

Validation of Mix Method Risk Management Framework through Expert Judgement

**¹Nagamalleswari Dubba , ²Kodukula Subrahmanyam and
³Bharat Siva Varma**

¹ Associate professor, Department of CSE, Koneru Lakshmaiah Education
Foundation, Vaddeswaram, AP, India

² Professor, Department of CSE, Koneru Lakshmaiah Education Foundation,
Vaddeswaram, AP, India

³ Associate Professor, Department of CSE, SRKR Engineering College,
Bhimavaram, AP, India

¹Correponding author: smkodukula@kluniversity.in

Abstract:

Risk Management plays a vital role in the establishment of information systems in any organization. Researchers have proposed several risk management frameworks and models in organizational context. Those studies were using either qualitative or quantitative approach and are mostly tool based and complex in structure. This study has aimed to develop a risk management framework using both qualitative and quantitative approaches. Initially an algorithm was developed which has been converted to an architecture/ framework. The framework has been validated through expert judgment. It has been sent to 150 domain experts from various software industries. These results were statistically verified and found an incredible support for the proposed framework.

Introduction:

The proposed framework SIS, consists, three important phases namely Risk Recognition, Risk Appraisal and Risk Treatment. In the first phase the usage of Source code analysis, Information Acquirement and SWOT Analysis were combined and risk has been identified. Later, through discrimination analysis risk has been appraised. Finally, the treatment rules were used to treat the risks identified.

Algorithm for proposed Frame Work

1. Recognise the risks
 - a. Identify qualitative and quantitative measures
 - i. Use qualitative method to assess the risk
 1. Perform Source Code Acquirement and recognise risk using Cyclomatic complexity
 - ii. Use quantitative method to assess the risk
 1. Use Information Acquirement and SWOT to identify risk through expert judgement
 - b. Calculate the over all risk with appropriate weightages
2. If risk is recognised in step 1 proceed to step 5
3. else
4. repeat step 1 until risk is recognised
5. Perform risk reckoning
 - a. Apprise the risk through discrimination analysis for the identified risks
6. Continue risk dealing
 - a. highlight the risk
 - b. mitigate the risk
7. Measure the output

SIS FRAMEWORK

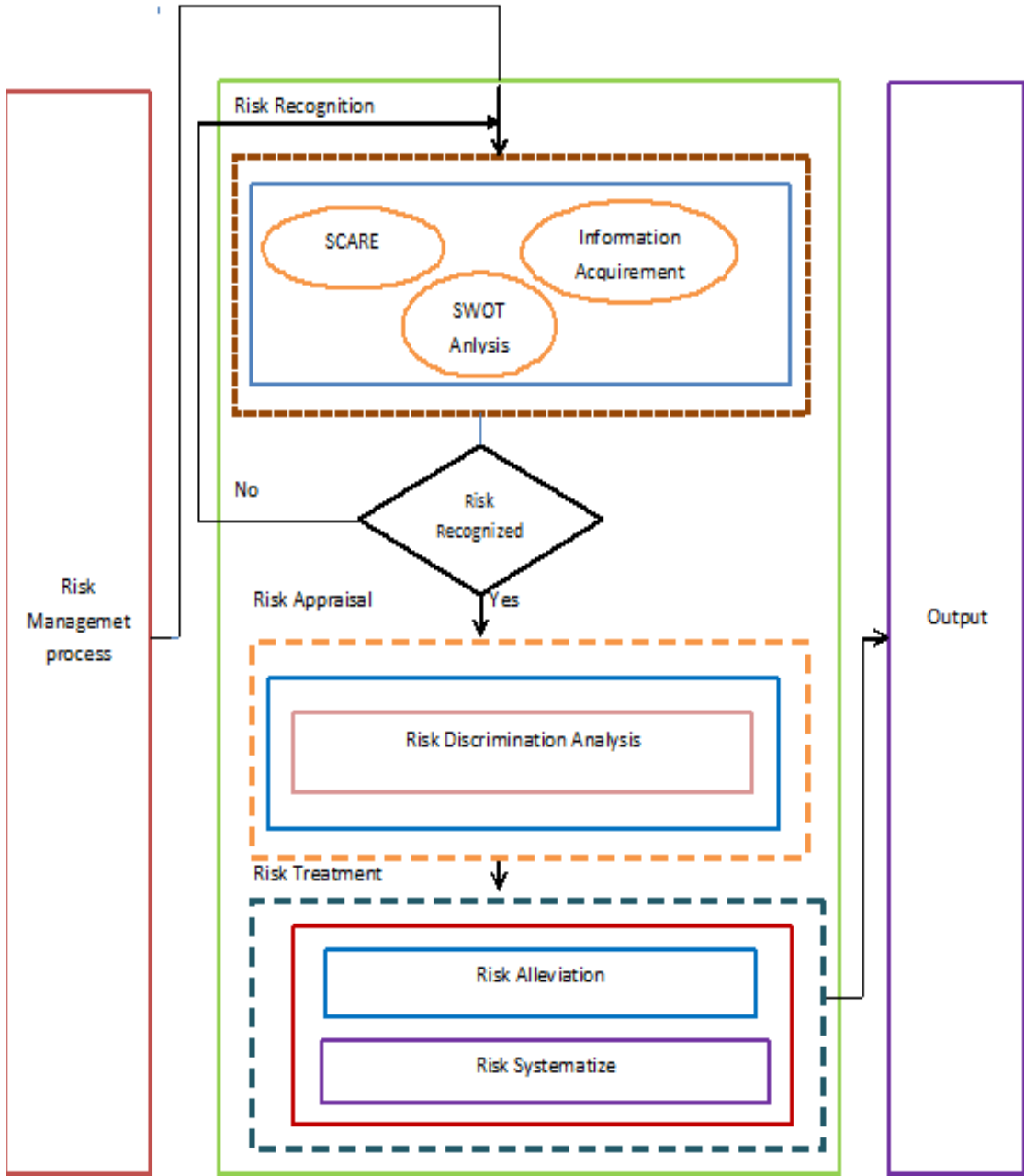


Figure 1: Proposed SIS Framework

The SIS framework adapted simple structure and is using mixed method analysis (both qualitative and quantitative) to assess the risk. SIS framework is divided into 3 phases namely Risk Recognition, Risk Appraisal and Risk Treatment, in Risk recognition phase the risk was identified with the help of SCARE analysis, Information Acquirement Process and SWOT analysis. Discrimination analysis was done in the Risk Appraisal phase and concluded with the treatment rules. Which will be shown in figure 10?

Risk Recognition

In risk recognition phase Source Code Analysis (SCARE), Information Acquirement (IA) and SWOT Analysis were combined to identify the risk. Through SCARE the risks related to source code will be determined, whereas IA and SWOT will be used is used to identify the other risks associated with Information Systems.

Risk Appraisal

Once risk values are identified in the risk recognition phase through discrimination analysis risk are described for all the factors to be considered. This analysis clearly highlights the risks to be addressed.

Risk Treatment

Risk treatment plays a vital role in success of any software product. Risk treatment strategies are four type's i.e. Risk acceptance, Risk Avoidances, Risk limitations, Risk Transmission. Risk acceptance is a common risk treatment option and used to estimate the cost of other treatment options such as avoidance, limitations and transparency'. Generally risk acceptance 72 strategy is employed by the industries that do not want to spend lot of money risk avoidance. Risk avoidance is an action that avoids the project from any exposure to any type of risk whatsoever. Risk limitation involves a bit of risk avoidance and bit of risk acceptance or an average of both. Risk transfer is a process of out sourcing risk handling to a third party. Risk transfer is beneficial if the risk is not a core competence of that pharmacy industry. The following figure shows risk treatment work flow.

The appraised risk moved to the next phase i.e, risk treatment phase. In this the risk is alleviated based on high, medium, and low. Depending upon the type of risk, the treatment rules were suggested. If risk is high they may suggest different rules, if it is medium or low means based on the impact of that risk may be giving the treatment rules, sometimes simply the risks are ignored if impact is low. Finally the treatment rules are output to the output phase.

In order to perform risk recognition the above mentioned five factors were used in the Source code analysis, Information acquirement, and SWOT Analysis.

Source Code Analysis Acquisition Process

In source code acquisition process the source code has been categorized based on the identified factors Participants, Infrastructure, Technology, Environment and Information using the appropriate functionalities and usabilities which were described in table 1.

Table 1: Source code categorization

Factor Name	Associated Code
Participants	User Interface which includes placing of labels, buttons, images, and various other controls
Environment	IDE related data with related pages which includes Output Display Pages
Infrastructure	Supporting Programs
Technology	Impact of Data base, JDBC Connectivity, DAO,RDO
Information	Database Protection Programs

Validation of Proposed Frame Work

After proposing the framework in order to validate expert judgment (Quantitative Survey based Analysis) is used. It has been sent to 150 domain experts from various software industries. The responses were received from 104 experts from 26 Industries like Amazon, Infosys, Wipro, CTS, etc

The Respondents have significantly shown support (92%) for the framework. These results were statistically verified by estimating standard deviation and variance, which were obtained through standard methods as follows:

The average standard deviation obtained is **1.45** and average variance is **2.25**, which shows that all the data values are similar, i.e. the perceptions of respondents is better (smaller SD value).

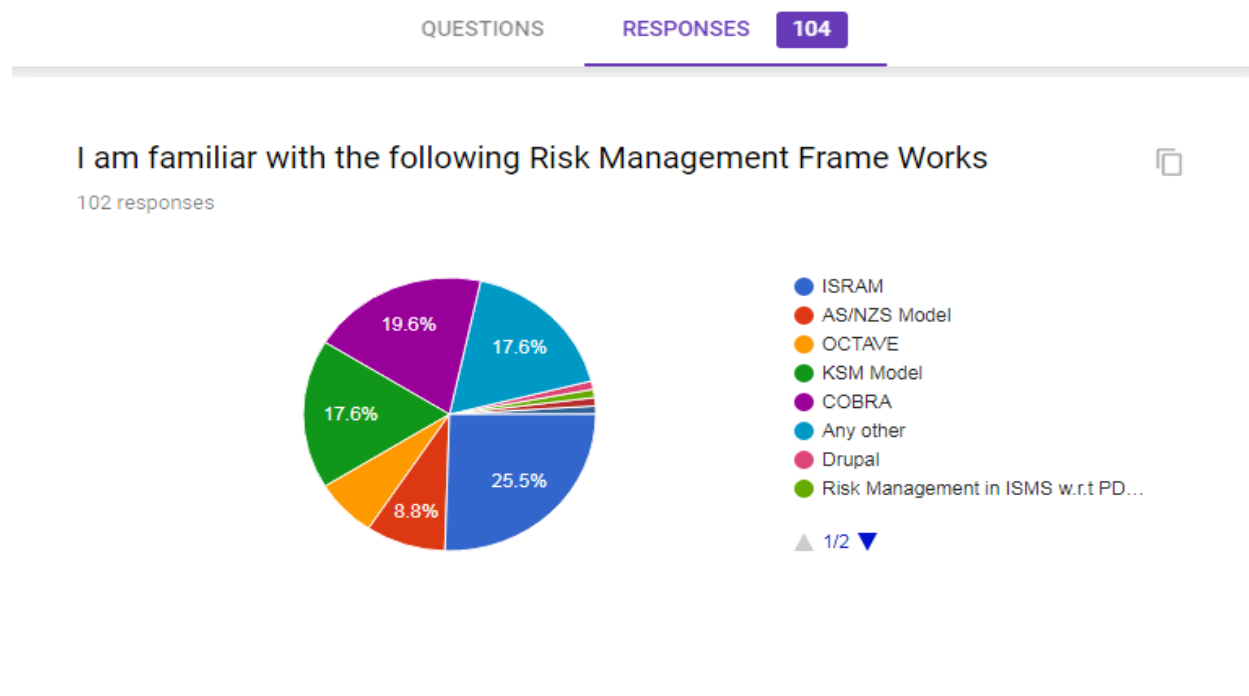


Figure 2: Risk management Frameworks familiarity

The framework is validated through expert judgment. Initially opinion on the familiarity of the system is obtained from the participants. The responses have shown that ISRAM model is most

popular with 25.5% and COBRA stood second with 19.6% shown in figure 2. With the help of this question authors understood the knowledge levels of risk management models of the participants and were able to proceed further in the research.

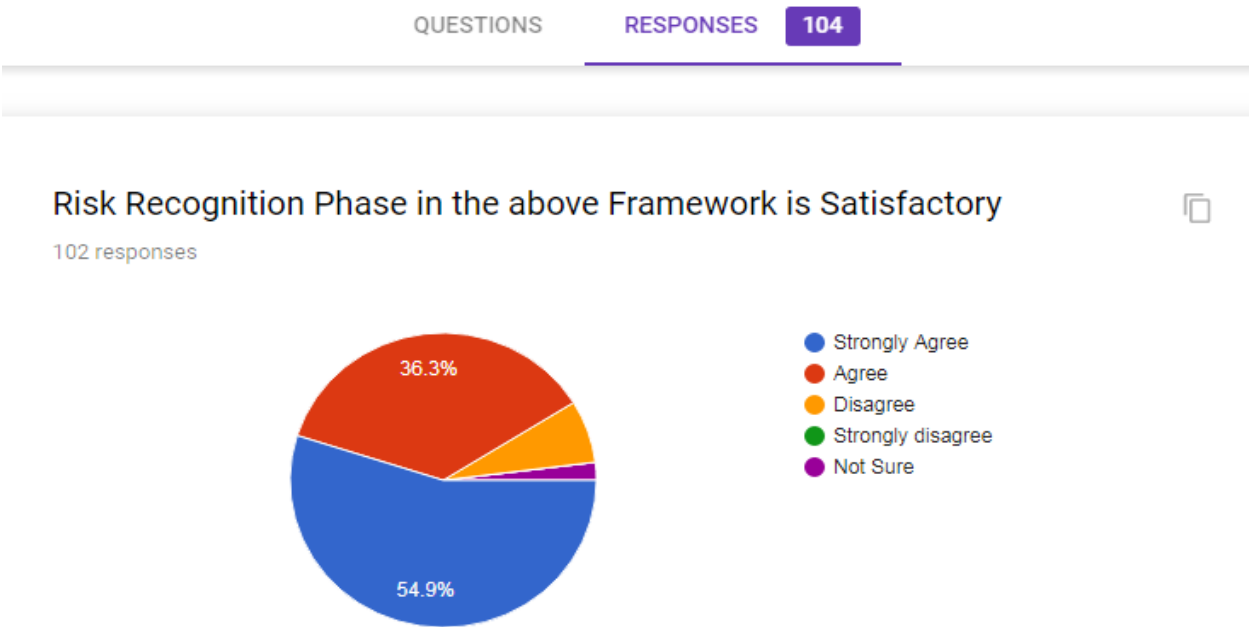


Figure 3: Risk Recognition phase validation

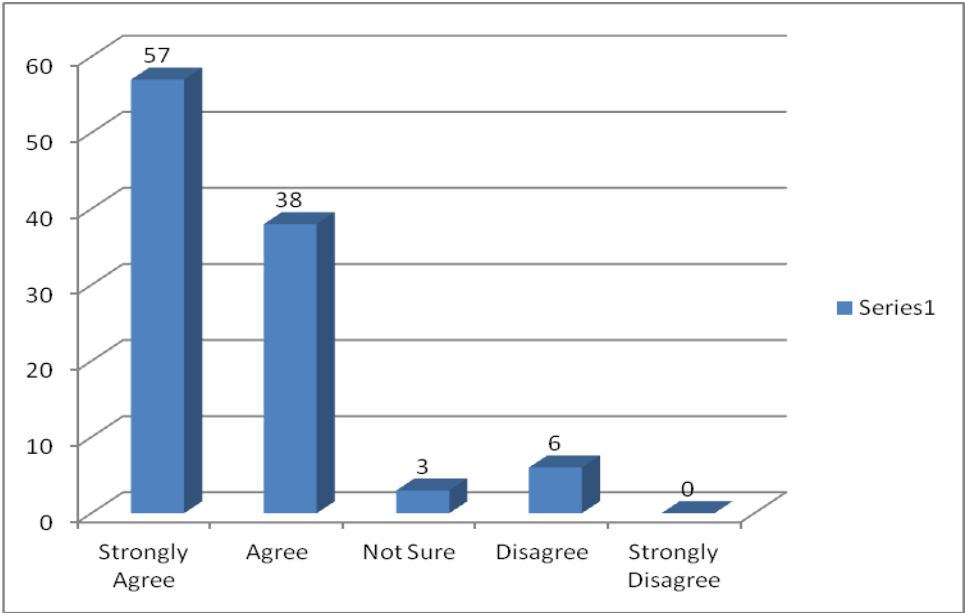


Figure 3: Risk Recognition phase validation

Through this question authors were able to get 91% support for the proposed risk recognition phase. Out of 104 respondents, 95 participants have expressed satisfaction over this phase. The figures 3 and 4 represent these results.

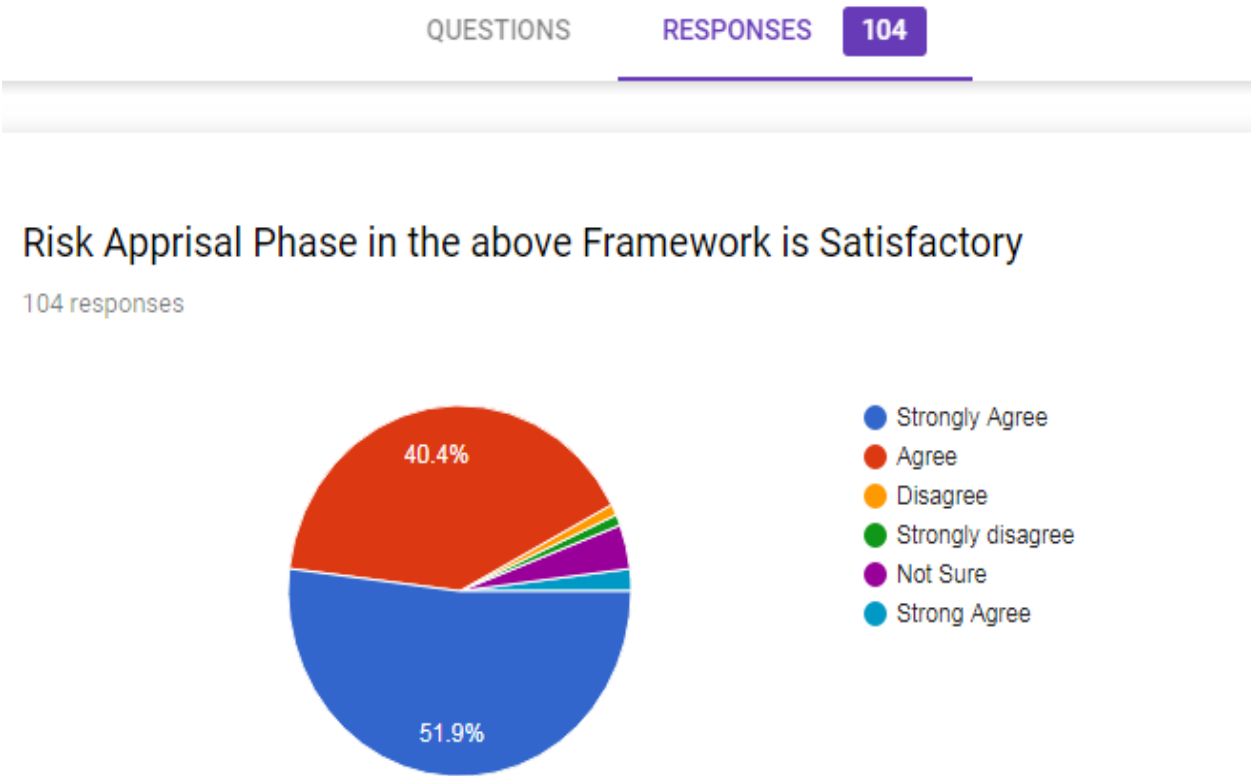


Figure 4: Risk appraisal phase validation

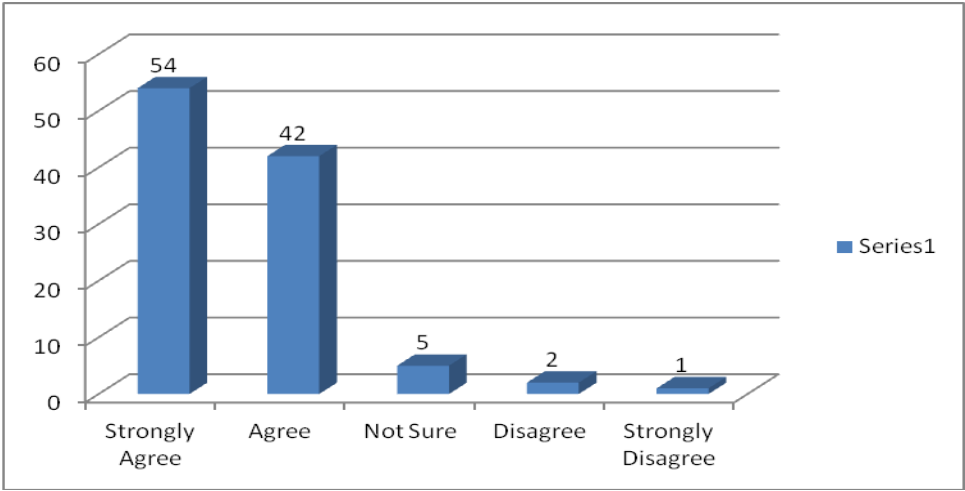


Figure 5: Risk appraisal phase validation

Through this question authors were able to get 92% support for the proposed risk appraisal phase. Out of 104 respondents, 96 participants have expressed satisfaction over this phase. The results are clearly shown in figures 5 and 6.

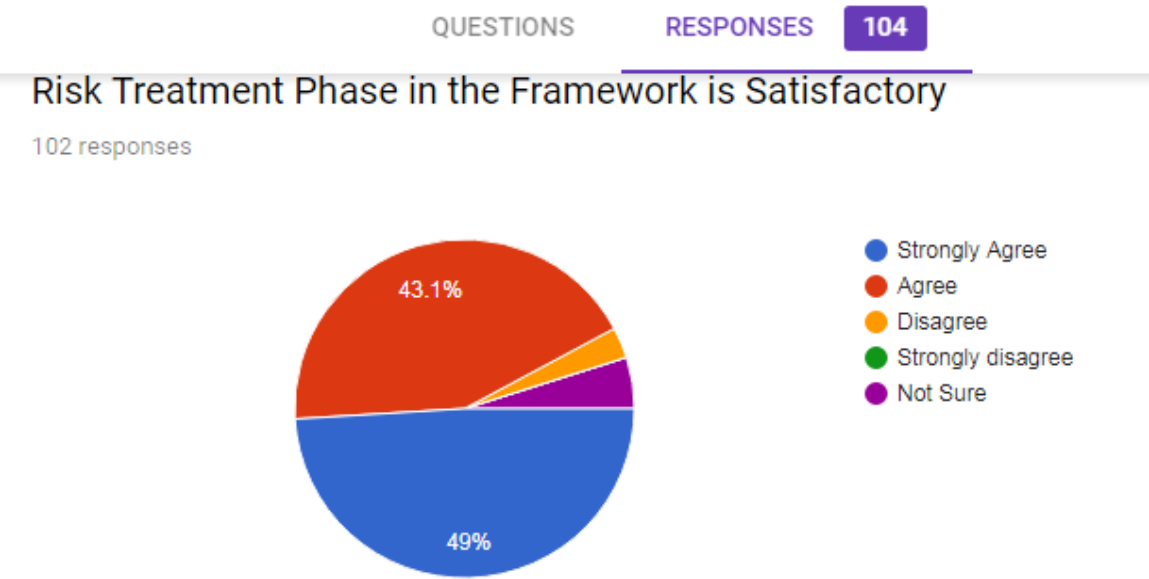


Figure 6: Risk treatment phase validation

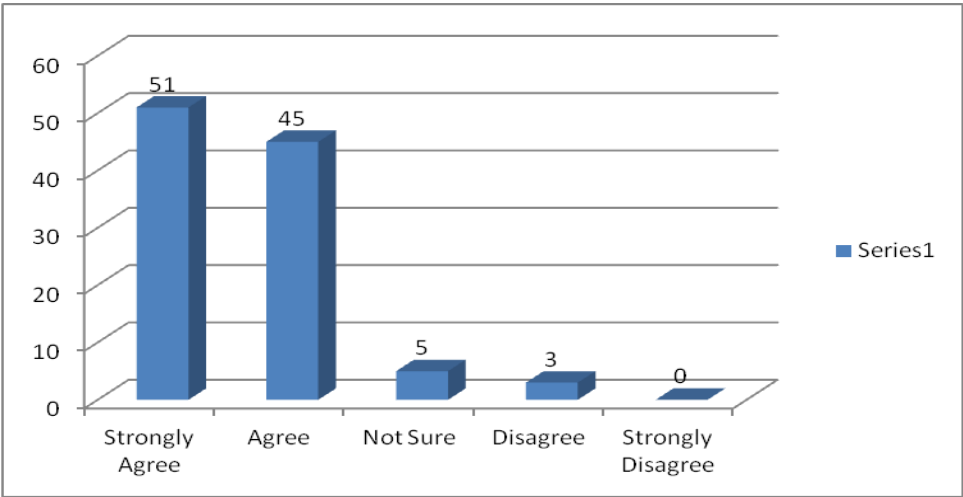


Figure 7: Risk treatment phase validation

Through this question authors were able to get 92% support for the proposed risk treatment phase. Out of 104 respondents, 96 participants have expressed satisfaction over this phase. The results were clearly shown in figures 7 and 8.

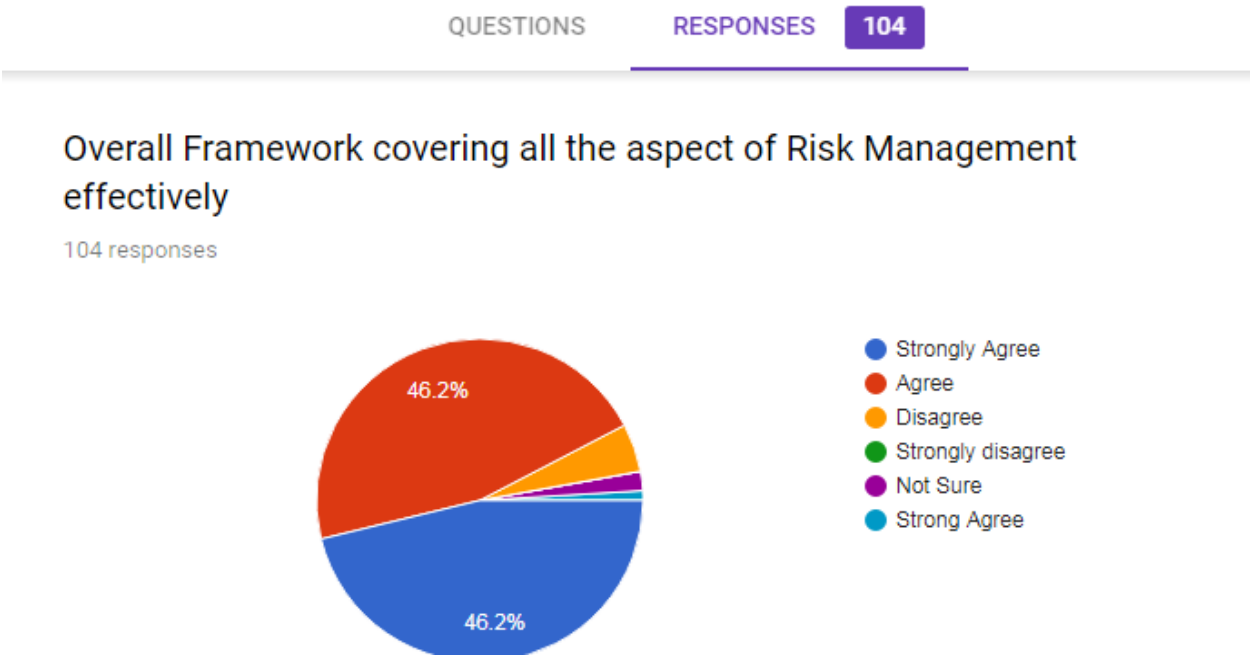


Figure 8: Overall Frame Work Validation

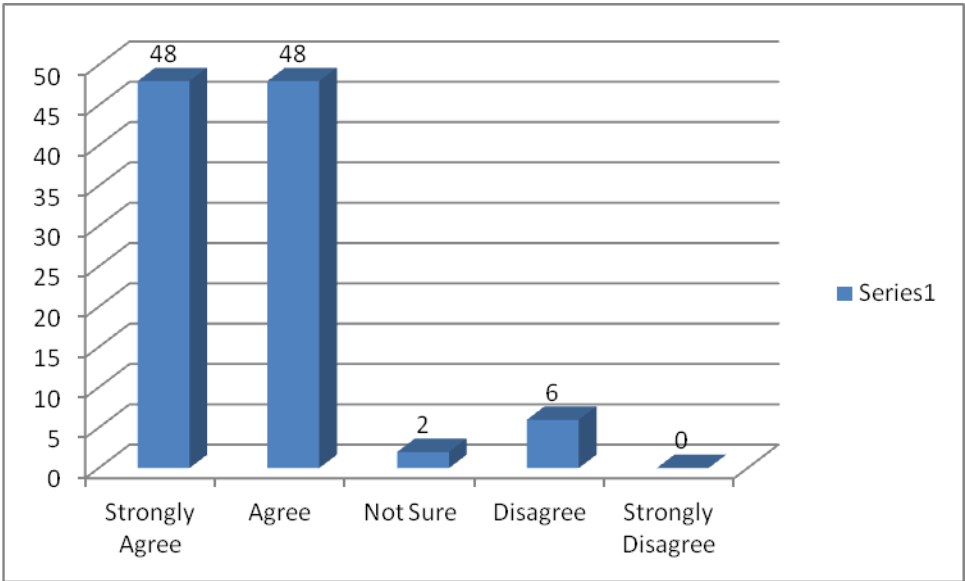


Figure 9: Overall Frame Work Validation

Through this question authors were able to get 92.4 % support for the overall proposed framework. Out of 104 respondents, 96 participants have expressed satisfaction over this phase. The support clearly shown in figures 9 and 10.

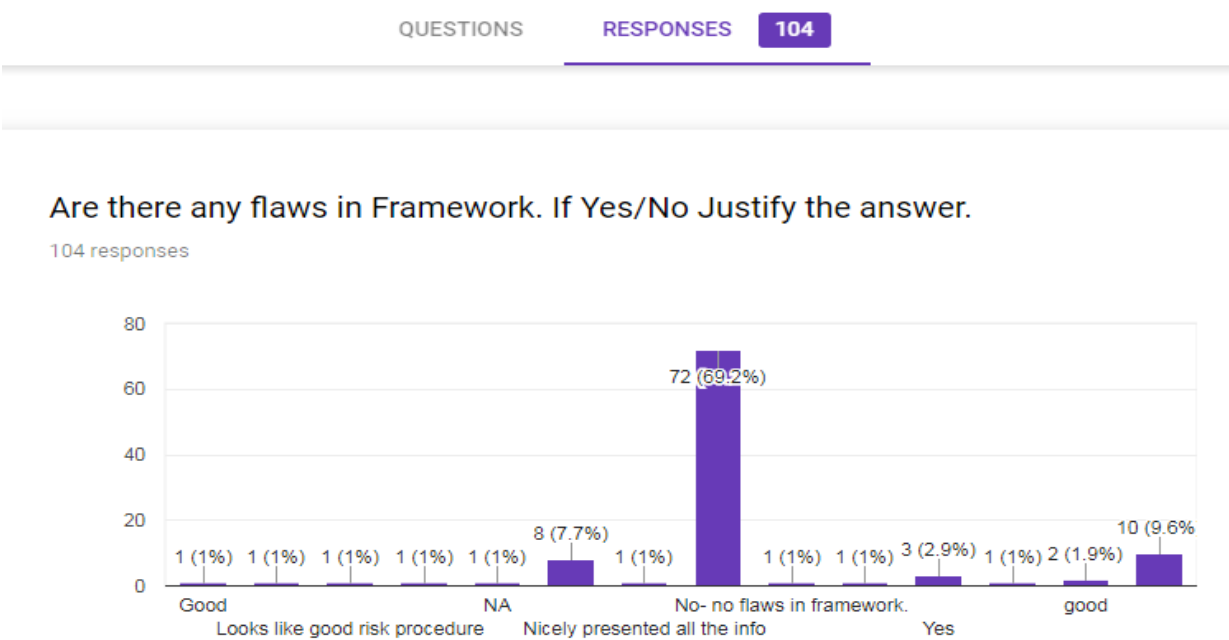


Figure 10: Frame Work Validation through flaw identification

Through this question authors were able to get 69.2% support for the overall framework and all the 72 participants have clearly indicated that there were no flaws in the proposed framework. The support clearly given in figure 11.

Conclusion:

The Expert Judgement used to validate the proposed frame work has given tremendous overall support (92%) and given insights to the researcher for proceeding further. By taking this as bench mark, authors have proceeded further to risk recognition, risk appraisal and risk treatment phases of the framework and identified the risks of the information systems. These were later used to compare with exiting risk management models.

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