A Business Process Modelling and Notation Meta-Model Approach to Enhance Prioritization for Decision-making in Requirement Engineering

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***Abstract*—It is has always been the main focus of requirements engineer in making sure a set of optimal requirements is prepared in development of a project. With the current issue of getting the desired result, engineers would prioritize the set of requirements and utilize this to produce a list of optimal requirements. This paper will discuss some introduction of the evolution of software requirements prioritization, some related works, approach of conducting the research and finally discussing the expected result of this research. This will be the first step in the effort of translating Business Process Modelling (BPM) into its meaningful value to be used as a criterion in prioritizing Business Process (BP). During prioritizing BP, modelling usually provide decision-maker with only outcome of producing qualitative criterion without the basis of any facts and figures. The idea is to be able to derive a quantitative criterion from a model through the use of meta-modelling. The outcome of this research should be able to justify the need of prioritizing requirements based on its root, and that is business process.**

***Index Terms*—Business Process; Business Process Modelling; Quantitative Criterion.**

I. Introduction

Modelling is not just a tool to display a complex diagram with interconnected concepts from a text-based artefact, it's more that. The hidden potential and abundance amount of information within Business Process Modelling and Notation (BPMN) should be used to its fullest, especially in helping Requirements Engineer (RE) making decisions in prioritizing Business Processes. This research will aim in translating BPMN to quantifiable data and will be used to enhance the prioritization process of BP. But, what are the quantitative data that can captured for the sole purpose of prioritizing BP? And here we are passionate to prove and give answer to the final question, will the result enhancing the process prioritizing BP.

A. Core Idea

The novel idea is to take into account the hidden potential of modelling tools, in my case will be Business Process Modelling and Notation in the shoes of a decision-maker. How exactly you asked? By developing a meta-model to make quantification and this will provide concrete and justifiable basis to prioritize each of the related BP that will be involved within the software project development. The stated idea would be achieve by breaking down Business Process Modelling and Notation to its roots (meta-model) for the purpose of processing and analyzing information to be used in the business process prioritization. This result will play an important role in deciding the number of resources that should be spend for each of the listed business processes and will provide a clear justification that will be shown to the stakeholders.

Central hypothesis (es):

1. Development of meta-model to quantify existing BPMN
2. Approach will enhance the process of prioritization BP done by RE
3. Problem related to contradiction priority of BP between stakeholders and RE can be solved phase.

II. Related Works

This section will describe some of the related research that is done in the field of business process prioritization. This is to determine the basis of the propose research and also to rationalize the need of conducting further research in the field of business process prioritization. Noted, most of the research are quite extensive and covers more than just prioritization of business process. One research utilizes business processes from different projects to determine the priority of each projects. The research utilizes large amount of data in producing prioritization result, the data consist of evidences gather from previous projects, self-explanatory the name of this method is evidence-based management. Another example of project that worth mentioning is utilizing also another set of data, it is being called Search-Based Software Engineering (SBSE). Using existing and historical data of past projects to determine a set of requirements for a propose project. There is a small amount of research related to prioritizing the listed requirements.

A. The Interplay between Evidence and Judgment in IT Project Prioritization Process

The mentioned research is based on executing prioritization of which it project should be given more resources based on

evidence-management. The scope of study is in one company that involve two different department. In total of 21 different IT project is being included in this study. During the execution of this research, top management of the company and from both department are included in the presentation of finding, this is for the purpose of including their input in the prioritization process.

The research starts by getting decision from the case company to give green light on its proposal. Secondly is the development of a portfolio that will contains all the necessary information needed for executing the prioritization based on the proposed evidence-based management from all 21 IT projects. And the final step is developing another portfolio that will contain all the nested decisions on the 21 IT projects from both department Noted that this final portfolio is also containing information from different aspect such as experts, sponsors, networks, etc.

In a nutshell, there are thousands of existing techniques and methods available for the purpose of assisting decision-maker in prioritizing business processes in one or multiple projects. With the help of information technology, the role of these tools even extends through different project and it is integrated with the rest of the project team. Currently there are a lot of tools in the market that claimed that they could provide justifications based on comparing evidence in producing solution in helping decision-maker prioritization. (Dickinson et al., 2001 and Kester et al., 2011)

In the age of information on-demand, it is the role of IT experts to out-perform their predecessor in innovating and taking the current solution to the nest level. With what's to come in the near future, we can expect that IT has been and still will be the critical back-bone in any solution. With the current issue of business process prioritization, information system has been task with the responsibility of coming out with an infrastructure or solution that could assist and rationalize on each decision-making process by providing critically related on-demand information. (Davenport, 2010 and McAfee et al., 2012)

Even with many research being conducted in the field of prioritizing business processes. Many still believes that in which point of view a project is being initiated, money matters the most. Monetary matters has always been the blood-line in justifying the top priority of any element of an end product, it is even used to as one of the top criterion in prioritizing business processes. When it comes to prioritizing business processes, financial data sometime doesn't offer the best result and may misled the decision-maker in providing the efficient and reliable decision. (Dickinson et al., 2001) But this will also need to consider from different point of views.

Evidence-based business process prioritization seems promising in the current practice of industry and with the available infrastructure, everything is in place for pre and post-processing of thousands of information determine the priority of each business process. What currently matter most is the suitability of chemistry whether the available evidence can be used on any future project that is being thrown to it. The uniqueness of each project will play its part is maturing and providing more evidence-based data.

B. Software Requirements Selection and Prioritization using SBSE Approach

This was also another related research that is being done. The main focus of this research is to identify the different ways in conducting requirements prioritization that are currently in practice. There are different approaches that could be used for prioritization and in the stated research, the author has highlighted a few and systematically review them. It is also highlighted by the author some elements of relation to multi-objective modelling, where it can be assume that business process modelling is also a way to go when prioritizing requirements.

When talking about the topic of software requirements prioritization, it is the main focus is to make sure to be able to identify optimal choices of pool of requirements and exploit those set of information for the purpose of decision-making. This is to ensure that all the optimum set requirements is enough to satisfy the demand of the stated stakeholders (Zhang, 2004). But we have to also mention that software are unique in every aspect. So there is the problem of some projects has indirect stakeholders, and it is quite difficult to satisfy. Especially in the case of a software that is developed for global users.

In this paper, the author mention 28 studies were selected and analyzed. According to the authors, the main findings were (1) that most of the methods analyzed focused on a limited set of requirements selection factors, with an emphasis on hard constraints (technical, budget and cost, resource, effort, and time-related constraints); (2) approximately half of the models were validated in the industry, while the other half was validated in the academia, being 80% case studies; (3) almost all models were intended for market-driven software development; and (4) most of the release planning models had been proposed in academic papers. (Kitchenham, 2004)

Even though with all the review that are being done is quite comprehensive, there none specific information that focusing in business process and business process modelling notation. We may consider that software requirements prioritization is the larger picture in the topic of prioritization, in the future we hope to be able to conduct a research that would focusing more on business process. This is for the purpose of focusing prioritization with the utilization of business process.

C. Other Related Works

There are various researches being conducted in similar field, however this research differs to them in three distinct ways. Firstly, the existing research highlights macro view of software requirements prioritization and is a broad area of research. Secondly, the existing research contributes in the focus area of producing the result based on large search-based data set. Finally, the end result those researches the establishment of different method of executing software requirements prioritization without mentioning the abilities of modelling. The propose research in this paper will be much more focus in the origin of every software requirements that is business process with the inclusion of the closely related modelling tools utilized in this area, business process modelling notation will hopefully show a significant result in improving the result of software requirements prioritization.

III. METHODOLOGY

This section will discuss briefly on the environment in conducting the research. In general, this particular research is to be set at Malaysia as its main reference of artifact and benchmark. Data will be collected and analysis will be performed. From here onwards, the task of making sure all the effort of translation is being done correctly and also making sure its alignment with the current practice of the industry.

Figure 1 depicts the process flow for ensuring the research's steps is clearly define and well-structure. Each objective has been embedded within the process flow. Bear in mind that certain objective must be achieve in certain stage of the process flow. Hopefully by successfully walk-through using the propose flow, research could done without any hiccup.

By following the propose workflow, result should be able to be produce and benchmarked. Whether or not the result of this research producing a noticeable impact on the current practice is to be determined. This will finally proof the actual quantification of Business Process Modelling role in the task of a decision maker.

IV. CONCLUSION

The idea of using notation quantitative data, source will be data captured from analyzing the approach of BPMN meta-modelling in the process of decision-making should provide more concrete and sound justification to the basis of those decisions. Figure 2 depicts some areas of contribution by this research. Especial in the evaluation process of business process prioritization. The outcome will be beneficial to the stakeholders that are involved in the software development project such as system owners, primary system users, requirements engineer, developers etc.

Contributing in the area of knowledge of business process prioritization in the phase of requirement elicitation. This will serves as an extended quantitative data in assessing the prioritization process and could be applied on different fields. This will replace the currently practice of BPMN analysis by providing facts and figure based data rather qualitative based data. And will instantly change the way we will looked and perceived BPMN role in future IT projects.

REFERENCES

[1] Shollo, A., Constantiou, I., & Kreiner, K. (2015). The interplay between evidence and judgment in the IT project prioritization process. The Journal of Strategic Information Systems, 24(3), 171-188.

[2] Pitangueira, A. M., Maciel, R. S. P., & Barros, M. (2015). Software requirements selection and prioritization using SBSE approaches: A systematic review and mapping of the literature. Journal of Systems and Software, 103, 267-280.

[3] Achimugu, P., Selamat, A., Ibrahim, R., & Mahrin, M. N. R. (2014). A systematic literature review of software requirements prioritization research. Information and Software Technology, 56(6), 568-585.

[4] Felfernig, A., & Ninaus, G. (2012, June). Group recommendation algorithms for requirements prioritization. In Proceedings of the Third International Workshop on Recommendation Systems for Software Engineering (pp. 59-62). IEEE Press.

[5] Khan, J. A., Rehman, I. U., Khan, Y. H., Khan, I. J., & Rashid, S. (2015). Comparison of Requirement Prioritization Techniques to Find Best Prioritization Technique. International Journal of Modern Education & Computer Science, 7(11).

[6] Ohlsson, J., Han, S., IAMSR, Å., Johannesson, P., & Rusu, L. (2014). Developing a method for prioritizing business process improvement initiatives. In Pacific Asia Conference on Information Systems (PACIS), Chengdu, June 24-28, 2014 (p. 342). Association for Information Systems.

[7] Riegel, N. (2012, September). Model-based prioritization in business-process-driven software development. In Requirements Engineering Conference (RE), 2012 20th IEEE International (pp. 349-352). IEEE.

[8] Ejnioui, A., Otero, C. E., & Otero, L. D. (2013). Prioritisation of software requirements using grey relational analysis. International Journal of Computer Applications in Technology, 47(2-3), 100-109.

[9] Huzooree, G., & Ramdoo, V. D. (2015). A Systematic Study on Requirement Engineering Processes and Practices in Mauritius. International Journal, 5(2).

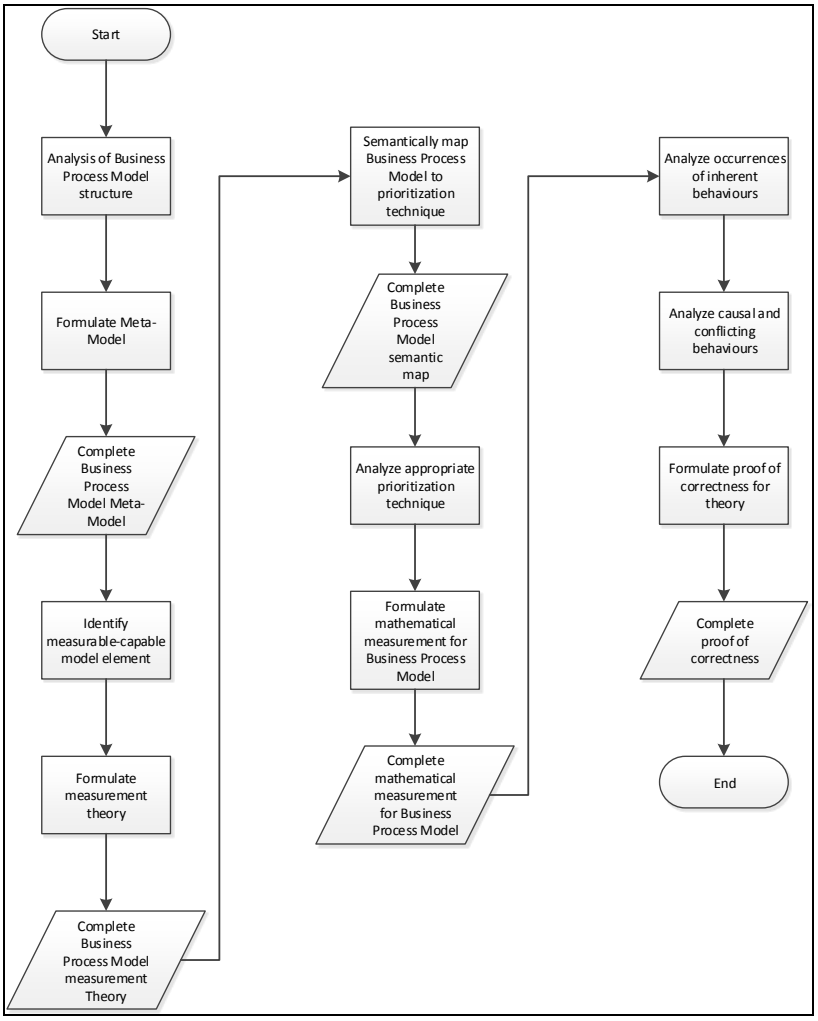

Figure 1: Process Flow of achieving the desired goal

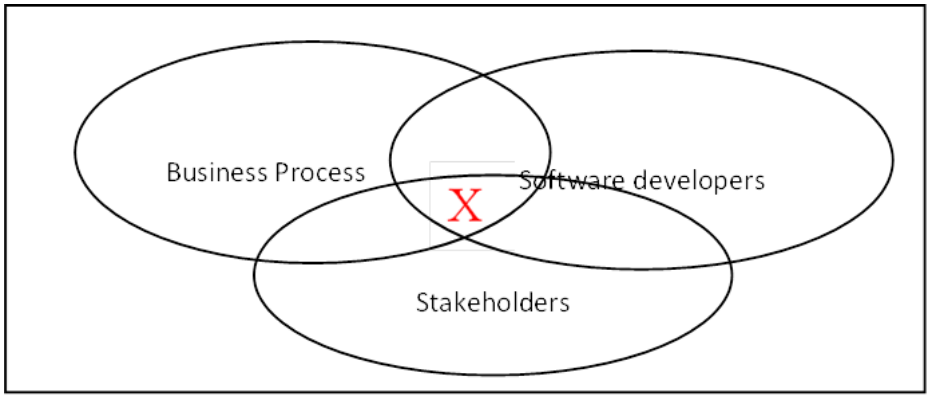

Figure 2: Diverse area of impact contributed by research outcome