use can be seen as a characteristic of the HCT but is also related to familiarity with HCT at the individual level), and they were described as a facilitator by some and as a barrier by others.

Table 4: Trust Facilitators

Trust Facilitators	Publications
Compatibility	S10,S13,S21,S28,S37,S42
Security	S10,S14,S18,
Reliability	S3,S14,S21,S31,
Functionality	S3,S11,S16,S21,S22,S31,S38,S42,
Usability	S1,S10,S13,S32,S43
Knowledge	S6,S13,S18,S35,S39,S40,S41,
Positive attitude towards usage	S3,S5,S8,S9,S13,S14,S29
Perceived system usefulness	S1,S3,S5,S8,S9,S13,S26,S28,S29,S34,S35,S36,S37,S39,S41,S42,S44,S46,S47
Training and technical support	S5,S11,S14,S39,S46

Table 5: Trust Barriers

Trust Barriers	Publications
Privacy concerns	S3,S7,S8,S11,S12,S17,S18,S19,S23,S24,S25,S28,S32,S43
Security issues	S7,S8,S12,S15,S16,S19,S22,S23,S24,S32,S43,
Lack of efficiency	S11,S12,S15,S31,
Cost issues	S4,S6,S11,S14,S17,S25,S32,S42,S44,S45,S46
Poor quality	S1,S3,S12,S15,S19,S23
Design & technical concerns	S6,S14,S18,S23,S30,S33,
Lack of knowledge	S1,S15,S20,S27,S31,
Negative attitude towards usage	S1,S5,S8,S14,S20,S32
Perceived risks of usage	S9,S10,S11,S13,S22,S28,S31,S38,
Task complexity	S11,S15,S17,S30,
Poor training and technical support	S2,S11,S17,S40,S45,S47
Governance/regulatory compliance and policies	S2,S11,S12,S19,S22,S34,S47

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