MODELLING & DESIGNING OF A RISK ASSESSMENT PROCESS FOR BANKS USING UML

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ABSTRACT:

Estimating the risk involved in a bank and its branches has been the top priority for many banks across the world after the recession. Recently, there has been a growing tendency to adopt UML (Unified Modelling Language) for different modelling needs and domains, and it is widely used for designing and modelling various systems. UML diagrams practices have been applied for designing and modelling the Risk assessment process so as to improve technical accuracy and understanding in requirements related with this Risk Management. We have applied a subset of UML diagrams for modelling the Risk assessment process. Unified Modelling Language (UML) has been used as the specification technique. This paper proposes a uniform solution to mitigate the risk using consolidation process combined with modelled process of UML. A Risk assessment is the first thing a business must take before developing an anti money laundering and countering the financing of terrorism programme. It involves identifying and assessing the risk of a business reasonably expects to face from money laundering and financing of terrorism. Once a risk assessment is completed a business can then put in a programme that mitigates these risks.

KEYWORDS

Risk Assessment, Unified Modelling Language (UML), software modelling, software development process.

I. INTRODUCTION

Banks whose branches spread across the world assess the risk of the bank from the inputs given by the respective Country representatives and come to a conclusion. The drawback is when banks reputation is damaged in one jurisdiction, the entire institution suffers. A business line that employs state of art methods can nonetheless be uniform approach addresses the problem and helps protect all business lines from reputational damage. In the long run uniform approach is more efficient. This uniform process enables bank to compare compliance risks in different countries and allocate resources more appropriately. For that we use UML to represent the uniform methodology for Risk assessment to mitigate the risk.

In this paper we propose an approach for the representation of Risk Assessment process with class diagrams of UML. These modelling diagrams not only benefit the banks for developing but they also visualise the entire system (methodology) in a global view and benefit from the effectiveness of graphical language in knowledge representation and numerous advantages of using modelling diagrams in the context of design.

The paper is structured as follows: section 2 presents UML section 3 presents the methodology section 4
presents the motivation of our approach section 5 illustrates a discussion on the effectiveness of the approach and section 4 concludes the paper with the summary of research and some future directions.

Unified Modelling Language

A model is simplified the whole existence. Originally a model provides a map of a system. Models maybe include whole details of a system. So in general we can say that a good model is a model that can determine all the elements involved in the plan, relationships between them and how effective they can be. Each system explained by several models and there is a semantic map which describes the system in each model.

UML (Unified Modelling Language) is a complete language for capturing knowledge (semantics) about a subject and expressing knowledge (syntax) regarding the subject for the purpose of communication. It applies to modelling and systems. Modelling involves a focus on understanding a subject (system) and being able to communicate in this knowledge. It is the result of unifying the information systems and technology industry’s best engineering practices (principals, techniques, methods and tools). It is used for both database and software modelling. UML attempts to combine the best of the best from: Data Modelling concepts (Entity Relationship Diagrams), Business Modelling (work flow), Object Modelling and Component Modelling. UML is defined as: “UML is a graphical language for visualizing, specifying, constructing, and documenting the artefacts of a software intensive system” [Booch]. Software architecture is an area of software engineering directed at developing large, complex applications in a manner that reduces development costs, increases the quality and facilitates evolution[8]. A central and critical problem software architects face is how to efficiently design and analyze software architecture to meet non-functional requirements. UML offers vocabulary and rules for communication and focus on conceptual and physical representations of a system. The various structural things in UML are Class, Interface, Collaboration, Use-case, behavioural things comprise of Interaction, State machine, Grouping things comprise of packages and notes.

a) Things: important modelling concepts.

b) Relationships: tying individual things (i.e., their concepts).

c) Diagrams: grouping interrelated collections of things and relationships.

The artefacts included in standard UML consist of:

Use case diagram, Class diagram, Collaboration diagram, Sequence diagram, State diagram, Activity diagram, Component diagram and Deployment diagram (OMG, 1999). There are different ways of using UML in terms of design methodologies to accomplish different project objectives.

II. Functional overview of proposed methodology

The functionality is derived from the Functional Methodology and the building blocks are categorized as the inventories as listed below

Inherent Risk:

- sporting Entity
- Products and Services
- Compliance Obligations

QR:

- Rules and Regulations Manual
- Policy and Procedures

A basic assumption that we made about the above is as follows:
**Reporting Entities:**

Reporting entities are mostly provided by the Group Finance and also entered by the Country Representatives. The Reporting entities may have one or more products and services associated with them.

Products and Services: This is one of the building blocks of our proposed methodology. The Country Representatives needs to enter as much information in order maintains the accuracy of the Products and Services inventory.

Each Product and Services will be given with a meaning full name linked to one Reporting entity. The Product and Services can also be linked to other entities at a later part.

**Compliance Obligations**

A compliance obligation is defined as an industry-specific requirement imposed by constitution, statute, regulation, rule, regulatory guidance, code of conduct etc. These are entered by Country Representative.

**Quality of Risk (QR):**

QRM constitutes of different tools as listed below, which ensures the Risk will be mitigated with minimal residual risk.

- Rules and Regulations Manual (RRM)
- Policies

Rules and Regulations: The Rules and Regulations Manual contain enterprise-wide policies and procedures, which serve, inter alia, as a key mitigating element in the risk assessment process. This will be entered by Country Representative.

**Policies:** The policies of the individual reporting entities represent the next level of mitigating elements to be addressed in a risk assessment.

**Risk Assessment**

Once all the Inventories and the QR Elements are in place the Country Representative can start the risk assessment process. During the process the CCR will have to enter the (1) Risk Assessment date (2) Business Contact (3) Associated Compliance Obligation and (4) Some meaningful title for the assessment.

Along with the above information each Risk Assessment needs

1. The Reporting entity that is being risk assessed
2. The Product & Services
3. The recommended RRM, Policies
4. Risk Assessment ratings

Based on the Country Representative’s evaluation the Inherent Risk rating will be awarded as per the below business rule matrix.

<table>
<thead>
<tr>
<th>Inherent Risk</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Impact</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>M</td>
</tr>
<tr>
<td>Medium</td>
<td>M</td>
</tr>
<tr>
<td>High</td>
<td>L</td>
</tr>
</tbody>
</table>

Based on the inputs entered by the Country Representative’s for the inherent risk and the QR a residual risk rating is generated as per the below matrix.

<table>
<thead>
<tr>
<th>Residual Risk</th>
<th>QRM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Inherent Risk</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>M</td>
</tr>
<tr>
<td>Medium</td>
<td>M</td>
</tr>
<tr>
<td>High</td>
<td>L</td>
</tr>
</tbody>
</table>
During the risk assessment the Country Representative’s can log issues or incidents pertaining to the assessment and the same can be escalated as (1) middle level managers (2) local to the next escalation level. The escalation hierarchy is as mentioned below

Head

Country Representative

Region Head

Formula : Inherent Risk - Quality Risk = Residual Risk

First, UML is a graphical language and benefits from the mentioned advantages of using graphical language to communicate knowledge.

Second, UML is standardised by OMG (Object Management Group) and therefore benefits from the advantages of using the standards.

Third, UML is very expressive.

The class diagram allows you to understand the concepts and relations between them. For example we can visualize in this diagram that an object is instantiation of a class and the class is composed of several operations. Furthermore this diagram allows the organisation of concepts in compartments which differentiate between the links to knowledge and the links to pedagogical activities. UML is very good for

\[
\text{Head} \\
\text{Country Representative} \\
\text{Region Head}
\]

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\text{III. MOTIVATION}
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There are three reasons why we propose to use UML for modelling the Risk Assessment process.
designing of Risk Assessment process and benefits from the well expressiveness of the language. In particular class diagram is the most used diagram of UML [2], and it is a good candidate for the representation of knowledge in the form of concepts and relations. The class diagram has the advantage of being capable of presenting a global view of the design and organising the semantic class and visualizing the relationships between the classes. While working with the class diagrams the users can benefit from the power of graphics in context of designing, the expressiveness of UML, and from the adaptive links in class diagrams and their presentation according the requirements.

**IV. DISCUSSION**

In this section we discuss about the UML effectiveness in designing over Dataflow diagrams.

For example in the diagram above, all the components involved for the assessment of risk are connected and the relationship is established using Unified Modelling Language.

Here we have used the concept of generalisation to represent the Reporting Entities, Products, Unit Area, Compliance Obligation, Instruction Manual, etc... and established other relationships also.

In this way we are able to view the system as a whole setting some common parameters to assess the risk in all the countries depending on the rules and regulations followed in the respective country.

The above class diagram explains the residual risk assessment. It explains the classes and its relationship. The following points help us to assessing the risk.

**How UML is helping in assessing the risk?**

1. Here the expressiveness of UML come into picture and allows all the country representative's follow the standard procedure.
2. We are able to view the entire system and thus more overall understanding.
3. Even for the development of a automated Enterprise Application based on any of the standard web development languages.
4. The efficient design with UML helps them to generate reports using any of the reporting tools which plays key role for the development of the business.
5. The risk can be mitigated in long run by using this system.
6. Finally the Organisation will not go for a toss due to wrong or random assessment reports given by the country representatives.

The residual class diagram as shown below.
V. CONCLUSION

By using class diagrams in UML, we could model a system as a class diagram in order to determine all the relationships in the system clearly. Also, we have shown the procedure and functioning of risk assessment system and all the relations in the system by presenting a bank Case Study. We come to these results that class diagram for domain specific systems in UML is one of the important and efficient methods for analyzing systems by using this, we can model and design a complex system easily.

REFERENCES


Authors

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