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COLLABORATIVE RISK MANAGEMENT FRAMEWORK WITH MODIFIABLE RISK REGISTER STRUCTURE

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Abstract

Scarce successes in Enterprise Risk Management implementations are largely due to long process of risk register development, poor monitoring of emerging risks, lack of collaborative effort and lack of effective communication and training. A recent study published by Arthur J. Gallagher Think Tank, indicates that it takes the enterprise 18-26 month to develop a risk register, after which the effort gets stuck, as the risks are reviewed periodically by a single appointed Risk Officer or a Team. The enterprise, however, frequently faces emerging risks that have to be assessed and mitigated. They are addressed most efficiently by multidisciplinary, interdepartmental teams in a collaborative environment. This paper describes a framework for Collaborative Risk Management based on the model of Multidimensional Preemptive Coordination. The risk register modifiable structure allows for run time expansion, making mitigation a continuous process. Variable risk structure depth allows risk management at different hierarchical altitudes.

Key words: collaborative risk management, enterprise risk management, risk register

1. INTRODUCTION

Corporate interest in Enterprise Risk Management (ERM) has particularly exploded after the last financial crisis. A report on Enterprise governance, risk and compliance (GRC) solutions (Chartis Research, 2014) states that traditional GRC has failed to alert the financial institutions to risks that led to the financial crisis. Financial institutions were not the only one to suffer fines and penalties from inadequacies of GRC procedures, energy sector and pharmaceuticals manufacturers followed suit. Financial consequences were significant in general businesses also. This led to vast research effort to analyze the causes of poor performance of otherwise robustly conceived systems.

The enterprises approach ERM implementation by enumerating corporate risks, evaluating their attributes and organizing them into a corporate Risk Registry. Operational risk identification and Risk registry design is often performed by a single risk official (32%), or a small designated team (45% - source Beasley, 2015) in a series of interviews, surveys and meetings that collide with everyday personnel responsibilities. This practice lengthens the implementation phase considerably (18-26 months).

A detailed Risk Registry has up to few thousands identified risks, which makes it cumbersome to manage. Once designed, the structure of the Risk Registry remains fairly rigid due to necessary risk aggregation and interdependencies. Emerging risks, that might require a different risk structure, are difficult to merge into the existing design. This is even more pronounced in the construction industry, where each project might have its own set of particular operational risks.

If the Risk Registry could be restructured in time while retaining the interdependencies, risk aggregation could be recalculated and new risks easily merged into existing business workflow. Multidisciplinary risk assessment in meetings and interviews could be strengthened with a focused social networking making an efficient collaborative environment. Modifiable risk structure and social network collaboration, makes Risk Registry design a continuous process. This suggests that ERM implementation need not be constrained by Risk Registry completeness, and can enter into the enterprise everyday workflow as it develops.

This paper describes a risk management framework that combines a modifiable risk breakdown structure with multidimensional collaborative environment that significantly reduces ERM implementation time.

2. TRADITIONAL RISK MANAGEMENT AND ITS SHORTCOMINGS

A number of risk management frameworks are recognized in the literature, each one with different formal steps, but all of them are trying to identify, assess and remediate risks.

The ISO 31000 standard describes a framework for implementing risk management, rather than the framework for supporting the risk management process (FERMA, 2009). After the initial step of mandate and commitment, the standard proposes following steps: design of framework, implementing risk management, monitor and review the framework, improve the framework.

PMI body of knowledge framework (ANSI, 2004) is oriented towards project risk management and involves six steps: Risk Management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning and risk monitoring and control.

The COSO framework (COSO, 2004) is an enterprise wide framework with the following steps: internal environment, objective setting, event identification, risk response, control activities, information and communication and monitoring.

The Software Engineering Institute framework (Dorofee, 1996) with five distinctive steps: identify, analyze, plan, track and control with communication being underlying infrastructure essence.

Fairly framework (Fairly, 1996) implies seven steps: identify risk factors, assess risk probabilities and effects, develop strategies to mitigate risks, monitor risk factors, invoke a contingency plan, manage the crisis and recover.

Continuous Risk Management NASA framework (Stamatelatos, 2011) contains six phases and is a life cycle process: identify, analyze, plan, track, control and communicate risk.The research “Seizing opportunity: Linking risk and performance” (Atkinson, 2008) clearly identifies “inadequate risk assessment practices” as the most important shortcoming in corporate performance management. It further states that traditional approach to Risk Management, where risks are grouped in silos, create dangerous blind spots for business. Risk is, by definition, forward looking. It is a measure of probability, either loss or gain, which directly impacts corporate performance objectives. Almost 60 percent of the time, failure to assess and respond to strategic or business risks is behind rapid declines in shareholder value.

Institute of Management Accountants published practical ERM implementation guidelines (IMA, 2007), with distinctive ERM maturity models. The model has three phases:

a) building a foundation for Business Risk Management with three stages: awareness , capability and alignment

b) building segment level Business Risk Management, also with three stages: engagement, value and operationalize

c) building enterprise level Business Risk Management with final three stages: collaborate, coordinate and integrate.

According to the Gallagher report (2013), the first phase takes on average 18-26 months. It is performed by a small team, sometime with external consultants in meetings with operations personnel or performing surveys. This leads to prolonged first stage implementations, which is perceived by the rest of the enterprise a one-time effort, and, consequently, not something the rest of the enterprise should include in their everyday activities.

Within the COSO ERM framework (COSO, 2004), risk assessment is defined as a process of four steps. The assessment phase comes into effect after the risk is identified. Risk identification produces a comprehensive list of risks organized by risk category (financial, operational, strategic, compliance) and sub-category (market, credit, liquidity, etc.) for business units, corporate functions, and capital projects. This phase is where the Risk Breakdown Structure is decided upon.

The assessment process begins with Development assessment criteria which are to be deployed across business units, corporate functions, and large capital projects. The criteria is defined in terms of likelihood and impact and sometimes as vulnerability and speed.

The next step is Assess risks where values are assigned to each risk. Assess risk interaction follows which usually results in risk interaction matrices. Lastly, risk prioritization takes place, where risk levels are compared with predetermined target list levels.

Assessment phase is followed by design of responses to risks, cost-benefit analysis, response strategy formulated and response plans developed.

In “Operational Risk Management in the Financial Services Industry” (SAS and Risk magazine, June 2004), most important obstacles to successful operational risk management were identified as:

a) Difficulty in collating sufficient volume of historical data

b) Overall awareness and knowledge of operational risk issues amongst general staff

c) Difficulty in ensuring the quality of the data and

d) Cost and time of implementation

Historical data is difficult to obtain as the risk management procedures are not integrated effectively into the business process, and hence, are regarded as extra, unimportant work. Everyday business processes are supervised by C-level

executives or supervisors on a daily basis, while risk monitoring procedures are commonly verified by audits performed once of few times a year.

The Gallagher study (Gallagher, 2013) distinguishes four fatal risk management conditions:

a) Absence of appropriate tone at the top: the necessity for compliance is diluted with the Board. In that sense, the last financial crisis was a wakening call. Board members became fully aware of financial implications of poor Risk Management.

b) Poor monitoring of emerging risks: the risk should be managed at a proper altitude in the hierarchy of the enterprise. Monitoring operational risks should be enforced by clear formulation of requests for action, and milestone checking upon execution. Results of the monitoring routines should be recorded, as well as lack of them.

c) Decentralization and/or Lack of accountability: centralized "silos" of information make it difficult for remote operations to become compliant, because business procedures differ. Lack of accountability make compliance enforcement difficult to implement

d) Lack of effective communication and training: poor communication will always impede awareness. Effective communication is essential for status change detection.

The amount of data that must be interpreted often proves to be overwhelming. This represents one of the major challenges effective risk assessment ("A practical guide to risk assessment", PriceWaterHouseCoopers 2008). Steps should be taken to personalize the data for each participant, to limit the amount of data that is presented to him, so he could focus to the problem at hand.

The lack of accountability is one of the reasons why risk assessment often is not acted upon. The accountability is enforced by communicating clear goals, risk owners, and milestones or deadlines that must be met. An audit trail of actions performed will also reveal lack of action and will steer the participant to meet the milestone.

The same report distinguishes another risk assessment challenge: Too many different risk assessments are performed across the enterprise. The risks should be assessed at the operational level, at the altitude where it will be managed best. The visibility of the team that performs risk assessment for a set of business procedures should be kept limited to those procedures, to avoid data overload.

Recent survey of 1093 enterprises, AICPA members (Beasly et all. 2015) showed that 25% of respondents consider that their organizations have "complete formal enterprise-risk management process in place", but only 23% describe their maturity level as being "Mature" or "Robust". Further 41% admit

to not being “at all satisfied” or “minimally” satisfied with the nature and extent of the reporting of key risk indicators to senior executives. Overwhelming 65% admit they were caught off guard by an operational surprise “somewhat” to “extensively” in the last five years. This percentage was even higher for large organizations and public companies.

3. RISK REGİSTERS WITH MODIFIABLE STRUCTURE

Identified risks are organized in a hierarchical structure, the Risk Breakdown Structure (RBS), which denotes the appropriate reporting structure for risk management. The RBS can follow different logic, it can be structured following the corporate organizational structure, which would align business unit managers as risk owners. In this alignment, a project manager would own all the risks pertinent to his project, and would be able to manage the project risks and detect risk status changes more efficiently.

A different approach would be to organize the risk hierarchy by risk type (strategic, financial, operational, compliance...). This organization would allow the management to assess more efficiently the risks on a corporate level, because they would not be granulated by business units, but the unit managers would lose the ability to assess the risk impact on a business unit level, as the risks would be granulated under different risk types in the enterprise.

The ERM design phase includes not only risk identification and assessment, but also development of mitigating procedures, events, responses and triggers tied to a particular risk. Few internal risks are independent of each other. In the WillisWire blog “Guide to ERM: Interdependence of Risks” (Underwood, 2014, p.2) the interdependency of risks is defined with four clear rules:

a) Two risks that move perfectly in lockstep are assigned a correlation value of +1

b) two risks that move exactly opposite to one another have correlation -1

c) two risks whose movement is completely unrelated have correlation 0

d) other possibilities fall along this spectrum accordingly

Risk interdependency is most commonly expressed in a correlation matrix. Most sources assume that the interdependency is bidirectional, when, in effect, this is only a special case. The illustrative Risk Interaction Map in “Risk Assessment in Practice” (Deloitte, 2012, p.12) shows that Supply Chain Disruption risk is related to Economic Downturn risk. Economic downturn certainly might influence Supply Chain Disruption in the enterprise, but the opposite is not plausible. In the same matrix, Exchange Rate Fluctuations risk is related to Customer Preference Shift risk which might be quite significant for enterprise everyday operations, but changes in customer preference certainly would not provoke exchange rate fluctuations.

Risk interdependency is embedded in the Risk Breakdown Structure. SAS white paper "Risk Aggregation and Economic Capital" (SAS, 2010, p.2) describes risk aggregation models in banks from simple linear aggregation to copula models. Most often, the Value at Risk (VAR) or Expected Shortfall (ES) is aggregated. But values at risk are not the only information embedded into the Risk Breakdown Structure. Each sub-risk has a number of events or triggers that might change the sub-risk status. Each sub-risk status change might invoke a change in the status of the risk at a higher level. The status change at a higher level is governed by the threshold imposed at each sub-risk.

Sub-risks are not the only interdependency of a particular risk. A risk can be related to a risk in a different part of the Risk Breakdown Structure. In a risk structure organized by business units, a particular risk often depends on a risk in a different business unit.

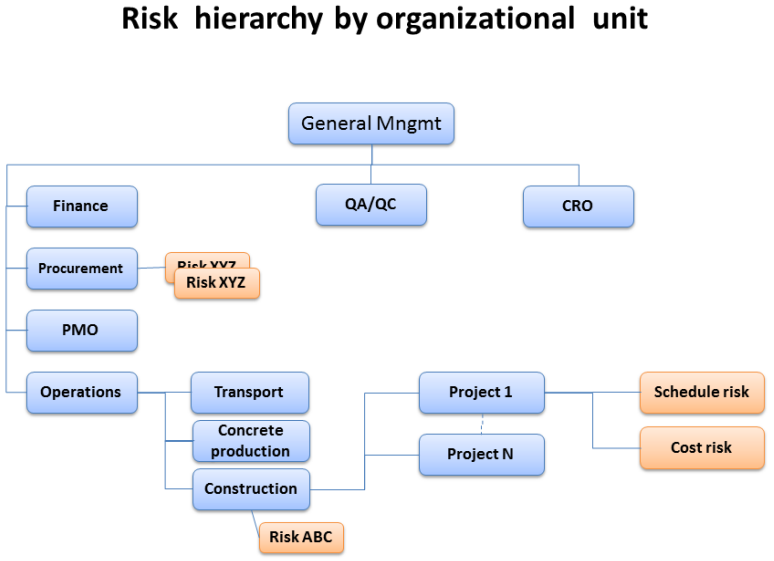

Figure 1 Risk Breakdown Structure by organizational unit

Consider a construction enterprise. The most important risk in construction industry is the risk of construction cost overrun, classified as high and frequent (Banaitiene, 2012). Numerous sources indicate that delays in construction activities are the primary cause of construction cost overruns. A research led by Flyvbjerg & all (2004) revealed that the 84% of 258 large international infrastructure projects had cost overruns which averaged to astounding 28% of the project budget. In the Schedule Delay Risk, the activities

that are on the critical path, may delay the whole project, so it is reasonable that this risk would be quite important to the project manager.

In an activity involving pouring concrete, the risk of delay may be caused by external conditions (like weather) and internal, like insufficient qualified personnel assigned to the activity. But there are a number of factors that might influence activity delay, that are external to the project, but still inside the enterprise, in other business units, where the project manager does not have the power to enforce priority to his project. There may be a disruption in concrete delivery, either by lack of operating vehicles in the Transport Department, or by changed production priorities in the Concrete Production. The interdependence is clearly directed from the Production Plant towards the Project as the delay in project schedule due to other causes will not influence concrete production. Changes in Concrete Delivery Delay Risk status (defined in Production Plant Risk Breakdown Structure sub-tree) might change the Activity Delay Risk status of a particular project. Another project might not have any concrete pouring activities, and might be totally independent of developments in the Concrete Production Plant.

Risk identification and assessment is a multidisciplinary task. Operational risks are best assessed at operational level by C level executives and personnel that are performing everyday tasks. In the illustrated case of Activity Delay Risk, the project manager will not single handedly assess this risk and correlated sub-risks. It will take a multidisciplinary team of qualified personnel from Concrete Production, Transport Department and probably Financials and Procurement, to assess the risk in full and to design triggers and mitigating procedures. Most importantly, a communication protocol must be established. This is addressed by the Multidimensional Preemptive Coordination explained in the next chapter, but is mentioned here to illustrate the complexity of information cubicles tied to a single identified risk.

Risk monitoring adds another level of complexity into the Risk Register structure. Integrating monitoring procedures into everyday business activities leaves a trace of history records tied to a particular risk. Once the risk monitoring starts, history data, collaboration efforts, procedure results, auditing findings are recorded and linked to a risk and hence, to a point in a Risk Registry structure. Such a risk monitoring system was described by Bacun (OFEL proceedings, 2015).

Traditionally, once the risk hierarchy structure is selected, all the rest of the Risk Management system is built upon it. It remains static and new risks are added into the same structure. This is an acceptable situation for mostly static enterprises, like banks and insurers, but project oriented enterprises, in construction industry and the like, face different challenges. They would introduce different levels of hierarchy corresponding to the different project amplitude. A single project might become so significant, that it is separated almost to the level of a separated business unit. A number of projects might be

grouped depending on a predominant activity type. A group of projects might be regrouped into different monitoring structure, corresponding to changed workflow conditions. An ongoing project might be organizationally split into segments due to organizational or geographical contingencies.

New risks are added into the existing registry structure and the registry is expanded as situation evolves. This might satisfy enterprise needs at the strategic level. But on the operational level, new developments might mandate a restructuring of the Risk Register. The Risk Register should not be rigid. A point in a Risk Breakdown Structure, whether it is an ending point (*leaf*) or a higher level point (*node*), might need to be *moved* to another part of the RBS, together with all the information cubicles attached to it. This is achieved by embedding structure information in a risk record using any of the available tree structure maintenance algorithms.

If the Risk Breakdown Structure is modifiable in run time, then emerging risks can be addressed more efficiently. We would not need to develop full operational Risk registry of few hundred or thousands of risks before we put monitoring into action. The ERM implementation would start with few important risks and develop over time. The 18-26 month of initial Risk Registry development could be significantly reduced, as risk registry development would become a continuous process.

4. COLLABORATIVE RISK MANAGEMENT FRAME-WORK

Risk Registry development starts with strategic risk identification and assessment. It cannot be done by a single individual or team, because it encompasses all of the business functions formulated through enterprise business objectives. The assessment process advances via meetings and interviews with qualified personnel from different business units and different professional levels. Those initial efforts collide with everyday business activity which is probably the reason for long initial ERM implementation.

Research on meeting efficacy (Romano & Nunamaker, 2001) has shown that 73% of participants questioned meeting effectiveness due to poor planning, 11%-25% of time was spent on irrelevant issues, 33.4% consider meeting time is unproductive and majority of surveyed executives concluded that 20%-30% of the meetings were unneeded. At the same time, on average, 9.6 hours are spent per week in meetings. Between 8% and 15% of personnel budget of the company is spent on meetings. At an average of 15 participants in a meeting (depending on a company size), the analysis found that total cost of meetings are in range of US$50 million to US$ 70 million annually.

KPMG report identifies software tools as indispensable in risk management practice. They have paramount role in providing the organizational

infrastructure that enable risk executives to make appropriate decisions. 73% of interviewed C-level executives consider technology an indispensable tool to embed risk management into everyday business procedures.

Multidimensional Preventive Coordination governs the communication across the enterprise. It provides collaborative infrastructure based on multiple coexisting corporate social networks focusing participant's efforts on particular risk variants. The system automatically maintains an auditable trail of previous actions performed during assessment, so new professionals are easily introduced on per need basis contributing quickly and efficiently. They share information, new developments and discuss alternatives on a corporate social wall which is private to the invitees. The model is easily extended to include individuals external to the enterprise in a safe way, with a horizon of visibility restricted to the problem in focus (Bacun, 2014).

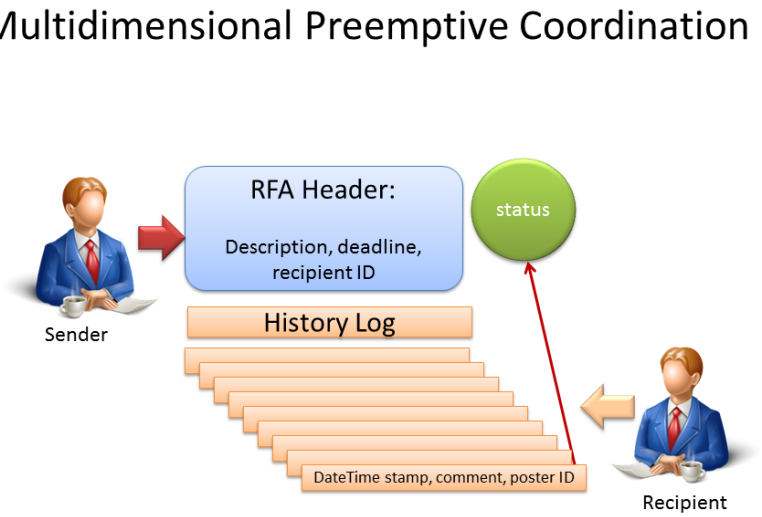

Figure 2 A simple form of Request for Action

In its most simple form, the Sender issues a Request for Action (RFA) to the Recipient with a task description, a deadline and an initial status. The Recipient logs the progress, problems and new developments in the RFA history log. Only the Sender may change the details of the issued RFA. The system logs the changes into the history log. Only the Sender can declare an opened Request for Action finished.

Both Sender and the Recipient can post to the history log, but neither of them can change or delete log entries. Each log entry is given a unique ID, the poster ID and a date/time stamp, creating an audit trail of task's progress. Both

Sender and Recipient can change the status of the RFA, signaling the other party of a new development. The system also can change the status of the RFA, if a particular condition is met, like approaching or missed deadline, no activity for a period of time, or some other, predetermined condition. The history log becomes a topic social wall where the participants discuss and monitor the progress of a particular business problem, while the system maintains an audit trail of actions performed. The topic social wall is visible only to the invitees.

The Recipient might initiate a subtopic, requesting help or information from another party via a linked RFA. Such a discussion would be part of the original thread and visible to the original participants. The subtopic Recipient will not see the original discussion, as his horizon of visibility is restricted to the level of the received RFA. In this way, participants can be introduced to different altitudes of the enterprise effort keeping their focus sharp. Linked Requests for Action form a single thread of assessment effort, integrated into a single coordination topic, where each participant has a different scope of visibility.

Each participant may be part of multiple threads. His own corporate social wall will show news, discussions, instructions and reported problems from all the threads he participates in, from his horizon of visibility. He can easily respond or comment on any post and change the status, and the system will alert the participants of appropriate thread.

The coordination structure includes participants from different departments and seldom follows the organizational structure of the enterprise. Time spent on a particular request resolution might interfere with Recipient's everyday tasks. The Recipient's supervisor (or upper level in the corporate organizational structure) is alerted of approaching or missed deadlines. If everyday business activities are governed by appropriate Requests for Action, the supervisor gets full insight into subordinate time and activities. The subordinate reports daily progress, problems and new developments using received request as a report card. The Risk Management is fully integrated into business activities and becomes a continuous every day process.

The Board would assign the initial request Recipients and deadlines to initial risks, allowing board members to monitor progress of ERM implementation. Each Recipient would invite the necessary professionals into the topic and issue further Requests for action down the line. Assessments would identify further risks at the lower levels, which would be assigned a coordinator via a RFA. The identified risks would be assessed. Responses, events and triggers would be designed, mitigating and monitoring procedures set up, and owner designated. Each risk would be intrinsically positioned at a certain altitude, not necessarily following the organizational structure of the enterprise. Risk granularity will not be a problem, as no single individual would handle all the risks, but rather, only those that are in his horizon of visibility. The system would propagate alerts instantaneously, both through the Risk Breakdown Structure and the Organizational Breakdown Structure.

5. CONCLUSION

The adoption of Risk Management in the enterprise has been disappointing. In recent AICPA survey of 1093 enterprises, only 25% of respondents consider that their organizations have "complete formal enterprise-risk management process in place", but only 23% describe their maturity level as being "Mature" or "Robust". After the initial stage of Risk Registry development, the effort stalls, primarily because the lack of integration into everyday business life, everyday business activities. The initial identification and assessment takes as much as 18-26 month (Gallagher, 2013) which leaves the impression of one time effort. The resulting Risk Registries are expanded with new entries into the same structure with overwhelming granularity. Emerging risks that would demand registry restructuring are difficult to implement.

This paper describes a framework with variable depth Risk Registry, which allows positioning each risk at the proper corporate altitude, hierarchical position where it will be best managed. The Registry is flexible, allows restructuring in run time and simplifies integration of new emerging risks into corporate life. Risk identification and assessment is governed by the model of Multidimensional Preemptive Coordination, introducing collaborative environment, corporate social networking, for multidisciplinary effort to address emerging risks. Risk granularity is solved by participant's focused horizon of visibility to invited risk assessment processes. Participation in multiple assessment procedures, multiple coordination topics, is solved by individually tailored social wall, where the participant can easily respond, share new ideas and report problems. The system maintains and auditable log of all actions performed introducing accountability across the enterprise. Status changes, approaching and missed deadlines and alerts are propagated vertically both through the Risk Breakdown Structure and Organizational Breakdown Structure, enabling enterprise wide communication, personalized for each participant.

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