A Meta-Requirement Approach to Validate User Requirement Specification: Threshold Definition

Muhamad Idaham Umar Ong
Faculty of Computing
Universiti Malaysia Pahang Al-Sultan Abdullah
26600 Pekan
Pahang, Malaysia
idaham@ump.edu.my

Mohamed Ariff Ameeden
Faculty of Computing
Universiti Malaysia Pahang Al-Sultan Abdullah
26600 Pekan
Pahang, Malaysia
mohamedariff@ump.edu.my

2023 IEEE 8th International Conference On Software Engineering and Computer Systems (ICSECS) | 979-8-3503-1093-1/23/$31.00 ©2023 IEEE | DOI: 10.1109/ICSECS58457.2023.10256371

***Abstract*— The software requirement specification document is critical for ensuring that software development projects are completed on time, within budget, and meet the needs of all stakeholders. User requirement completeness refers to the extent to which user requirements accurately and fully capture the needs and expectations of stakeholders for a given system or application. The completeness of user requirements is critical for the successful design and implementation of information systems, as incomplete requirements can lead to a range of issues, including system failure, delays, and cost overruns. The author has developed a meta-requirement validation approach to validate the completeness of a set of requirements. Based on a numerical reading, the user of the approach will be able to determine the completeness of the requirement. This publication's main objective is to identify the threshold value through a method of literature search. The identified threshold value will be used to determine the minimum reading for the result to be deemed complete. The result of a 70% value has been identified to be suitable for the use of the validation approach.**

Keywords—Requirements Engineering; Design Science Research; Information Systems; Information System Design Theory; Meta-requirement

I. INTRODUCTION

Design science research (DSR) is a field that focuses on developing and evaluating innovative artefacts or designs to solve complex problems in various domains such as information systems, engineering, and healthcare. DSR is an iterative process that involves creating, testing, and refining the artefact until it meets the desired performance requirements and adds value to the relevant stakeholders. DSR aims to contribute to the advancement of knowledge by providing practical solutions to real-world problems.

Part of this area of knowledge is being known as information system design theory (ISDT). The field of ISDT is a theory that provides a framework for designing and developing effective Information Systems (IS) [1]. It derived from the area of knowledge of Design Science Research (DSR). It is a key concept in DSR, whereby it is a problem-solving paradigm that aims to create innovative solutions to complex problems through design, implementation, and evaluation [2]. ISDT focuses on the design of IS artefacts, such as databases, software systems, and user interfaces, by providing a set of guidelines and principles that can be used to ensure their effectiveness in addressing specific business needs. According to Hevner et al. (2010), ISDT is a critical component of DSR, as it provides a theoretical foundation for the creation of practical and useful IS artefacts.

From there, the author has proposed the knowledge of the stated field in the field of Software Engineering. The solution will work in the context of project management, where its main aim is to assist in the validation of requirements completeness with the assistance of Meta-requirement. Meta-requirements are high-level requirements that define the properties or characteristics of the requirements themselves, rather than the product or system being developed. These requirements are critical for ensuring the quality and effectiveness of the software development process.

Ultimately, the solution will produce a numerical reading that reads the successful traceability between the meta-requirement and requirements. This reading will define the completeness status of the set of requirements. The next course of action is to define the suitable threshold value that must be achieved to differentiate the result of the executed trace. In this section, the research will discuss the threshold value that has been agreed upon for measuring the completeness of requirements. The threshold value will be presented as a percentage of pattern similarity or adherence when comparing the User Requirements (UR) mapping to the defined Meta-Requirements (MR).

The objective of the publication is to

1. Execute a literature review
2. Analyse
3. Defining the threshold value.

This paper will be structured in the following: introductory, literature review, methodology, result, and conclusions.

II. RELATED LITERATURE

A. Design Science Research and Information System Design Theory

Design Science Research (DSR) is a problem-solving approach that involves the creation of innovative solutions through a process of design, implementation, and evaluation. Information System Design Theory (ISDT) is a theory that