OmniaScience

Journal of Industrial Engineering and Management
JIEM, 2015 – 8(3): 738-762 – Online ISSN: 2013-0953 – Print ISSN: 2013-8423
http://dx.doi.org/10.3926/jiem.1293

Risk Leveling in Business Environments - A Novel Approach for Macro Risk Management

Shahid Rasheed[1], ChangFeng Wang[1], Faiza Yaqub[2], Suhail Memon[1]

[1]School of Economics and Management, Beijing University of Posts & Telecommunications (China)
[2]NPCC, National Transmission Dispatch Company (Pakistan)

shahidrasheed@outlook.com, wangcf@bupt.edu.cn, faizayaqub@gmail.com, suhail_sam06@yahoo.com

Received: November 2014
Accepted: April 2015

Abstract:

Purpose: The purpose of this study is to presents a specialized risk management approach and a structured risk management methodology for optimizing the macro business environments in turbulent business spheres.

Design/methodology/approach: In this work, we present a specialized approach called 'Risk Leveling', and an organized risk management methodology known as 'Risk Leveling in Business Environments (RLBE)'. The Risk Leveling approach guides on how to deal with the contextual turbulences in order to attempt the ideal business settings, and the RLBE methodology provides an operational procedure to evaluate and manage the macro risks in a designated way. RLBE follows a multi-tier approach towards divergent risks and focuses on balancing the risky macro environs facing the business (segment). While observing risk mitigations, this approach recommends utilizing the available resources in a systematic and efficient way. The RLBE procedure directs how to reduce the risks to match them with the enterprises' risk tolerance; it also attempts to diminish the mutual risk disparities giving rise a context in which no risk is seen too big or too small comparative to the others. In order to actualize the desired, the RLBE process utilizes a mix of group decision methods (i.e. Brainstorming, Delphi, Three Point Estimates), analysis tools (i.e. Analytical Hierarchy Process (AHP)), and philosophies (i.e. As Low As Reasonably Practicable (ALARP)) in an orderly fashion.

Findings: Risk Leveling procedure presented in the study adopts the standard risk management process, attempts to pacify macro risks, and strives to achieve risk leveled environments for the industry. During its course to pursue the best business settings, RLBE favors to conserve the scarce organizational resources by utilizing them systematically.

Originality/value: This approach can be practiced by the regimes to pacify and regulate the macro risks in the turbulent market segments.

Keywords: Risk Management, Business Environments, Macro Risks, Risk Leveling, Structured Methodology

1. Introduction

In the advent of industrial developments and with the mushrooming of information exchange, the world is converging into a global village. Conglomerates, all around the world, are pursuing investments beyond set bounds (Scherer & Palazzo, 2011; Held, McGrew, Goldblatt, & Perraton, 2000). Consequently international mergers, acquisitions and joint ventures are becoming a norm (Du & Boateng, 2012; Beamish, 2012; Uddin & Boateng, 2011; Bhalla, 2014; Abor & Agbloyor, 2012). All such moves are expediting the so called globalization phenomenon (Scherer & Palazzo, 2011; Held et al., 2000) which is paving the way for rising trans-boundary interdependence of businesses and social actors; this is causing a heightened competition and an upsurge in both risks and opportunities (Chhokar, Brodbeck, & House, 2013; Held, 1999; Laroche & Park, 2013). However, certain risks in the host markets are challenging the business continuity jeopardizing the existing industry, and building resistances for potential entrants to embark into new marketplaces (Wells, 1998). Risk is termed with diverse definitions in different realms. It is referred as a possible danger, a likely vulnerability, a suspicion in investment return, and a probable uncertainty etc. (Aven, 2010, 2012; Aven & Renn, 2010). Though risk (or uncertainty) is also regarded positive in some contemporaneous developments (Levin, 2012; Hopkin, 2014), for our reader's clarity, (unless mentioned) this manuscript only recognizes risk as a disruptive, negative, and unwanted phenomenon.

The corporate evolutions, the industrial advances, and the leading globalization are largely governed by the macro factors; for example, the economic and political decisions by the governments (e.g. foreign direct investment policy, deregulation or privatization rules), the technological progressions (e.g. communication, transportation), and the socio-political advances (e.g. relocations, knowledge propagation) etcetera (Cohen, Kennedy, & Perrier, 2000; Scherer & Palazzo, 2008; Scholte, 2005). Such macro forces pose numerous risks to the businesses, impede the industrial growths, and threaten the interests of stakeholders at all levels; be it the host regimes, the transnational investors or the local, regional or national

entities (Sylvain, 2007). We suggest that the business interests can be secured through apt risk management in the host regimes. The mainstream of professional bodies (ISO, OGC, IRM, RIMS, PMI, P2M,) recognizes risk management as a central requirement to help establishments deliver their objectives (ISO, 2009; IEC/ISO, 2009; OGC, 2010; PMI, 2013a; PMCC, 2008). Despite the fact that risk management can cultivate rich environments bringing in benefits for the investors (e.g. corporates) and the recipients (e.g. public), it is little practiced at the government levels; adding sufferings to the stakeholders (Pellegrinelli, Partington, Hemingway, Mohdzain, & Shah, 2007; Moss, 2004).

Regardless of the origin or specificity of the investors, and irrespective to the scales, scopes or volumes of the endeavors, the macro risks should be cut down to possible minimum for an optimal industrial growth. Such motives can be achieved through suitable plans laid to counter (probability or the impact of) the risks, minimizing the negative upshots and raising the chances of success (Dafikpaku, Eng, & Mcmi, 2011; Hillson & Simon, 2012). However, it is mandatory to observe a balance between the 'cost' of mitigation and the arising 'benefits' while utilizing the mitigation resources. Moreover, in order to gauge and control the macro risks effectively, some organized risk management approach is required. In such pursuits, we present a specialized approach which guides on how to deal with the contextual turbulences in order to attempt the ideal business settings, and an organized risk management methodology that provides an operational course of actions to evaluate and manage the macro risks in a designated way. We label the specialized approach as 'Risk Leveling', and tag the methodology as 'Risk Leveling in Business Environments (RLBE)'. While treating the risks, Risk Leveling, encourages maintaining the desired 'cost and benefit' balance, and thus favors the utilization of scarce organizational resources in a justified way. RLBE procedure, on the other hand, tracks the standard risk management process and provides a procedural line of action to manage the macro risks.

In the risk management literature we note certain deficiencies. Majority of the studies discuss the risk in the micro perspectives; the macro sides are little discussed. Consequently, the mainstreams of risk management efforts are found discussing either a particular concern or a specific project or a program; that too in the micro dimensions. See for example the orientation of literatures on risk management (Hillson & Simon, 2012; Levin, 2012), or the risk management methods reviewed by (Robert & Arias, 2011) etc. Also, the risk methods and procedures found are sometimes too philosophical or conceptual to practice in reality. For reference see the conceptual work given by (Ahmed, Kusumo, Savci, Kayis, Zhou & Khoo, 2005) or a theoretical research presented in (Kwan & Leung, 2009) for risk investigations. Lastly, the majority methods treat risk recognition, assessment or treatment in a piecewise formation; they hardly touch risk management (process) in a holistic fashion. All such deficits motivate us to devise a methodology that may address risk needs of the industry in the macro perspectives.

To identify, assess and value risks, several risk processes (e.g. 5 stage process by PMI (PMI, 2013a) and ISO risk process (ISO, 2009) etc.) and qualitative and quantitative tools and techniques (e.g. Expert Judgments, FMEA, Monte Carlo analysis, Decision Tree, and Probability and Impact Matrices etc.) are available in the literatures. Interested readers may refer to (IEC/ISO, 2009) and (Beck, Demirgüç-Kunt, & Levine, 2000), for example. This study aims to employ uncomplicated yet widely recognized methods to craft the RLBE methodology.

Rest of the paper is arranged as follows. Section 2 provides overview of macro risk forces conterminous with the business and outlines their implications. Section 3 describes the broader dilemma caused by macro risks and proposes (an organized) risk alleviation to be the solution. In Section 4, we present Risk Leveling approach and the RLBE procedure for risk management in detail. Section 5 educates the readers with a relevant case study, while Section 6 briefs the way forward. Finally Section 6 concludes the theme.

2. Risk in the Macro Environments and Implications for the Business

Sometimes also known as PESTEL, the macro-environments are the 'pertinent universe' or 'field of action' for the industry. Contrasting the micro forces, which consist of the indigenous business drivers of the enterprises, the macro factors are the foreign powers that govern the business continuity in a market. As shown in Figure 1 these factors include the economic, technological, political, legal, social, and environmental risk forces that may affect the business (positively or negatively) (Kaynak, Ajami, & Bear, 2013). The macro factors influence the principal investments, affect the enterprise working, impact the endeavors' progresses and pose frequent challenges to the industry.

Figure 1. The Macro Risk Forces in Business Environment

The economic settings defined by the economic systems and conditions of a state determine the enterprise existence within the market. The political environs founded by the laws and bylaws provide a framework for doing business. The social environments comprising the values

and beliefs of people are considered one of the hardest to change part; however, they impact the ways of working. Similarly the natural environments, regarded almost inflexible, influence the industry dimensions. Likewise the technological atmospheres surrounding the enterprises are the rapidly changing environments; they are potent enough to pose significant opportunities or threats to the industry. Finally, the legal environments comprising the laws and rights govern the relationship of a business with its customers and suppliers (Cohen et al., 2000; Scherer & Palazzo, 2008; Scholte, 2005). All these dense forces encounter with the products from introduction to decline; the operations from startup till end; the projects from initiation to closure (PMI, 2013a); the programs from formulation to termination (Thiry, 2004); the portfolios from conception till retirement (PMI, 2013b); and the enterprises from seeding until decay. The presence of multifaceted macro factors and the resulting implications for the industry may never be undermined.

All kinds of the endeavors and the investments - irrespective of their volumes - are prone to external uncertainty. Endeavors are the initiatives with varied scopes and objectives e.g. the operations, projects, programs, and portfolios. Similarly, the investments are the stakes that might range from public (e.g. public health facilities) to private (e.g. sole proprietorship) and domestic (e.g. internal capital) to international (e.g. FDI). Any combinations of the aforementioned (e.g. public-private and private-private partnerships) are also possible. By volumes we mean the scales of said initiatives e.g. small, medium, large, and so on. We propose that the interactions of surrounding risk vary with changing scopes of the endeavors. The micro factors, for instance, are the dominant actors for the day to day operations or the defined term projects of an enterprise. However, as we move from projects towards programs, the macro forces come into picture more vividly. Further travels towards portfolios observe even more interaction of macro factors on the businesses. The same concept is elucidated in OGC UK standard (OGC, 2010) and implied in ISO risk standard (ISO, 2009).This varying level of exposure is painted in Figure 2.

Figure 2. Endeavors with Varying Level of Risk Exposures

Although external factors apply on how the internal affairs of an enterprise are shaped, the business initiatives often appear incapacitated in controlling the former. Dealing with the macro concerns is envisaged as the key suit of the governments.

3. The Predicament and the Resolve

For various societal, economic and strategic gains, the transitional markets (especially the developing states) continuously seek investments from the developed countries (Al-Debei & Al-Lozi, 2012). They also bear inclination to mobilize the domestic industry for similar gains. On the other hand, a number of enterprises aim to expand outside set bounds. The smart initiatives (e.g. multinational companies) are well aware of the fact that the best 'organizational fit' lies in equilibrium between the internal strengths of the organizations and the external risks in the environments (Anand & Ward, 2004). The established multinationals enjoy pretty well internal strengths, however, what hinders their (market entry) decisions are the risky macro environments of the target regions; where such portfolios hold no or little controls (Kaynak et al., 2013). Such affairs often imperil the potential deals abstaining the conglomerates from entering the target markets (Omar & Porter, 2011). The domestic industry (e.g. SMEs) also badly suffers for similar grounds (Amroune, Hafsi, Bernard, & Plaisent, 2014; Yalcin & Kapu, 2008). External variables are thus found exceedingly influential in shaping the business decisions and continuity of the industry.

Arise here the requirement for pacifying the risky environs in the best business interests (van Asselt & Renn, 2011; Renn, 2005). Such intent can be realized by exercising prudent risk management, where practical approaches and instruments may be helpful. Many of the researchers and professional bodies working in risk domains have laid guides & standards (refer to PMI, 2013a, 2013b, 2013c; ISO, 2009; PMCC, 2008; OGC, 2010), tools & techniques (consult e.g. Chapman, 2011; IEC/ISO, 2009), and procedures & processes (check in e.g. PMI, 2013a; ISO, 2009; Hillson & Simon, 2012) for risk management. We may explore some suitable approach to manage risks in the macro contexts so that the interests of regimes and businesses may be secured.

It is important to understand that each business entity (or enterprise) holds different ability to bear the risk quantified against objectives, called the risk (bearing) capacity (Hillson & Murray-Webster, 2011). Both the existing corporates and the potential entrants struggle to enhance their risk (bearing) capacities and meet the external challenges (of the host market); else they prefer switching to other marketplaces where they might sustain. In either of said cases, the businesses attempt contexts where their internal and the external environments might strike a balance. Let us assume that the risk bearing capacity of an enterprise is fixed. The (host) regime may still offer the desired balance by reducing the macro risks conterminous with the business. This concept is painted in Figure 3.

In practical scenarios however, where there are innumerable enterprises working in a particular (industrial) domain, finding such arrangements for each individual entity might be an (over)exhaustive (and possibly a futile) effort. In such cases, the risks may be reduced to defined 'aggregate' levels keeping in view the available resources and the sector specific

(facilitation) agendas of the governments. In order to manage the risks in a systematic way, we obviously need (to adopt) certain organized approach. Next we discuss a specialized risk approach tailored for the scenario discussed above.

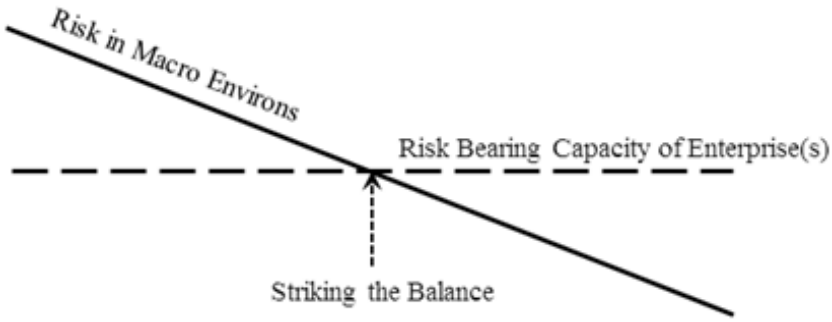


Figure 3. Striking a Balance – Risk versus Risk Bearing Capacity

4. Risk Leveling

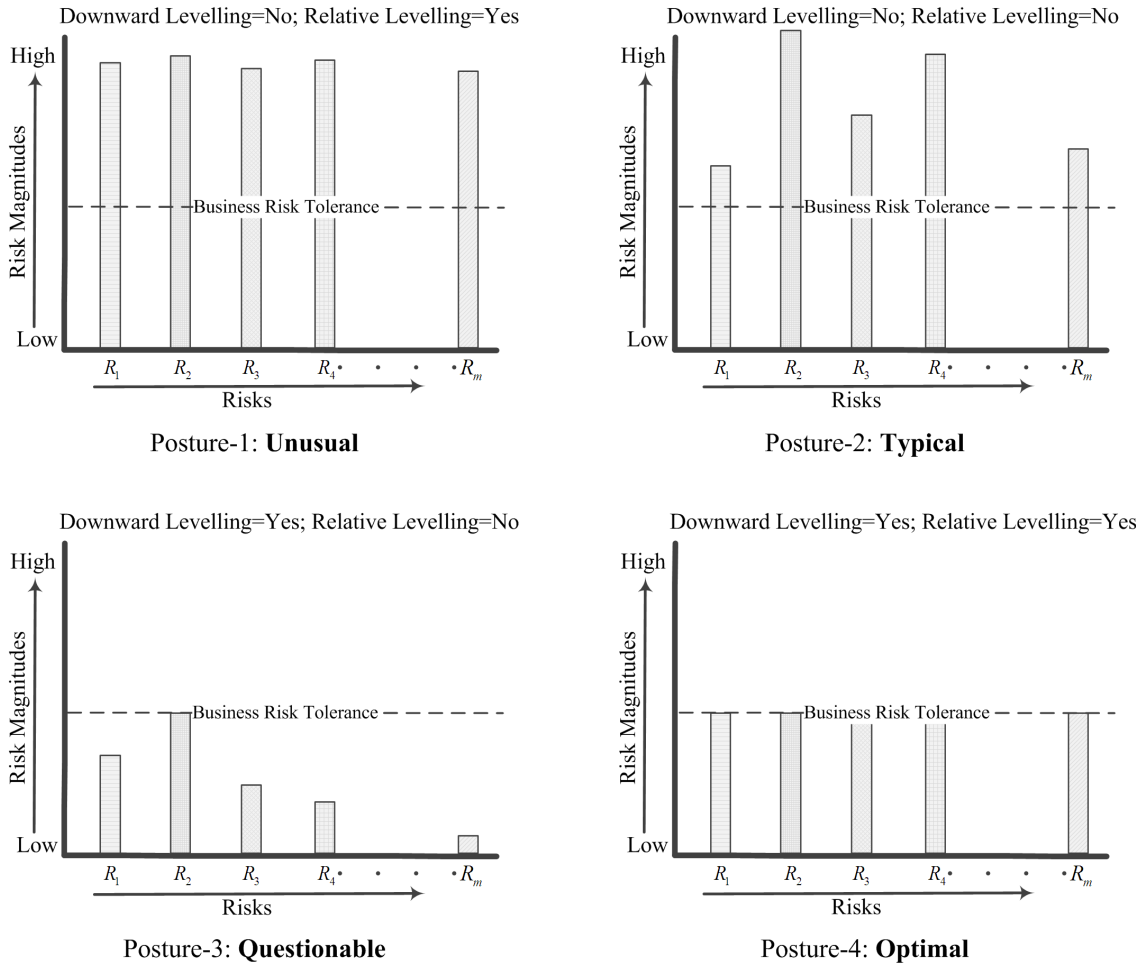
In a turbulent industry environment risks have dissimilar standings; some risks are seen overly critical for business whereas some others may occupy moderate to low ranks. As we commence risk mitigation, we propose to achieve such balanced environment where the entire macro risks become well settled and symmetric. Such destined environment – called risk leveled environment – may nurture the businesses in an optimal way. In this fulfillment we coin the Risk Leveling approach and the procedural methodology which are detailed in the sections to follow.

4.1. Risk Leveling – The Concept

Risk Leveling may be conceived as a (risk management) system that struggles to achieve an environment wherein all the (external) risks are leveled down in absolute terms; and at the same time, the risks are mutually leveled in comparative footings. These two fold perspectives, in our expression, are connoted as 'downward leveling' and 'relative leveling', correspondingly. By curtailing individual risks down to acceptable levels and diluting their mutual disparities, Risk Leveling attempts to strike a balance between the risk treatment efforts and the resulting benefits by rationally utilizing the (scarce) organizational resources (in an orderly manner). In a broader sense, Risk Leveling is all about mitigating the macro risks in a sensible and composed way. It aims to substantiate a (wished-for) system in which no risk is seen too big or too small compared to the other contiguous risks, and all the (residue) risks turn fairly acceptable to the businesses (industry).

We may provide the analogy of 'Risk Leveling' to the 'Field leveling' of the farmer in the plowing field. For cultivation, the farmer prepares the uneven fields in two distinct ways: first, (s)he rocks down the big piles of soil with a bulldozer, and second, by use of leveler plough, (s)he evens off the field to provide a terrain that is symmetric and friendly for the entire crop. If the terrestrial field is taken as the business environment and the crop is presumed to be the business, the farmer's act of preparing the land for the crop bears a resemblance to the Risk Leveling for the business, where the 'bulldozing' becomes analogous to the 'downward leveling' of risks and the 'leveler plowing' corresponds to their 'relative leveling'.

If we analyze a market keeping in view the risk magnitudes and the relative risk (dis)parities (for a set of macro risks), four possible postures are encountered; they are presented in Figure 4 below. Out of them first two postures conceivably represent the opening states of the market before risk mitigation is initiated, whereas the latter two represent the imaginable outcomes after mitigation is exercised.



Posture-1: **Unusual**

Posture-2: **Typical**

Posture-3: **Questionable**

Posture-4: **Optimal**

Figure 4. Four Market Postures

- Posture-1, named **Unusual**, translates a situation where the magnitudes of the entire set of risks are way higher than the tolerance limits of the industry; yet their relative disparities are low, which essentially means that all of them are mutually equivalent. It represents unlikely case for practical scenarios.

- Posture-2, labeled **Typical**, reflects a market condition that manifests diversity in risk magnitudes; however, all of them are ample beyond the industry's tolerance. This posture characterizes a typical risky (or turbulent) market.

- Posture-3, tagged **Questionable**, though signifies that mitigation has been pursued to reduce the risks; it reflects that risks are overly treated resulting in a rise in their mutual disparities. It represents an unjustified (and inefficient) utilization of resources causing diminishing of certain risks even beyond the desired levels.

- Posture-4, termed **Optimal**, represents such an ideal setting in which the risks are reduced to match the industry's tolerance and their mutual parities are also attempted through best resource utilization.

While all the other provisions are objectionable (either representing insufficient or inefficient resource utilization), posture-4 (termed Optimal) is the ideal target to be pursued. It may offer a highly balanced and conducive environment to the industry. This may be succeeded only if we assume 'sufficient' and 'efficient' use of resources in a structured pattern. In the coming section we discourse how such arrangements can be achieved in reality.

4.2. Risk Leveling in Business Environments (RLBE)

In order to realize the abovementioned concept of Risk Leveling, we craft a methodical procedure 'Risk Leveling in Business Environments (RLBE)'. The RLBE procedure may be defined as an operational course of action designed to achieve risk leveled (macro) business environments. The RLBE methodology, as shown in Figure 5, is built upon certain known and reliable instruments exploited in a specific way. Two prime applications used in the scheme are the ALARP (As Low As Reasonably Practicable) and the AHP (Analytical Hierarchy Process). The ALARP is used to denote the intensity of a risk in the given context (whether tolerable or not) and acts as mitigation or extenuation reference in Risk Leveling. On the other hand the AHP, which revolves around pairwise comparisons by virtue of its configuration, provides a measure of mutual leveling in this particular procedure. In addition, this course adopts the Brainstorming technique for risk identification; moreover, the Delphi and Three Point Estimation surveys are utilized to assess the risk probability and risk impact, accordingly.

The RLBE activity starts with scanning the specific industrial sector where the macro environments and the business context (in the concerned market) are established initially. The key stakeholders and their influences on the industrial segment are analysed. The preliminary risk criteria and its association to the industry are also determined. To undertake this initiative an expert board is identified which involves multidisciplinary experts having in-depth knowledge and experience of the specific sector (in question). Also a risk steering committee is formed that carries out diverse tasks throughout the progression.

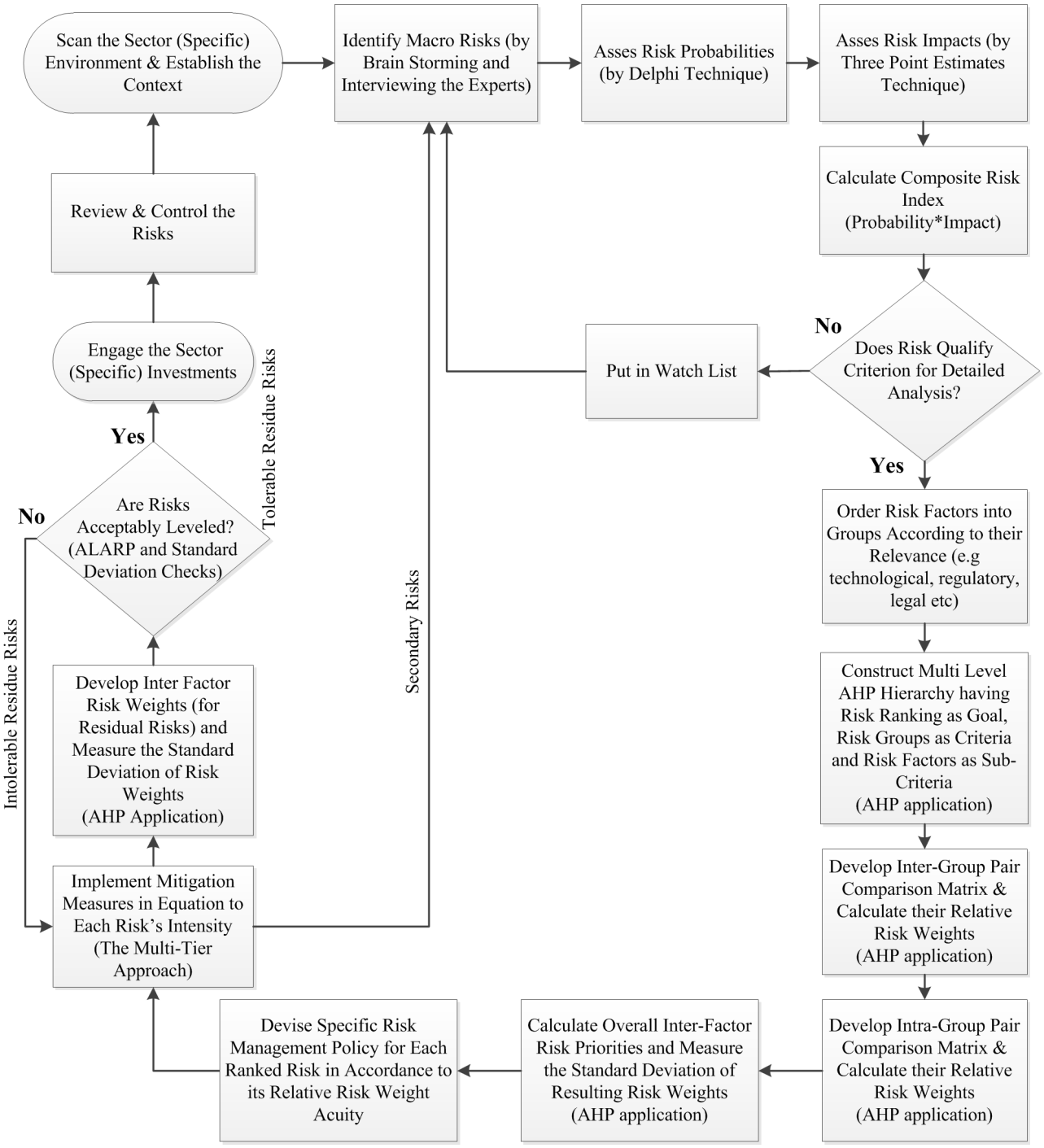


Figure 5. Risk Leveling in Business Environments (RLBE)

Following the context establishment, entire macro risks (factors) are identified through engagement of the experts. In such doings, any combination of the formal and informal interviewing and brainstorming methods may be applied (Litchfield, 2008; Kvale & Brinkmann, 2009). The results comprise an exhaustive dictionary of the potential risks facing the industry. This index resembles the risk breakdown structure (as detailed by Hillson, 2003) and may outline risk definitions, risk factors, stakeholders, potential risk owners and other risk relevant information. Next we determine the risk probability and impact assessment to work out the Composite Risk Index (CRI) which can serve as basis for the preliminary risk valuations. The risk probability is defined as the likeliness of happening of a risk and the impact is regarded as the consequences that are faced in case of such happening. For CRI calculations, this procedure relies on 'Three Rounds' and 'Three Views' approach where the probabilities and impacts are determined by Three Round Delphi and Three Points Estimates technique respectively. The typical Delphi is composed of a set of multi round anonymous surveys where the opinions of panelist experts are collected on the probability of happening of each risk. At the end of each distinct round the anonymous summary of judgments is provided to the panel. It provides a basis for converged opinion in the following round and results a forecast that manifests increased accuracy and consensus. For comparatively unknown circumstances where the actions are highly dependent on the accuracy of forecasts (such as risk assessment) the Delphi is much popular for its consensual characteristics and ease of use (Hsu & Sandford, 2007; Bonnemaizon, Cova, & Louyot, 2007). Despite the mixed opinion of researchers about Delphi (see for example Markmann, Darkow, 2013; Tapio, 2002; Bloor, Sampson, Baker, & Dahlgren, 2013) we accredit it on grounds that it is well established, extensively adopted, and has now survived for multiple decades (Mullen, 2003). Three Point Estimates is yet another renowned method for uncertainty assessments from collective insights and experiences. This technique uses a weighted averaging mode to estimate the results from three divergent projections called the Optimistic (O), the Pessimistic (P) and the Most likely (M) views. It is very famous in management disciplines for planning (e.g. PERT) and predictions that are based on limited evidence. The concluding impacts are worked out from weighted average of the three views as (O + 4M + P) / 6.

Having the risk probability and impact results achieved against each risk factor, they are multiplied together to formulate Composite Risk Index (CRI) values. The CRIs reflect the risk magnitudes or the expected values. They serve as metrics to pick out certain risks for further analysis; the rest are put in watch list for future considerations. The risk steering committee designs the associated filtering criterion. Such criterion is founded on the market and business context, the government preferences, the available resources, governing implications, and the projected benefits etc. A simple criterion may be to pick certain categories e.g. critical, very high, and high risk ranks (if CRI is based on qualitative indicators) or a fixed percentile e.g. top 50 percentile ranks (if CRI is based on numeric values) of risks for comprehensive risk analysis (to be performed ahead). The evident reasoning for putting some risks on watch list is that the

risks are not static (OGC, 2010; Hillson & Simon, 2012); so they demand an unceasing analysis.

Although reasonable for preliminary assessments, the risk matrix (and CRI) are not sufficient for comprehensive risk analysis for many downsides (Cox, 2008). For detailed analysis, this procedure recommends using a Multi Criteria Decision Method (MCDM). The methodology aims to rank the individual risks through mutual comparisons. Such intent is pursued through utilization of Analytical Hierarchy Process (AHP) which is a renowned MCDM technique; it is based on paired comparisons and deduces tangible values that are used for decision making (Saaty, 2008; Saaty & Peniwati, 2013). Owing to its flexibility, openness and efficiency, AHP has been extensively utilized for decisions in a variety of disciplines including engineering, finance, management, health, politics, education, governance and many more fields (Ho, 2008 Rasheed, Changfeng, Yaqub, Rafique, & Di, 2014). The AHP process defines the weights of the criteria elements first; the ultimate solution weights of the alternatives with reference to the criteria are built thereafter (Saaty, 2008; Bodin & Gass, 2003). The AHP operation contains three basics, which are the hierarchy building, priority formation and synthesis, and the consistency check. In order to apply AHP to gauge different risks in Risk Leveling plan, alike risks are clustered together to form risk groups. After such clustering is done, a three layer hierarchy (as shown in Figure 6) is framed. Risk Grading sits at the top of hierarchy as the 'Goal' whereas the Risk Groups and Risk Factors form the 'Criteria' and 'Sub-Criteria' being the second and third layer, respectively.

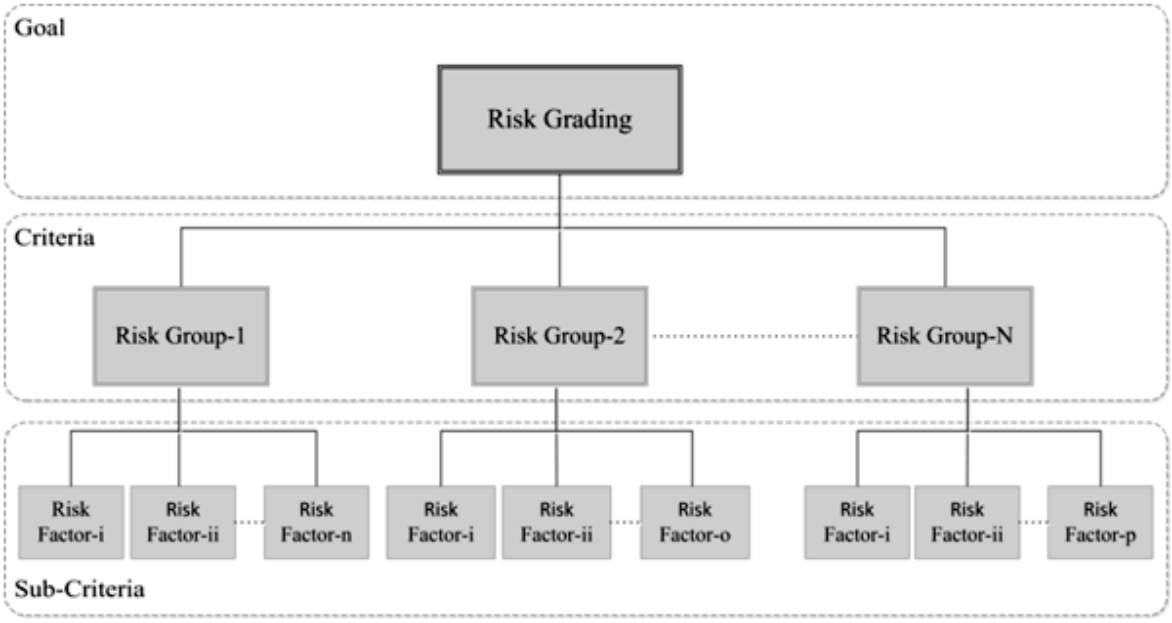


Figure 6. Representation of Multi Level Hierarchy

Specialized AHP questionnaires are served to the experts and their verdicts on comparative grading of risks (Using the Saaty's 1-9 scale) are recorded. The panelists are queried like, 'how many times big or small is the risk A in comparison to the risk B in hampering the growth of the industry/ business (in question)'. Survey proceedings on Inter-Group pair comparisons and the Intra-Group (elements within same group) pair comparisons are collected, framed in AHP matrix, and synthesized. As the comparisons are based on subjective judgments, the possibility of inconsistency is carefully verified (through consistency ratio evaluation; which should not be more than 0.1, ideally) and if essential, the observations are revised. Conclusive (relative) priority of each risk factor is calculated by multiplying its risk weight (in Intra-Group formation) with the weight of its parent risk group (in Inter-Group formation). The final AHP tabular houses all the risk factors with relative weights/ priorities.

For a typical turbulent (business) sector, the macro risks bear varied (comparative) standings, and so do their respective weights (in AHP table). A careful inspection of relative ranks reveals a wide-range bearing of risks where some risks appear far above the mean (or average) value (which is $1/m$; in case of m risks) and some others seem way below. Certain elements could reside near the mean (or average) as well. The risks falling far off from the mean are known as the outliers. More the numbers and the weights of the outliers are, the greater is their Standard Deviation (from the mean) and vice a versa. The increased standard deviations reflect an imbalanced posture of (macro) risks and point the requirement of leveling to achieve even, well-adjusted and consistent environs for the industry/ business.

The open choice for the governments to combat the macro risks are the policy instruments. Risk Leveling proposes observing such mitigation policies that can level down the entire uncertainties in line with the ALARP (As Low As Reasonably Practicable) recommendations. ALARP is a subjective inference that is largely used in the risk context in health and safety fields. It is appreciated as basis approach for citing tolerable risks, rational for regulatory determinations, primarily. The ALARP tries to equilibrium the cost-benefit philosophy for managing risk (Marszal, 2001) and endorses that the cost of extenuating a risk should allow clearly defensible relationship to the expected value. Since the risk tolerability and risk acceptability decisions may have significant economic, financial and other business implications, it is important to understand essentials like decision framework, risk perception, risk tolerance, risk employment and their connotation to the ALARP (Melchers, 2001). Figure 7 depicts the theoretical link of risk levels and the ALARP.

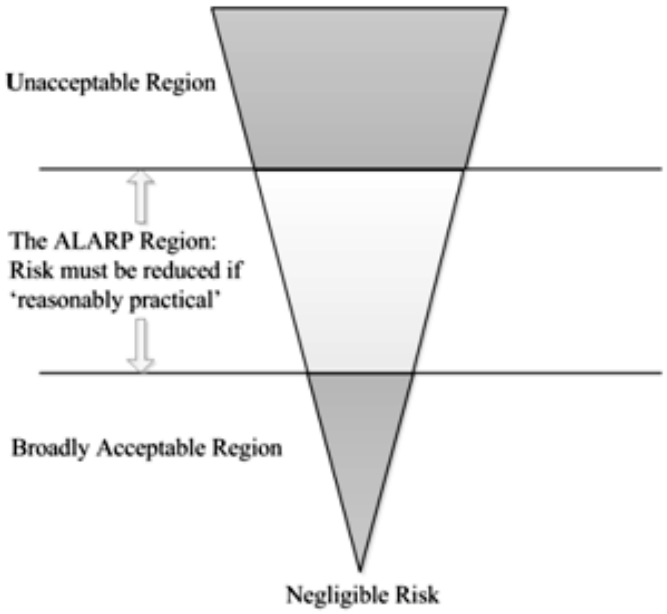


Figure 7. Risk Levels and the Concept of ALARP

In order to undertake risk mitigation, Risk Leveling recommends taking measures against each individual risk in equation to its acuity and intensity. For such reasons, we conceive the risks in multiple tiers according to their risk weights. The sample classes may be tier-one (with highest primacy risk), tier-two (having medium priority risks), and tier-three (bearing lower weightage risks); added classifications may also be assumed if risk factors are considerably large. In the extreme cases where best vigilances are required, each risk in itself may serve as a class. The core motive in doing so is that, for each tier of risks, we intend to devise mitigation of equating acuity followed by resource allocations of corresponding strengths. This helps in mitigating the risks and bringing them within the industry's tolerability. The desired mitigation may be hunted by decreasing the probability of risk, or reducing its severity, or exploiting them both in parallel.

The leveling strategy follows the assumption that the risk mitigation efforts bear a (direct) proportionate relationship with risk reduction; the more efforts you put in the more reduction in risk level you can achieve. Given the fact that resources available are usually limited, one prime objective of risk management should be to balance the use of resources in such a style that least sum of resources brings in most extenuation benefits. Following the similar agenda, this strategy believes in treating the tier-one (highest primacy) risks with profound exertion, turns towards tier-two (medium priority) threats with relatively lesser force, and ultimately addresses the tier-three (lower weightage) factors gently. This 'multi-level' approach leads to symmetric risk fields (in the sector). Besides accomplishing 'downward leveling' through direct risk reduction, each round of mitigation adopted in said manner brings in plunging deviance of the outliers from mean risk weight (in AHP ranking table); this helps achieving 'relative

leveling' of risks, as well. Such mitigation rounds are sustained till the time all the risks become acceptable or fairly tolerable by the industry. The degrees of risk reduction and the extents of mutual leveling are determined by the best judgements of the decision makers; this may vary in varying contexts and segments. In theory, this multi-level and multi-round mitigation may trim down the risks to outright nil. However, the optimal use of resources (in line with the ALARP) limits us to compromise on certain (non-zero) residue values. Anyway, the residue risks must correspond to the industry's tolerability.

While exercising risk mitigation through Risk Leveling, we may define certain criteria for the residue risks' acceptances. Such criteria are largely driven by the reform agendas of the regimes. A sample leveling benchmark, for example, could be accomplishing fairly tolerable risks coupled with a defined percentage reduction in standard (risk) deviation (in the AHP chart). After each round of mitigation, the (residue) risk weights are determined (through AHP technique), and the resulting standard deviation is compared with the launching value. An improved outcome symbolizes success in leveling; this drive is continued until any (pre) defined criterion is achieved. Figure 8 exhibits the risk postures in pre-leveling and post-leveling scenarios, in an abstract way.

After the Risk is achieved in a satisfactory way, the fall back plans are outlined for a rainy day. Given the rationale that the environments are never constant, this approach recommends continually reviewing and controlling the risks over time. Variance analysis may be helpful in exercising such controls.

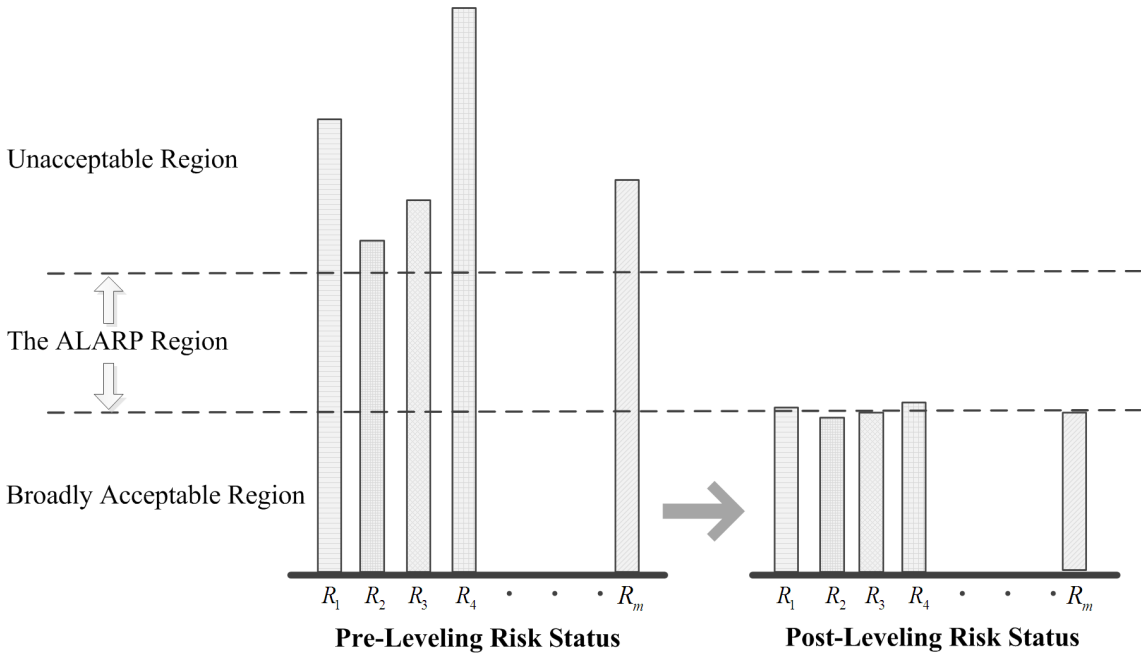


Figure 8. Risk Leveling - A Conceptual Presentation

The environments are now conducive to welcome the new investments as well as to facilitate the existing industry. The businesses may go on board with greater confidence bringing in benefits for the enterprises and the public. Risk Leveling trusts in addressing the contexts in a mode where, besides experiencing tolerable risks, the entities envision entire series of risks symmetric and even; in other words no risks are seen too big or too small compared to the others, anymore.

4.3. Objectivity in Risk Leveling

Let m is the number of risks being addressed for leveling, their composite risk index are represented by R and their relative weights (in AHP matrix) are denoted by W respectively. The pre-leveling relative weights vector is given by $W^{(0)} = (W_1^{(0)}, W_2^{(0)}, W_3^{(0)},..., W_m^{(0)})$ where the Standard Deviation (SD) of these risks is denoted by $\sigma_{R(W^{(0)})}$.

Now we adopt 'multi-tier' strategy for risk alleviation (outlined in Section 4.2), and try to follow tolerable & reasonably practicable (the ALARP) residual risks. In the resultant scenario (when leveling is done), we connote the post-leveling relative weights vector as $W = (W_1, W_2, W_3,..., W_m)$ and the accompanying Standard Deviation by $\sigma_{R(W)}$ correspondingly.

Let $R_j^{(0)}$ is the opening value of the jth risk prior to mitigation, and r_j is the lowest bound residual value of the jth risk in ALARP range. If we assume R_j to be any random target value in ALARP region, then for m risks being addressed, we can say that

$$R_j^{(0)} \geq R_j \geq r_j \geq 0 \qquad j = 1, 2, 3,..., m$$

The optimal Risk Leveling tends to achieve risk extenuation in line with the following dual drives synchronously

$$\min \sum_{j=1}^{m} R_j$$

and

$$\sigma_{R(W)} < \sigma_{R(W^{(0)})}$$

5. Risk Leveling – An Illustrative Case

Here we illustrate a real world case which will help our readers to understand the Risk Leveling phenomenon thoroughly. In an effort to provide e-services to highly underserved and remote areas of the country, the Government of Pakistan (GoP) launched a program to build and operate thousands of Tele-Centres in the country (MOITT, 2014). In the pilot set up, Terms of Reference (TOR) was floated and Request for Applications (RFA) from the potential contestants was sought (USFCo GoP, 2013). Since the sites involved were highly turbulent whilst the TOR cited was quite stringent, the drive was apparently unworkable. During a pre-bid conference (USFCo, 2014) wherein several companies (having domestic as well as international shareholdings) participated, a number of serious concerns were raised; the prospective bidders finally vowed not to contribute until the grievances were addressed, and the TOR was revised.

In order to understand the (risk) perceptions of the potential bidders, a couple of meetings of the industry representatives with the program body were arranged. It was revealed that the key risks perceived by the companies were apparently external in nature. While addressing the issues, the businesses felt themselves (somewhat) incapacitated, so therefore looked towards the regime to sort them out. In the beginning a (brainstorming) session was conducted to recognize the top of line risks professed by the businesses. Although the (actual) proceedings did not adopt structured survey techniques for information collection as outlined in our methodology (please refer to Section 3.2), the following key risks were acknowledged and documented.

R1. Risk of unavailability of suitable locations for site establishments

R2. Risk of broadband Internet inaccessibility or unviability for sites

R3. Lack of availability of trained HR to operate on remote sites

R4. Absence of commercial electric power supply on target sites

R5. Physical security threats on marked sites

R6. Risk of mounting regulatory burdens and taxes

In the follow on session, an AHP survey was executed to rank the (listed) risks, in which the observations of the representative set of stakeholders were recorded; the results of survey synthesized over respondent's judgments are tabulated below in Table 1.

	R1	R2	R3	R4	R5	R6	Weights
(R1) Risk of unavailability of suitable locations for site establishments	1.00	3.00	2.91	2.03	1.05	5.11	0.292
(R2) Risk of broadband Internet inaccessibility or unviability for sites	0.33	1.00	1.21	0.27	0.30	1.91	0.086
(R3) Lack of availability of trained HR to operate the remote sites	0.34	0.83	1.00	0.56	0.32	2.89	0.099
(R4) Absence of commercial electric power supply on target sites	0.49	3.69	1.80	1.00	0.84	4.87	0.212
(R5) Physical security threats on marked sites	0.95	3.32	3.08	1.20	1.00	5.01	0.265
(R6) Risk of mounting regulatory burdens and taxes	0.20	0.52	0.35	0.21	0.20	1.00	0.046
λmax=6.110, CR = 0.018							
Mean of Risk Weights = 0.167							
Standard Deviation of Risk Weights (Pre-Leveling) = 0.094							

Table 1. Tele-Centres Program Risks – Pre-Leveling Comparison Matrix & Relative Weights

Later on, several mitigation measures were argued and the best possible choices were approved with consensus of the stakeholders. Each of the potential risks was responded with counter tactic(s) of corresponding strength. The key measures decided are given below.

M1. Provision of free Tele-Centre locations in govt. schools or public buildings

M2. Free commercial power supply and 50% subsidy for solar power arrangements

M3. Technical training of the site operators selected from respective remote communities

M4. Satellite broadband provision where essential; 50% subsidized broadband service

M5. Govt. sponsored financial insurance of all sites against security threats

M6. Absolute tax waivers on installations; 50% discounts on operational incomes

The leading developments recorded added comforts and willingness of bidders for a potential take. Such willingness of bidders symbolizes that the risk mitigations committed were good enough to meet their tolerability; this corresponds to 'downward leveling' phenomenon in our analogy. In a later stage, the relevant improvements were incorporated and the revised TOR was floated. The consequent bid received an overwhelming response, and lots of competitors participated in the tender. In order to gauge the perceptions of the stakeholders, the same AHP survey was solicited yet again. The repeat survey results are summarized below in Table 2.

	R1	R2	R3	R4	R5	R6	Weights
(R1) Risk of unavailability of suitable locations for site establishments	1.00	0.58	1.49	0.49	0.46	0.87	0.118
(R2) Risk of broadband Internet inaccessibility or unviability for sites	1.74	1.00	1.92	0.82	0.74	1.57	0.192
(R3) Lack of availability of trained HR to operate the remote sites	0.67	0.52	1.00	0.52	0.49	0.70	0.100
(R4) Absence of commercial electric power supply on target sites	2.03	1.22	1.92	1.00	1.00	1.67	0.223
(R5) Physical security threats on marked sites	2.16	1.35	2.03	1.00	1.00	1.74	0.233
(R6) Risk of mounting regulatory burdens and taxes	1.15	0.64	1.43	0.60	0.58	1.00	0.133
λmax=6.023, CR = 0.004							
Mean of Risk Weights = 0.167							
Standard Deviation of Risk Weights (Post-Leveling) = 0.052							

Table 2. Tele-Centres Program Risks – Post-Leveling Comparison Matrix & Relative Weights

A watchful comparison of the survey results discloses that the relative risk disparities went on a fall in the latter case, and the standard deviation of relative risk weights was reduced by 44.7% as compared to the initial value. Such drop in relative disparities of risks reflects 'relative leveling' phenomenon in our impression. In conclusion, we establish that the stated twofold leveling developments made the businesses participate in the cited endeavor.

6. Way Forward

The dependability of the leveling schema can be further improved by adopting such tools which may accommodate risk interdependencies in an enhanced fashion. For instance, Analytical Network Process (ANP) may be used in place of AHP; ANP is an evolution of AHP and takes care of criteria interdependencies in enhanced way (Saaty & Vargas, 2006; Greco, Cricelli, & Grimaldi, 2013). Utility of other MCDM techniques may also be explored. Procedural computations of RLBE may be expedited through computerized programs and automated tools e.g. online or web surveys (e.g. real time Delphi on internet (Gnatzy, Warth, von der Gracht, & Darkow, 2011), web based dynamic Delphi (Yao & Liu, 2006) etc.), spreadsheets, and automated AHP applications (e.g. Super Decisions, MakeItRational, Expert Choice etc.) etc. A step ahead, the RLBE scheme – in complete – may be burnt into computerized application, for optimum facilitation of the managers.

7. Conclusion

The risky macro environments are detrimental for the stakes of the investors as well as the governments; consequently the market developments suffer. Managing and controlling such risks is mandatory in order to bridge the gap between the 'investors' and the 'hosts'. This may result in cultivating the business friendly environments for the industry. Authors of this research have tried to develop a particular approach, Risk Leveling, which may help the public domains in conceiving and managing the macro risks in a special way. The RLBE procedure described in this research may help them in achieving the risk leveled environments. The intent of this proactive risk management approach is to control the macro uncertainties for the larger interests of the governments, the industry, and the enterprises. It believes in manipulating the contexts to achieve 'as low as reasonably practicable' risk. Additionally it pursues such settled contexts in which the risks are no longer seen too big or too small relative to the others. Since this scheme is grounded on easy to use techniques and widely known concepts, it can be embraced by the practitioners readily. It may inhibit integral placement in strategic management drives of the regimes, and may be adopted for managing risks in a variety of markets and industry segments.

Acknowledgements

This work was supported by the National Natural Science Foundation of China (71271031) under the project name, "The Establishment and Control and Empirical Research of Security Risk Pre-warning Index System in Mega Projects based on Optimal Control Theory". We like to extend heartfelt gratitude to the Pakistan telecom professionals for their assistance; we also acknowledge the kind collaboration offered by Prof. Dr. Wang ChangFeng at Beijing University of Posts and Telecommunications China.

References

Abor, J., & Agbloyor, E. (2012). Trends in cross border mergers and acquisitions in Africa. *AfricaGrowth Agenda*, 10-11.

Ahmed, A., Kusumo, R., Savci, S., Kayis, B., Zhou, M., & Khoo, Y.B. (2005). Application of Analytical Hierarchy Process and Bayesian Belief Networks for Risk Analysis. *Complexity International*, 12(12), 1-10.

Al-Debei, M.M., & Al-Lozi, E.M. (2012). Implementations of ICT Innovations: A Comparative Analysis in terms of Challenges between Developed and Developing Countries. *International Journal of Information, Business and Management,* 4(1), 224-252.

Amroune, B., Hafsi, T., Bernard, P., & Plaisent, M. (2014). 11 SMEs in developing countries and institutional challenges in turbulent environments. *Building Businesses in Emerging and Developing Countries: Challenges and Opportunities*, 215.

Anand, G., & Ward, P.T. (2004). Fit, Flexibility and Performance in Manufacturing: Coping with Dynamic Environments. *Production and Operations Management*, 13(4), 369-385. http://dx.doi.org/10.1111/j.1937-5956.2004.tb00224.x

Aven, T. (2010). On how to define, understand and describe risk. *Reliability Engineering & System Safety*, 95(6), 623-631. http://dx.doi.org/10.1016/j.ress.2010.01.011

Aven, T. (2012). The risk concept-historical and recent development trends. *Reliability Engineering & System Safety*, 99(0951), 33-44. http://dx.doi.org/10.1016/j.ress.2011.11.006

Aven, T., & Renn, O. (2010). *Risk management and governance: concepts, guidelines and applications.* Vol. 16. Springer. http://dx.doi.org/10.1007/978-3-642-13926-0

Beamish, P. (2012). *Multinational Joint Ventures in Developing Countries (RLE International Business)*. Routledge.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2000). A new database on the structure and development of the financial sector. *The World Bank Economic Review*, 14(3), 597-605. http://dx.doi.org/10.1093/wber/14.3.597

Bhalla, P. (2014). Mergers & Acquisitions in India: A sectoral analysis. *International Journal of Business & Economic Development*, 2(2).

Bloor, M., Sampson, H., Baker, S., & Dahlgren, K. (2013). Useful but no Oracle: Reflections on the use of a Delphi Group in a multi-methods policy research study. *Qualitative Research*, 1468794113504103.

Bodin, L., & Gass, S.I. (2003). On teaching the analytic hierarchy process. *Computers & Operations Research*, 30(10), 1487-1497. http://dx.doi.org/10.1016/S0305-0548(02)00188-0

Bonnemaizon, A., Cova, B., & Louyot, M.-C. (2007). Relationship Marketing in 2015:: A Delphi Approach. *European Management Journal*, 25(1), 50-59. http://dx.doi.org/10.1016/j.emj.2006.12.002

Chapman, R.J. (2011). *Simple Tools and Techniques for Enterprise Risk Management*. Wiley.

Chhokar, J.S., Brodbeck, F.C., & House, R.J. (2013). *Culture and Leadership Across the World: The GLOBE Book of In-Depth Studies of 25 Societies*. Taylor & Francis.

Markmann, C., Darkow, I.L., von der Gracht, H. (2013). A Delphi-based risk analysis-Identifying and assessing future challenges for supply chain security in a multi-stakeholder environment. *Technological Forecasting & Social Change*, 1815-1833.

http://dx.doi.org/10.1016/j.techfore.2012.10.019

Cohen, R., Kennedy, P.M., & Perrier, M. (2000). *Global sociology*. Macmillan Basingstoke.

Cox, L.A. (2008). What's wrong with risk matrices? *Risk Analysis*, 28(2), 497-512. http://dx.doi.org/10.1111/j.1539-6924.2008.01030.x

Dafikpaku, E., Eng, M.B.A.B., & Mcmi, M. (2011). The Strategic Implications of Enterprise Risk Management : A Framework. In *ERM Symposium.* 48.

Du, M., & Boateng, A. (2012). Cross-border mergers & acquisitions by emerging market firms: A review and future direction. *Proceedings in Finance and Risk Perspectives*.

Gnatzy, T., Warth, J., von der Gracht, H., & Darkow, I.-L. (2011). Validating an innovative real-time Delphi approach - A methodological comparison between real-time and conventional Delphi studies. *Technological Forecasting and Social Change*, 78(9), 1681-1694. http://dx.doi.org/10.1016/j.techfore.2011.04.006

Greco, M., Cricelli, L., & Grimaldi, M. (2013). A strategic management framework of tangible and intangible assets. *European Management Journal*, 31(1), 55-66.

http://dx.doi.org/10.1016/j.emj.2012.10.005

Held, D. (1999). *Global transformations: Politics, economics and culture*. Stanford University Press.

Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (2000). Rethinking globalization. In Held, D. & McGrew, A. (Eds.). *The Global Transformations Reader*.

Hillson, D. (2003). Using a risk breakdown structure in project management. *Journal of Facilities Management*, 2(1), 85-97. http://dx.doi.org/10.1108/14725960410808131

Hillson, D., & Murray-Webster, R. (2011). Using risk appetite and risk attitude to support appropriate risk-taking: a new taxonomy and model. *Journal of Project, Program & Portfolio Management*, 2(1), 29-46.

Hillson, D., & Simon, P. (2012). *Practical project risk management: The ATOM methodology*. Management Concepts Press.

Ho, W. (2008). Integrated analytic hierarchy process and its applications – A literature review. *European Journal of Operational Research*, 186(1), 211-228.

http://dx.doi.org/10.1016/j.ejor.2007.01.004

Hopkin, P. (2014). *Fundamentals of risk management: understanding, evaluating and implementing effective risk management*. Kogan Page Publishers.

Hsu, C.-C., & Sandford, B.A. (2007). The Delphi technique: making sense of consensus. *Practical Assessment, Research & Evaluation*, 12(10), 1-8.

IEC/ISO (2009). *Draft International Standard IEC / FDIS: Risk Management-Risk Assessment Techniques.*

ISO (2009). *Risk management — Principles and guidelines (ISO 31000 : 2009)*. Available at: http://www.iso.org/iso/home/standards/iso31000.htm

Kaynak, E., Ajami, R., & Bear, M.M. (2013). *The Global Enterprise: Entrepreneurship and Value Creation*. Taylor & Francis.

Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. Sage.

Kwan, T.W., & Leung, H.K.N. (2009). Measuring Risks within a Program Consisting of Multiple Interdependent Projects. *2009 International Conference on Computational Intelligence and Software Engineering*, 1-7. http://dx.doi.org/10.1109/CISE.2009.5363150

Laroche, M., & Park, S.-Y. (2013). Recent advances in globalization, culture and marketing strategy: Introduction to the special issue. *Journal of Business Research*, 66(8), 955-957. http://dx.doi.org/10.1016/j.jbusres.2011.12.017

Levin, G. (2012). *Program Management: A Life Cycle Approach*. CRC Press.

Litchfield, R.C. (2008). Brainstorming reconsidered: A goal-based view. *Academy of Management Review*, 33(3), 649-668. http://dx.doi.org/10.5465/AMR.2008.32465708

Marszal, E.M. (2001). Tolerable risk guidelines. *ISA Transactions*, 40(4), 391-9. http://dx.doi.org/10.1016/S0019-0578(01)00011-8

Melchers, R. (2001). On the ALARP approach to risk management. *Reliability Engineering & System Safety*, 71(2), 201-208. http://dx.doi.org/10.1016/S0951-8320(00)00096-X

MOITT (2014). One Year Performance Report. Available at: http://www.moitt.gov.pk/gop/index.php?q=aHR0cDovLzE5Mi4xNjguNzAuMTM2L21vaXQvdXNlcmZpbGVzMS9maWxlL3BvbGljaWVzL09ORV9ZRUFSX1BFUkZPUk1BTkNFX1JFUE9SVC5wZGY=

Moss, D.A. (2004). *When all else fails: Government as the ultimate risk manager*. Harvard University Press.

Mullen, P.M. (2003). Delphi: myths and reality. *Journal of Health Organisation and Management*, 17(1), 37-52. http://dx.doi.org/10.1108/14777260310469319

OGC (2010). *Management of Risk (M_O_R®) - Guidance For Practitioners 3rd Edition - Office of Government Commerce UK*. TSO (THE Stationery Office). Available at: http://www.axelos.com/Risk-Management-MoR

Omar, M., & Porter, M. (2011). Reducing risk in foreign market entry strategies: standardization versus modification. *Competitiveness Review: An International Business Journal Incorporating Journal of Global Competitiveness*, 21(4), 382-396. http://dx.doi.org/10.1108/10595421111152174

Pellegrinelli, S., Partington, D., Hemingway, C., Mohdzain, Z., & Shah, M. (2007). The importance of context in programme management: An empirical review of programme practices. *International Journal of Project Management*, 25(1), 41-55. http://dx.doi.org/10.1016/j.ijproman.2006.06.002

PMCC (2008). *P2M: A Guidebook of Project and Program Management for Enterprise Innovation.* Tokyo, Japan.

PMI (2013a). *A Guide to the Project Management Body of Knowledge, PMBOK.* Fifth Edition. Project Management Institute.

PMI (2013b). *The Standards for Portfolio Management.* Third Edition. Project Management Institute.

PMI (2013c). *The Standards for Program Management.* Third Edition. Project Management Institute. http://dx.doi.org/987-1-935589-68-6

Rasheed, S., Changfeng, W., Yaqub, F., Rafique, K., & Di, Z. (2014). Risk Balancing in the Programmes – An Application in the Telecom Domain. *International Journal of U- and E-Service, Science and Technology*, 7(6), 175-194.

Renn, O. (2005). *Risk governance towards an integrative approach.* White paper no. 1. International Risk Governance Council.

Robert, S., & Arias, J. (2011). Review of Risk Management Methods. *Business Intelligence Journal*, 4(1), 59-71.

Saaty, T.L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences*, 1(1), 83-98. http://dx.doi.org/10.1504/IJSSCI.2008.017590

Saaty, T.L., & Peniwati, K. (2013). *Group decision making: drawing out and reconciling differences*. RWS Publications.

Saaty, T.L., & Vargas, L.G. (2006). *Decision making with the analytic network process*. Springer.

Scherer, A.G., & Palazzo, G. (2008). Globalization and corporate social responsibility. In Crane, A., McWilliams, A., Matten, D., Moon, J., Siegel, D. (Eds.) *The Oxford Handbook Of Corporate Social Responsibility.* 413-431. Oxford University Press.

http://dx.doi.org/10.1093/oxfordhb/9780199211593.003.0018

Scherer, A.G., & Palazzo, G. (2011). The new political role of business in a globalized world: A review of a new perspective on CSR and its implications for the firm, governance, and democracy. *Journal of Management Studies*, 48(4), 899-931. http://dx.doi.org/10.1111/j.1467-6486.2010.00950.x

Scholte, J.A. (2005). *Globalization: A critical introduction*. Palgrave Macmillan.

Sylvain, G. (2007). *Local Economic and Employment Development (LEED) Local Innovations for Growth in Central and Eastern Europe*. OECD Publishing.

Tapio, P. (2002). Disaggregative policy Delphi Using cluster analysis as a tool for systematic scenario formation. *Technological Forecasting and Social Change*, 70, 83-101. http://dx.doi.org/10.1016/S0040-1625(01)00177-9

Thiry, M. (2004). "For DAD": A programme management life-cycle process. *International Journal of Project Management*, 22(3), 245-252. http://dx.doi.org/10.1016/S0263-7863(03)00064-4

Uddin, M., & Boateng, A. (2011). Explaining the trends in the UK cross-border mergers & acquisitions: An analysis of macro-economic factors. *International Business Review*, 20(5), 547-556. http://dx.doi.org/10.1016/j.ibusrev.2010.11.003

USFCo (2014). News: Consultative session held with telecom operators regarding establishment of Telecentres. Available at: http://www.usf.org.pk/newsdescription.aspx?113

USFCo GoP. (2013). Request for applications for establishing universal tele-centers in rural areas- pilot project.

Available at: http://www.usf.org.pk/FCKeditor/editor/filemanager/connectors/aspx/UserFiles/resources/Special%20Projects/UTC/UTC%20Information%20Package%20Final_Web.pdf

van Asselt, M.B.A., & Renn, O. (2011). Risk governance. *Journal of Risk Research*, 14(4), 431-449. http://dx.doi.org/10.1080/13669877.2011.553730

Wells, Jr. L.T. (1998). Multinationals and the developing countries. *Journal of International Business Studies*, 101-114. http://dx.doi.org/10.1057/palgrave.jibs.8490027

Yalcin, S., & Kapu, H. (2008). Entrepreneurial dimensions in transitional economies: A review of relevant literature and the case of Kyrgyzstan. *Journal of Developmental Entrepreneurship*, 13(02), 185-204. http://dx.doi.org/10.1142/S1084946708000922

Yao, J., & Liu, W.-N. (2006). Web-based dynamic delphi: a new survey instrument. In *Proceedings of SPIE, the International Society for Optical Engineering*. 62410I–1.