















It is still difficult to differentiate to what extent we need to develop or introduce blockchain elements in the entire system from evaluating students' works. Do we need to develop it immediately given the problem or system? When do we need to deploy blockchain, and what are the benefits of it? Although the AOM can model the concept of blockchain, the participants feel it is challenging to model it due to lacking deep knowledge of blockchain technology.

From the survey, it is interested in reporting that blockchain development is a complex process. Without in-depth knowledge of blockchain, novices seem no clue where to start on it. For this reason, we shall need a methodology to lead the novices to produce a potential blockchain application by using AOM, as it seems that AOM is aided to extract more blockchain requirements while analyzing and understanding the use case problem.

#### IV. CONCLUSION

The main goal of this paper is to introduce Agent-Oriented Modelling to solve the complexity and usability issues of blockchain enabling applications. To achieve this, we first apply the Agent-Oriented Modelling to a "win a fortune" case study. Then, we evaluate the proposed methodology with a group of Software Engineering students.

The first step of the methodology introduces planning and discussion on the requirements' details between stakeholders and programmers until smart contracts are deployed through agent models in this paper. In the goal, the model illustrates the motivation of the system from a human perspective. Role models describe the responsibilities and task description involved in the system, and the Organizational model shows the relationship between the roles. The domain model shows how the roles will handle the information of the system in any environment. From the scenario model, each task is explained in a sequence order to achieve the goal. We can view the interaction and the information exchange between the agents from the interaction model in more detail. The knowledge model shows the shared and private knowledge of the agents in the system. Lastly, the overview of the entire development is shown in the behaviour model. By adopting AOM to represent the blockchain application, we believe that the blockchain developer can get familiar with the lifecycle and the requirements of blockchain technology. More works are needed further to verify the correctness and usability of the AOM, especially how AOM can rapidly prototype the blockchain enabling application.

The future work for this study is to extend the Agent-Oriented Modelling by adding modelling notation to explore further the potential and adaptability of the blockchain on an application. The current methodology mainly focuses on the analysis and design of the application. Therefore, the future work proposes extending the current methodology to analyze and understand the use case problem and highlight the needs of blockchain technology to convince the stakeholder of the project to adopt blockchain.

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