Input Data Collection for the Fit-Gap Analysis Method: a Literature Review

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***Abstract*—Development of Enterprise Resource Planning (ERP) systems has become an independent industry for the improvement of information systems. It can be stated that ERP systems are designed to support the operation of a company. The fundamental objective of the system is to create a business value that aims at reducing the time and costs of the business while increasing the profit of the company. Although the adaptation and deployment of the ERP system, in general, are complex and protracted processes that require a lot of resources, the obtained results sometimes differ from the expected results of users. Mostly for that reason, there are incomplete internal enterprise business processes and software requirements analysis and development. Therefore, there is a need to determine the compliance of the main enterprise requirements and business processes with the ERP system. To choose the most appropriate ERP system, it is necessary to identify all possible methods of input data for the fit-gap analysis method. Thus, the main aim of the present study is to identify possible input data for the fit-gap analysis method, which can be used for the selection of the most appropriate ERP system.**

***Keywords*—Fit Gap analysis method, ERP systems, Input data.**

I. INTRODUCTION

The development of Enterprise Resource Planning (ERP) systems nowadays [1] has become an independent industry of information system development. It can be stated that ERP systems are designed to support the operation of the company [2]. The fundamental objective of the system is to create a business value [3] that aims at reducing the time and costs of the business while increasing the profit of the company [4]. There are several reasons as to why the ERP systems are underused, for example: (1) insufficient analysis and development of the enterprise internal business processes and software requirements, (2) need for new servers, (3) obtaining additional or new servers, (4) updates and other required specifications [5]. However, adjusting and introducing the ERP system, in general, are complex and time-consuming processes [6] [7] requiring many resources [8], and the obtained results tend to be different than the results expected by the users [4] [9].

Therefore, it is important to analyse compliance of the ERP system with the enterprise main requirements and business processes. Fit-gap analysis method is one of the ways [10] how to successfully choose the right ERP system [11]. Overall, there are many studies addressing selection and introduction of the ERP system [12]; however, studies on the use of the fit-gap analysis method in the process of adjusting the ERP system are not that common. These include scientific publications analysing the main input and output data types of the said method for ERP system projects.

Therefore, it is possible that there are unresolved challenges related to the identification of the main sources of information in the decision-making process of the fit-gap analysis [13], and not only for selecting the most suitable ERP system solution.

Analysing the collected scientific publications, it is important to identify all possible types of input data in the fit-gap analysis method and to determine whether the obtained output data comply with the expected results. Therefore, the following research questions are defined:

RQ1: What input data are identified by publications on the fit-gap method?

RQ2: Can these data be used in the fit-gap method for the purposes of ERP system development and deployment projects?

RQ3: How can these data be categorized?

RQ4: What output data should be received for the input data?

RQ5: What kind of improvements are available for the pre-defined fit-gap methods?

This publication contributes by identifying and collecting possible input data of the fit-gap analysis method used in the selection of the most suitable ERP system.

The rest of the paper is organized as follows: Section 2 details the research design process, describing the process of selection and analysis of scientific publications. The description of scientific publications and answers to research questions **RQ1**, **RQ2** and **RQ3** are given in

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Section 3. Section 4 addresses study questions where the input data are contrasted with the output data of fit-gap method, as well as identifies the possible improvements of the fit-gap analysis method. Finally, Section 5 presents conclusions related to literature review and suggests directions for further research.

II. RESEARCH DESIGN

The literature analysis of the publication is aimed at collecting scientific publications about the input data of fit-gap method in the ERP system development projects, devoting special attention to the need of identifying the ways for improvement of the already identified fit-gap methods. The process of literature analysis is based on a systematic literature analysis seeking for answers to the research questions. Therefore, scientific literature available in the scientific databases has been analysed within the framework of the present study.

The literature analysis (see Fig. 1) has been performed in 4 stages to identify and collect scientific publications addressing the input data of fit-gap method in the ERP system development projects.

First, it is necessary to define key words for literature selection. For the purposes of the present literature analysis, five key words have been identified. The following key words have been used in the selection process of scientific literature: "fit gap method erp data", "gap analysis method inputs", "gap analysis method inputs erp", "Fit-Gap Analysis inputs", "Gap Analysis inputs erp", "gap analysis erp artefacts", "gap analysis artefacts".

Scientific databases have been used to select scientific publications covering the time period starting with 2000. Once abstracts have been analyzed, Stage 3 involved selecting twenty scientific publications for closer review of the scientific literature source, including the previously conducted research into the use of the fit-gap analysis method in ERP projects.

Thereafter, the selected scientific publications have been assessed in full. To carry out an in-depth investigation of the issue addressed by the publication, special attention has been devoted to references in the main texts of the selected scientific publications. Out of all initially selected scientific publications, only three address the use of the fit-gap analysis method in the ERP system selection and deployment projects, allowing the author to answer the research questions. Since the previously conducted [14] study on the fit-gap analysis methods was also identified among the selected publications, the input data of the method mentioned in the sources of the said publication would also be studied when gathering the available input data type. To answer the research questions, overall 13 scientific publications will be analyzed in more detail.

The input data types in the identified scientific publications can be categorized in two groups: (1) input data, the source of which is the customer, and (2) input data, the source of which is the ERP system and its functional description.

After analysing the main texts of the scientific publications, it has been concluded that in order to answer research question **RQ2**, it is not necessary to carry out additional literature analysis because while identifying scientific publications during the process of abstract analysis, only publications addressing fit-gap analysis input data and their use in the ERP system development processes have been selected. The following sections offer a more detailed analysis of the scientific publications.

III. The Method Input Data

For the purposes of the fit-gap analysis method and ERP systems, the available literature does not provide a definition for the concept of "data", but it follows from the literature that "data" can be defined as quantitative facts or information on events [6], which can be processed and used to compare the ERP system with the requirements of the users.

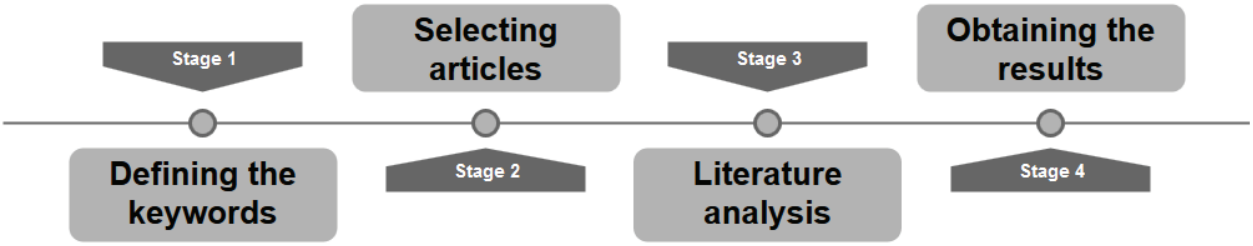

Fig. 1. Literature analysis process

This section collects and investigates not only scientific publications found in the process but also all pre-studied and analysed scientific literature [14], identifying input data types for the fit-gap analysis method. The section aims at answering research questions **RQ1**, **RQ2** and **RQ3**.

As previously mentioned, the input data of the analysis method can be divided into two categories: input data, the source of which is the customer and input data, the source of which is the ERP system and its functionality. Bearing in mind both categories, the identified scientific publications have also been categorized and analysed in detail (see Table 1). Overall, the author of the present study has found 13 scientific publications identifying business, functional and non-functional requirements and business processes as input data for the fit-gap method.

It has been identified in 13 scientific publications that the customer requirements are one of the input data types. In four out of 13 publications, the ERP systems and infrastructures have been specified as a type of input data.

However, three out of 13 publications argue that national legislation shall be considered when comparing customer requirements and ERP systems or selecting the ERP system.

TABLE I. CATEGORIZATION OF INPUT DATA

Input data type	Publication references
National legislation	[8], [15], [16]
Customer requirements	
Business requirements	[2], [4], [11], [15] – [21]
Enterprise business processes	[2], [8], [11], [15], [16], [18], [19], [21], [22]
Functional and non-functional requirements	[2], [4], [8], [16], [17], [19]
Not detailed	[23]
ERP system and infrastructure	
ERP systems and functionality, and business processes	[2], [15], [16], [19], [21], [22]
ERP system infrastructure requirements	[11], [18]
ERP system prototype	[20]
Not detailed	-

The analysis of scientific publications demonstrates that the most common input data types are business requirements, enterprise business processes and ERP system functionality and business processes. The customer's business requirements and processes can be regarded as the primary input data [8] divided into various enterprise events, enterprise operations, enterprise objects, metrics and data [17], [18], [21], activity diagrams, sketches, data vocabularies, and business process details [19]. The main ingredients of the business processes are client interviews and client enterprise business process observations [8], detailed descriptions of utilization cases (problem outline, assumptions, preconditions, prescriptions and statistics) [2].

After collecting the publications, it has been concluded that the best way how to improve the input data quality is to develop the business requirements in a working group composed not only of developers but also of customers [2]. It is also suggested to compile and describe the business processes in documents in a structured manner [2] by using pre-prepared templates [22]. This would allow incorporating the functional and non-functional requirements in the descriptions of business processes, as well as grouping and prioritizing the requirements according to a selection approach.

However, documentation is secondary data [8]. To prepare documentation, business processes are reviewed and documented to implement these business processes as part of a new solution. The requirement documents are composed of the business, functional and non-functional requirements [4]. The two main types of input data documentation arise therefrom: (1) specification of requirements of priority data software where all software requirements are categorized in the order of priority, (2) specification of software requirements including therein – for the purposes of the project development team – application requirements (describing customer needs with respect to software), process requirements (describing functions and tasks to comply with application requirements) and design requirements (describing requirements ensuring compliance with process) [11], [15], [16].

The category where input data are sourced from the ERP system and its functionality can be divided into three sub-categories. In six out of 13 scientific publications, authors argue that the ERP system functionality and ERP system business processes can be used as input data for the investigated comparison method. In two out of 13 scientific publications, authors argue that the ERP system infrastructure requirements can be used as input data, but only one publication addresses the ERP system prototype.

After an in-depth analysis of the scientific publications, it can be concluded that the national legislation can also be regarded as one of the input data categories. The national legislation does not address requirements defined by customers or requirements describing the ERP system, but instead deal with the legislation in the customer's country.

IV. FINDING THE METHOD OUTPUT DATA

Based on research question **RQ4**, the identified scientific publications have attempted to determine whether there is a relation between the input and output data. At first, all possible output data have been identified in each scientific publication (see Table 2).

The most common output data for the fit-gap method is the list of high-level ERP system functionality compliances/non-compliances against enterprise business processes, requirements and data. This is reflected in eight out of 13 scientific publications. Having gathered information from the publications, such output values contain descriptions and reviews of compliances and non-compliances between [22]: (1) main architectural elements, (2) solutions [19]; (3) enterprise, sectoral, integration and national legislation requirements [4], [15], (4) enterprise requirements [19] and (5) prevention of identified non-compliances, e.g., activities to be carried out [11] and assessment of work capacity thereof [4] and adjustment expenses [8], as well as suitability of the ERP system [23] and success factors of the ERP system [18].

TABLE II. POSSIBLE OUTPUT DATA OF THE METHOD

Output data types	Reference
List of high-level ERP system functionality compliances/non-compliances against enterprise business processes, requirements and data	[4], [8], [11], [15], [18], [19], [22], [23]
List of the most suitable ERP systems or the most suitable ERP system	[2]
Documentation on adjustment possibilities of the ERP functionality or *enterprise* business processes	[8], [17], [20], [21]
Suitability of an enterprise for introducing the ERP system	[16], [18]
Not mentioned	-

However, in four out of 13 publications the possible output data are documentation on the ERP system functionality or adjustment possibilities of the enterprise business processes. Statistically, the fit-gap methods offer less chances to obtain the list of the most suitable ERP systems or the most suitable ERP system or to determine suitability of the enterprise for the ERP system deployment. This is addressed only in three out of 13 publications.

V. CONCLUSIONS

Although the development of the Enterprise Resource Planning (ERP) systems has become an individual industry of information system development, one can still encounter cases when the ERP systems are insufficiently utilized for the purposes of enterprise business processes.

The present paper has attempted to identify and collect the possible fit-gap analysis input data used for the selection of the most suitable ERP system. The paper has also aimed at finding out whether the obtained output data comply with the expected results and whether it is possible to identify improvements of the existing methods based on the available information.

Within the framework of the study, 23 scientific publications have been investigated within the literature analysis finding answers to the three research questions: **RQ1**, **RQ2** and **RQ3**. Having gathered information about the questions under consideration, it can be stated that the most common type of input data is enterprise business requirements and processes, as well as ERP system functionality and business processes. However, for it to be possible to correctly use the said input data, it is necessary to develop a unified system for defining and describing input data and ensuring correct data input.

The author of the paper has strived to find a relation between input and output data (**RQ4**) and attempted to answer research question **RQ5**. Having analysed the identified publications, it has been concluded that the gathered information does not allow coming up with a clear answer to research questions **RQ4** and **RQ5**. Therefore, to answer research questions **RQ4** and **RQ5**, it is necessary to carry out an additional literature review, which is the next challenge in the study of the fit-gap analysis methods.

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