Risk Leveling – an organised risk management approach

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Abstract: Macro environments acquire ever more significance in the growing business worlds. Whereas the industrial enterprises assume greater controls in managing their internal environs, the evident responsibility of governments is to regulate the business surrounding risks, to optimise the external environments, and to deliver poses that are conducive to business. In such context, this paper presents a specialised approach – Risk Leveling – which embraces a focused risk management concept as well as an explicit risk management methodology. Risk Leveling accentuates upon organised and efficient consumption of available resources to achieve balanced risk postures in the business contagious environment. The ultimate intent of Risk Leveling is not only to cut the risks to business acceptability limits but to also ensure that mutual risk parities are conserved. Such intent is pursued through an organised procedure which employs a mix of analysis tools and philosophies including the AHP and the ALARP. By settling the contextual risks to business acceptability bounds, Risk Leveling aims to facilitate the regimes in regulating the macro business environments for wellbeing of business.

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1 Introduction

The industrial advancements in general and the emerging developments in the information and communication industry in particular have transformed the world into a global village. More and more businesses are progressively seeking investments beyond customary bounds. Consequently, acquisitions, ventures, and business mergers are now a norm (Beamish, 2012; Du and Boateng, 2012; Uddin and Boateng, 2011; Abor and Agbloyor, 2012; Bhalia, 2014). Such exchanges are augmenting the globalisation (Held et al., 2000; Scherer and Palazzo, 2011) and instigating upsurge in the industrial competition (Chhokar et al., 2013; Held, 1999; Laroche and Park, 2013). Despite all such moves, the unsettled host markets are still posing resistance to the corporates on account of prevalent risks (Wells, 1998), be it in the form of regulatory burdens for the local industry, or be the case of swelling entry barriers for fresh business entrants. Risk has been termed differently in different realms. It is referred to as a possible uncertainty, a probable danger, an expected vulnerability, and a doubt in some investment, etc. (Aven, 2010, 2012; Aven and Renn, 2010). Although risk has also been perceived positive in certain coexistent developments, for simplicity, this paper assumes risk as an undesirable phenomenon, merely.

The business evolutions and subsequent globalisation are essentially governed by the macro forces; for instance, the fiscal and political verdicts of the regimes (such as the FDI policy, or the deregulation or privatisation rules), the scientific developments (such as the communication and transportation), and the socio-political progressions (such as the knowledge propagation and relocations), etc., (Scherer and Palazzo, 2008; Scholte, 2005; Cohen et al., 2000). Such macro factors pose frequent risks to the transnational industries, thereby compromising the stakes of host regimes as well as the interests of local, regional or state entities and investors (Sylvain, 2007). The interests of stakeholders can however be protected through apposite risk management positioned inside the host regimes. Although a large plurality of professional organisations (ISO, PMI, OGC, RIMS, P2M, and IRM) rank risk management to be the essential part of realms for realising the organisational objectives (ISO, 2009; PMI, 2013a; OGC, 2010; IEC/ISO, 2009; PMCC, 2008), and despite the reality that risk administration can safeguard the benefits of investors (such as the corporates) and the recipients (such as the community), it is rarely observed by the governments – ending up with distresses to the stakeholders (Pellegrinelli et al., 2007; Moss, 2004).

Suitable risk management plans which might counter (the impact or the probability of) risk may always raise the chances of success and lessen the negative upshots (Daikpaku et al., 2011; Hillson and Simon, 2012). Such accomplishments are however subject to employment of apt and structured risk management approaches. In this paper, we present an organised risk management approach called Risk Leveling, which offers a procedural technique to regulate risks in a turbulent sphere. Risk Leveling follows the standard risk management process with an aim to achieve symmetric and risk settled surroundings for the business.
Remainder of this paper is organised as follows. Section 2 offers an outline of macro risk forces conterminous with businesses and highlights the pertinent implications. In Section 3, we describe the problems triggered by macro risks and propose that risk alleviation could be the right answer to attain healthy business environments. Section 4 presents Risk Leveling approach for risk management and offers its details. Section 5 presents some dissuasion and suggests the way forward, and Section 6 concludes the overall theme.

2 Implications of macro-environs for businesses

Also recognised as PESTEL sometimes, the macro-environs are the ‘field of action’ or the ‘pertinent universe’ for the business (concerns). Contrasting the micro-environs, which are rooted on the indigenous business drivers mainly, the macro forces are the external influences that decide the business endurance in a marketplace. As displayed in Figure 1, the macro forces embrace the political, economic, social, technological, environmental and legal risks that may impact a business (negatively or positively) (Kaynak et al., 2013). The macro forces stimulate the capital investment, impact the enterprise operations, govern the business progressions and position recurrent challenges to the businesses.

![Figure 1: Macro risk drivers for business](image)

The economic conditions and systems prevailing in a market define the enterprises’ existence in the market place. The political surroundings consist of laws and regulations that provide a structure for undertaking businesses. The social and natural environs also influence the ways of working and impact the business. Similarly, the legal frameworks govern and safeguard the interests of stakeholders such as the stakes of suppliers and customers. Finally, the technological environments adjoining the businesses pose substantial threats and opportunities to the industry, and their influence is even more
intense towards the evolving industry. These established factors heavily influence the products from introduction to decline; they equally impact the day to day business operations. Similarly, the PESTEL forces drive the projects from initiation phase through closure (PMI, 2013a). On a similar note they determine a program’s course from formulation to termination (Thiry, 2004) and a portfolio’s life from conception to retirement (PMI, 2013b). Irrespective of the pressure that these external forces exert on the internal concerns of the enterprises, the businesses frequently seem incapacitated to control them. Arguably, setting up healthy external environments is the prerogative of a government; it has little to do with an enterprise.

3 Risk management – a rationale choice

Driven by the evolving plans, the multinational companies are poised to expand beyond set boundaries. On the other hand, the developing countries and the transitional markets continually seek investment from the developed economies (Al-Debei and Al-Lozi, 2012). At the same time, the transitional economies need due contribution from the domestic industry towards the national growth. The enduring success, however, depends on the best equilibrium between the internal and the external business environments (Anand and Ward, 2004). Although the conglomerates endure virtuous inside strengths, they bear little or absolutely no say over the risky macro-environs (Kaynak et al., 2013), which potentially obstructs their decisions to enter the target regions (Omar and Porter, 2011). It is not only the multinationals that suffer due to risky environs, the domestic industries (e.g., SMEs) are equally hurt by such conditions (Amroune et al., 2014), (Yalcin and Kapu, 2008).

**Figure 2** Striking the balance

How to pacify the risky environs for the best interests of the businesses (and in turn the host markets) is a big question (Van Asselt and Renn, 2011; Renn, 2005). Luckily, the specialised research bodies have set relevant standards and guides (PMI, 2013a, 2013b, 2013c; PMCC, 2008; ISO, 2009; OGC, 2010), certain tools and techniques (IEC/ISO, 2009; Chapman, 2011) and some processes and procedures (PMI, 2013a; Hillson and
Simon, 2012; ISO, 2009) for managing the risk. Taking help from the mentioned developments, a specialised approach can be drawn to administer and manage risks in the macro contexts, and hence, to certain extent, the business interests can be safeguarded.

Significant here is to recognise that each enterprise or business entity holds different capacity to accept the risk measured against objectives, known as the risk bearing capacity (Hillson and Murray-Webster, 2011). To enable themselves to meet the external business challenges (of host markets), the enterprises of all sorts continually struggle to improve their risk (bearing) capacities. In case of failure, the businesses would shift to zones with better sustenance. In either of the situations, the enterprises would attempt contexts where they might strike a balance between the internal and the external business environments. Assuming that the risk-bearing capacity of an enterprise is stationary, such balances can still be achieved (within a host regime) by decreasing the macro risks. This idea is depicted in Figure 2.

Pursuing said settings for discrete enterprises, however, could be an (over)exhaustive (and ineffective) effort. In such scenarios where innumerable enterprises contribute towards a particular industry, the risks might be lowered to ‘aggregate levels’ that are drawn by the sector-specific (facilitation) agendas of the regimes and the available resources at hand. Nonetheless, an organised risk management approach is mandatory to realise the subject idea. Safety and Mission Assurance of National Aeronautics and Space Administration USA also believes in a similar approach to balance between the ‘program content’ and the ‘residual risk’ through optimum utilisation of the ‘mitigation options’ (Greenfield, 1999). Hereafter, we discourse a particular approach – Risk Leveling – that may administer risk in the scenarios discussed above.

4 Risk Leveling

In a turbulent business environment different risks bear different standings; some risks might be overly critical towards business while some others could be graded moderate to low. If we aim to realise risk mitigation, we must pursue such composed environments where the entire macro risks turn out to be well-settled and symmetric. Such intended environment – tagged as risk levelled environment – can be the optimal setting for a business to nurture. In such pursuit, we coin a specialised approach called Risk Leveling which embraces a particular concept as well as a procedural methodology; they are discussed in detail hereafter.

4.1 Risk Leveling – the core concept

Risk Leveling may be conceived as a risk regulating system which struggles to achieve risk levelled environments for business success. This approach outlines that, in order to achieve (risk) settled and (risk) balanced environments for business, the external risks should be dealt in two parallel ways. First, the macro risks should be mitigated on their absolute footings to ensure that the resultant risks (i.e., the residual risks) find a match with the risk tolerance of an enterprise (business). And secondly, they should be levelled mutually reaching a scenario where the risks are no more allowed to continue too bigger or too smaller in comparison to the other contagious risks. With these twofold developments in a synchronous way, Risk Leveling attempts to cultivate ‘risk levelled’ (i.e., risk-settled and risk-balanced) environments for business success. This dual phenomenon can be tagged with two distinct labels; ‘downward leveling’ and ‘relative
Risk Leveling – an organised risk management approach

leveling’. The phenomenon of mitigation of risks on their absolute terms is known as ‘downward leveling’, while the act of diminishing the relative risk disparities is called ‘relative leveling’. The ultimate intent of Risk Leveling approach is to realise a potential environment for the business enterprises where they envision the entire surrounding risks symmetric, and laying well within their tolerance limits. It is important to mention that such risk levelled contexts may only be endeavoured if each of the macro business risks is mitigated through corresponding (carefully matching) efforts, in a systematic way. Such matching efforts in turn help in conserving the scarce administrative resources by utilising them in sensible and composed ways.

In order to understand the leveling concept thoroughly, an analogy between ‘Risk Leveling’ and the ‘field leveling’ (of a farmer in the ploughed field) may be drawn. For cultivation reasons, a farmer addresses the uneven fields in two distinct manners; firstly, (s)he strikes down the big piles of soil with a bulldozer, and secondly, by use of leveller plough, (s)he evens off the fields. This way (s)he ensures a terrain which is friendly as well as symmetric for the entire crop. If the terrestrial field is presumed as the business surrounding environment and the crop is taken to be the business (enterprises), 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 ‘downward leveling’ of risks and the ‘leveller plowing’ corresponds to their ‘relative leveling’. The levelled fields obviously provide an enhanced environment for the overall crop growth. In the said analogy, therefore, the risk levelled environments can deliver improved contexts for development of business (enterprises).

Figure 3 Four market postures
If a market is analysed keeping in view the risk magnitudes and the relative risk (dis)parities (for a set of macro risks), four potential postures (as depicted in Figure 3) may come across. Earlier two postures conceivably represent the opening market states before any risk mitigation is attempted, while the latter two characterise the conceivable upshots after mitigation is implemented.

- Posture-1, tagged unusual, depicts an extraordinary situation where the scales of all the risks are much higher than the risk tolerance bounds of the business; however they exhibit little differences in the relative parities; this essentially means that all the risks are mutually equivalent. This posture characterises an unlikely or exceptional case for practical scenarios.

- Posture-2, named typical, represents a market situation that embodies diverse risk magnitudes; yet, the entire elements are still beyond the risk tolerance of the business. It describes a typical turbulent (or risky) market.

- Posture-3, labelled questionable, might result when risk mitigation efforts are pursued but the entire set of risks are overly treated; it simply reveals that although risks may be brought well under the controllable limits, an overly treatment may also consequence a rise in their mutual disparities. It characterises unjustified (or inefficient) consumption of resources during mitigation which may diminish certain risks even beyond the desired bounds.

- Posture-4, termed optimal, signifies such ideal settings in which the entire set of risks are condensed to catch a match to the business tolerance limits; moreover, their relative parities are also attempted through optimal utilisation of available resource.

Posture-4 here is the ideal settings to be pursued, since the other three postures represent either insufficient or inefficient utilisation of resources, and are objectionable for one reason or the other. This pose offers very balanced and conducive environs for the business to nourish.

Figure 4   Risk Leveling matrix (see online version for colours)
A business (enterprise) may belong to one of the four possibilities mentioned above. These (four) possibilities can be drawn in the form of a matrix, called Risk Leveling matrix. Build over four distinct quadrants, the Risk Leveling matrix is drawn by considering the risk magnitudes and the relative risk disparities in a two-dimensional space. This matrix is exposed in Figure 4.

The ultimate intent of Risk Leveling is to transform a ‘typical’ business into an ‘optimal’ business by driving it from quadrant 2 (Q-2) formations to quadrant 4 (Q-4) formations. Such optimal formations are however succeeded only if we undertake sufficient as well as efficient resource utilisation in structured ways. The coming section will address in detail how such settings can be pursued.

4.2 Risk Leveling – the methodical procedure

In order to realise the Risk Leveling concept in reality, a methodical procedure is crafted. This procedure is defined as a structural course of action that may be accepted to attain balanced and normalised (macro) environments in a given business domain. The Risk Leveling course of action is exposed in Figure 5. This methodology is built upon certain known and well reliable instruments, which are exploited in calculated order and ways. Two leading tools used in subject methodology are the As Low as Reasonably Practicable (ALARP) and the Analytical Hierarchy Process (AHP). The ALARP, which acts as extenuation reference in Risk Leveling, is usually employed to signify the intensity of risk in given settings; whether tolerable or not. In addition, the AHP, which finds its basis in pair wise comparisons in order to assess priorities, is used as a measure to expose mutual risk disparities in this procedure.

In practice, the activity opens up with the subject business sector’s scanning, where the macro-environs and the business contexts are analysed, first of all. The important stakeholders and their potential influences on business are recognised. The primary risk criteria and their association to business are determined, as well. To accept this initiative, an expert board with multi-disciplinary experts having thorough knowledge of the subject sector is also identified. Moreover, a risk steering committee is shaped which undertakes various tasks during the progression.

Following the context establishment stage, the macro risk factors affecting the subject business domain are identified and documented through the engagement of experts. For such purpose, a blend of informal and formal brainstorming and interviewing techniques may be applied (Kvale and Brinkmann, 2009; Litchfield, 2008). The results expose an extensive dictionary of possible risks towards the business. This directory reminds us of the risk breakdown structure (Hillson, 2003) having risk elements, risk definitions, stakeholders, risk owners, and further risk related evidences. Next, the risk probability and risk impact assessment are determined to calculate the Composite Risk Index (CRI), which serves a basis for the primary risk evaluations. Risk probability is regarded as the possibility of happening of a risk whereas the consequences faced in case of risk occurrence are recognised as the risk impact. For CRI calculations, this technique relies on ‘three rounds’ and ‘three views’ schema, where the risk probabilities are determined by three round Delphi and the risk impacts are assessed by three points estimates method.
Figure 5 Risk Leveling procedure

The classic Delphi is composed of a set of multi-round anonymous surveys from a panel of experts where their opinions on risk probabilities are recorded. At the end of each individual round, an anonymous summary of results is provided to the participants, which delivers a basis for converged opinion in the succeeding round; the resulting forecasts thus demonstrate improved consensus and accuracy. For relatively unknown settings, such as risk assessment, where the decisions are heavily dependent on the precision of forecasts the Delphi technique is quite popular because of its consensual characteristics and comfort of practice (Hsu and Sandford, 2007). Despite the varied beliefs of researchers about Delphi (see for example, Markmann et al., 2013; Bloor et al. 2013; Tapio, 2002) we endorse it because it is well-established, widely adopted, and long-lasted (Mullen, 2003). Similarly, three point estimates is also a famous way for uncertainty assessments from mutual visions and experiences. This method assumes a weighted averaging approach to estimate the results from three different projections named as
Risk Leveling – an organised risk management approach

optimistic (O), pessimistic (P) and most likely (M) views. It is very popular among project managers for planning (e.g., PERT) and forecasts that are founded on limited evidence. The weighted average of three mentioned views concludes the impacts using the formula $(O + 4M + P) / 6$.

The probability and impact outcomes for each risk factor are multiplied to frame CRI values. The CRIs reflect the expected risk magnitudes or values. Based on the CRIs, certain risks may be picked out for further analysis while the rest are put in watch list for future attentions. The risk steering committee plans the risk filtering criterion, which is generally build over the business and market contexts, the available resources, the government preferences, the governing implications, and the projected strategic benefits, etc. A simplex criterion could be to pick certain risk categories such as critical, very high, or high risk ranks (provided CRIs are based on qualitative indicators) or a fixed percentile, e.g., top 60 percentile ranks (if CRIs are based on numeric values) of risks for comprehensive risk analysis (that will be discussed ahead). The evident rational to populate the watch list is that the risks are never static (Hillson and Simon, 2012; OGC, 2010); an unceasing analysis is so highly desirable.

**Figure 6** Illustration of multilevel hierarchy

Although risk matrices (and CRI) serve reasonably good for preliminary assessments, they are not enough for comprehensive risk analysis for many weaknesses (Cox, 2008). For detailed risk analysis, this procedure therefore takes use of a popular Multi Criteria Decision Method (MCDM) known as the AHP, which aims to rank the individual risks (factors) through mutual comparisons and serves strong basis for decision making (Saaty and Peniwati, 2013; Saaty, 2008). Owing to its openness, flexibility and efficiency, AHP has been widely utilised for decision making in a variety of fields including finance, engineering, management, politics, health, education, governance and many others (Ho, 2008). The AHP course first defines the weights of the criteria elements, and then the ultimate solution weights of the alternatives with reference to the criteria are shaped (Bodin and Gass, 2003; Saaty, 2008).
Three basics for AHP operation are the hierarchy building, the 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 frame risk groups. After such clustering is done, a three layer hierarchy as shown in Figure 6 is formed. 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 second and third layer, respectively.

Specially tailored AHP questionnaires are served to a board of experts and their judgements on comparative ranking of risks (on Saatay’s 1–9 scale) are recorded. The panellists are queried like, ‘How many times big or small could be the risk A in comparison to the risk B in impeding the growth of the 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 synthesised. Since the comparisons are based on subjective judgements, consistency checks are applied to verify the consistency of judgements (ideally the consistency ratio should not be more than 0.1); and if necessary, the opinions are revised through repeat process. 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 embraces 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 the 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 hover around the mean as well. The risks falling far off from the mean are known as the outliers. The bigger the numbers and the weights of the outliers are the greater would be the associated standard deviation (SD) (from the mean) and vice versa. The increased SDs reflect an imbalanced posture of (macro) risks and point the requirement of leveling to achieve even, well-adjusted and consistent environs for the business.

Apparent choice with the governments to combat macro risks are the policy instruments. Risk Leveling proposes observing mitigation policies that can level down the entire uncertainties in line with the ALARP 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 allied business concerns, 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.

In order to undertake risk mitigation, the Risk Leveling approach recommends taking measures against each individual risk in equation to its acuity and intensity. A basic approach in doing so is to conceive available risks in multiple tiers in accordance to risk weights. The sample classifications might be tier-one with highest primacy, tier-two having medium priority and tier-three bearing lower weightage; nonetheless, added classifications may also be assumed in case risk factors are considerably large. In extreme, each risk in itself may serve a classification if highest precisions are desired. The core motive for such classification is to devise mitigation policies and allocate
resources of equating strength for combat against each tier. Eventually, the policies and resources are exploited to reduce the risks to tolerable and acceptable limits. Such minima can be hunted by decreasing the probability of risk or its severity or them both in parallel.

**Figure 7** Risk levels and the concept of ALARP

The leveling strategy follows the assumption that the risk mitigation efforts bear a direct (proportional) 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 business (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 business (entities). To what degrees the risk should be levelled down and to what degrees them should be levelled mutually is decided by the decision maker’s choice in the unique business contexts. In theory, this multi-level multi-round mitigation may downsize the risks to outright nil; however, a balanced and optimised use of (limited) resources (in line with the ALARP) leads us to compromise on definite (non-zero) residue values. In any case, such residue risks should catch a match to the tolerability of the business (enterprises).
Centred on the macro environments of the host market and the characteristics of the business entertained, the governing bodies may decide leveling metrics for (residual) risk acceptance. A sample leveling benchmark might be to hunt for fairly tolerable risks coupled with a defined percentage reduction in standard (risk) deviation (in the AHP chart). After each round of mitigation, the inter-residual risk weights are determined (through AHP technique) and the resulting SD is compared with the launching value. An improved outcome points the potential success in leveling; this drive is continued until any (pre) defined criterion is achieved. Figure 8 conceives the risk postures in pre-leveling and post-leveling scenarios, in an abstract way.

**Figure 8** Risk Leveling - a conceptual presentation

![Graph showing risk postures in pre-leveling and post-leveling scenarios](image)

After the Risk Leveling is achieved in a satisfactory way, the fallback plans are outlined for a rainy day. Given the rationale that the environments are never constant, this approach recommends continually monitoring and controlling the risks against the plans.

The environments are now conducive to welcome the new investments as well as facilitating 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 – no risks are seen too big or too small compared to the others, anymore.

### 4.3 Risk Leveling – the objectivity

Let \( m \) denotes the number of risks under address for leveling; their CRI are symbolised by \( R_i \), and their relative weights (in AHP matrix) are represented by \( W \) respectively. The pre-leveling relative weights vector is given by \( W^{(0)} = (W_1^{(0)}, W_2^{(0)}, W_3^{(0)}, \ldots, W_m^{(0)}) \) and the SD of these risks is signified by \( \sigma_{R}W^{(0)} \).

Now the ‘multi-tier’ strategy for risk alleviation, as detailed in the preceding section, is adopted, and tolerable and reasonably practicable (the ALARP) residual risks are
Risk Leveling is an organized risk management approach.

After the Risk Leveling is achieved, the post-leveling relative weights vector is
connoted as \( W = (W_1, W_2, W_3, \ldots, W_m) \) and the accompanying SD is designated by
\( \sigma_{R(W)} \).

Let \( R_j^{(0)} \) is the opening value of the \( j^{\text{th}} \) risk before mitigation, and \( r_j \) is the lowest bound residual value of the \( j^{\text{th}} \) risk in the ALARP range. If \( R_j \) is taken as any random target value in ALARP region, then for \( m \) risks being addressed, it is established that

\[
R_j^{(0)} \geq R_j \geq r_j \geq 0 \quad j = 1, 2, 3, \ldots, m
\]

Risk Leveling essentially tends to achieve risk extenuation in two parallel dimensions synchronously; as follows

\[
\min \sum_{j=1}^{m} R_j
\]

and

\[
\sigma_{R(W)} < \sigma_{R(W^{(0)})}
\]

### 4.4 Risk Leveling – a graphical summary

In order to summarise the entire model, a graphical overview of the Risk Leveling approach is presented for the thorough comprehension of readers.

**Figure 9** Risk Leveling – a graphical summary
5 Discussion and way forward

The operational and business environments are complex entities and therefore it may not be possible always to mitigate or control the risks; however, the risks can be continually influenced, moderated, and balanced to certain possible levels. For instance, the extreme and rare events including natural and human made tragedies such as natural disasters, political turmoil and instability, armed conflicts, and market or financial crashes, etc. can hardly be averted; yet, sensible risk management measures (e.g., redundancy setups, third party insurances, etc.) can always be taken in advance to maximally safeguard the interests of the entity or the industry in question.

The critics might say that being lengthy, repetitive, and somewhat burdensome process, the Risk Leveling progression is not very easy to implement on the ground. Also, that the process comprises an objectionable number of surveys and a lot of human judgements are involved which might go wrong or be inconsistent. Moreover, the consistency checks inside the AHP applications might be too lengthy or too delicate to be prudent enough. Given the facets we argue that this process is rarely suitable for micro level concerns, and hence not advisable. However, we maintain that, since the bigger drives always welcome bigger risks, no matter how easy or hard, the regimes have to bear the pain in case they intend to regulate the potential threats and aim to succeed.

As a way forward, the reliability of the leveling scheme can be enhanced by adopting certain tools which accommodate risk interdependency considerations in superior manner. For example, in place of AHP, the use of Analytical Network Process (ANP), which is an evolution of AHP and accommodates criteria interdependencies in heightened way (Saaty and Vargas, 2006), could enhance the results. Moving further, we may also explore the utilisation of other MCDM techniques. Certain other applications and automated tools, such as web based dynamic Delphi (Yao and Liu, 2006), etc., online surveys [e.g., real-time Delphi on internet (Gnatzy et al., 2011)], and automated AHP applications (e.g., MakeItRational, Expert Choice, Super Decisions, etc.) can further streamline the procedural computations engaged in this procedure. A step forward, to simplify its usage, the entire Risk Leveling schema can be encoded into a computer application.

6 Conclusions

Risky macro environs may prove damaging to the interests of the investors as well as that of the host regimes; consequently the business growths may suffer. Supervising and regulating the risks is essential to cultivate optimal business contexts. This study develops a particular approach to help the public sectors manage the macro business (risk) environments in systematic and an organised way. This approach – called Risk Leveling – coins a structured procedure that attempts to achieve risk levelled environments. This proactive risk management approach seeks to regulate the macro uncertainties for the greater stakes of the governments, the businesses, and the investors. The goal is to manipulate the contexts and attain ‘ALARP’ risk for given business. Moreover, it strives to realise such settled environments in which no risks are seen to be too big or too small comparative to the others. Risk Leveling is grounded on easy-to-use techniques and broadly known concepts, so therefore can be embraced by the managers easily. It may occupy fundamental placement within strategic drives of the
establishments. This approach is workable for diverse economies, markets, and business segments.

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