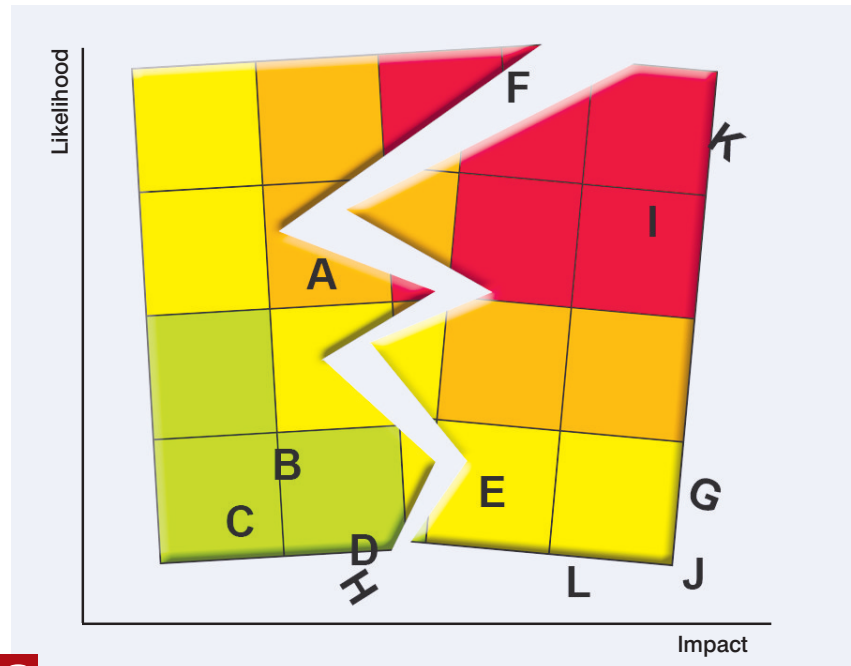


Companies Using Control Self Assessment Don't Really Know their Risk

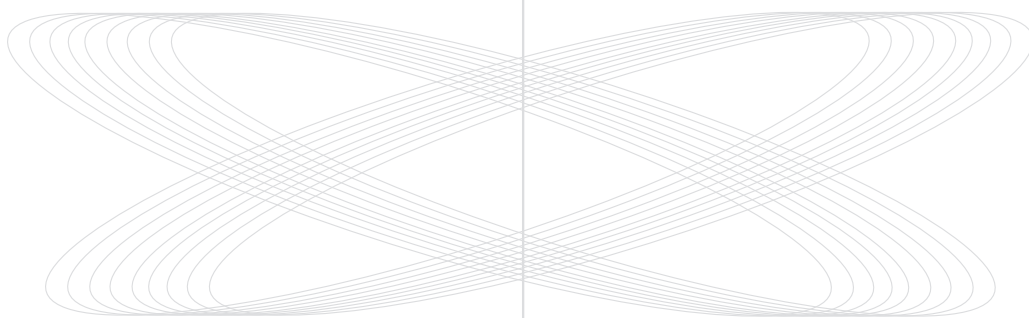
Dragonfly
September 28, 2005
By Judy Lee and Lieng-Seng Wee



Over the last few years, many corporates have embarked on developing their risk management processes using an approach called Control Self Assessment (CSA). This approach entails structured interviews at various levels of the organization, usually bottom up followed by top down vetting. Representatives in each organizational unit assess the risks and degree of control of various activities in their respective units. The results are consolidated into a "risk register" showing the enterprise's risks. Next, the risks are organized into a risk

assessment and control map that quantifies the risks into buckets of likelihood and impact (severity).

Although the CSA approach has helped increase awareness for risk and the need to develop risk management capabilities, we believe there are serious problems with the methodology. Over the last 5 years while advising clients under our current firm Dragonfly, we came across many attempts at using CSA to develop risk management. Some firms found that with



CSA they could not quantify their risks adequately. Neither could they relate their risks to their business economics and decisions. Others were uncomfortable with the robustness of the CSA methodology. Many found the CSA approach incomplete even though they could not clearly pinpoint where the problems are.

Based on our work developing quantitative risk management methodologies for clients in different sectors (corporates as well as financial institutions) we believe we have

identified the problems with CSA. The methodology itself is seriously flawed. Worse, the CSA approach produces some misleading decisions and gives a false sense of comfort in a company's ability to manage its risk. This article will point out and explain how CSA is flawed and the hazards of using it. We hope that it will help users, company directors and CEOs understand the limitations and dangers of using CSA. We also aim to show the imperative for using a more robust risk quantification and management approach.

Article Takeaways

- *CSA is a popular risk management approach*
- *But CSA is seriously flawed and produces dangerous implications*
- *CSA methodology uses a simplistic definition, provides inadequate quantification, understates and omits risks*
- *CSA produces misleading decisions and a false sense of comfort*
- *Crucial to warn Directors & CEOs of problems with using CSA*
- *Imperative that Directors & CEOs*
 - *Rework their risk framework if already using CSA*
 - *Use robust, quantification approach, not CSA, if just starting risk management*

Judy LEE and Liengseng WEE were pioneers in developing risk management from the late 1980s. They have two decades of experience in banking, derivatives, strategy and risk. After stints at Paribas, Booz Allen, Bankers Trust they founded Dragonfly, LLC a New York firm to advise clients on risk, strategy and investments in all sectors globally.

Why the CSA Methodology is Flawed

The CSA methodology is seriously flawed because it:

- Uses a simplistic definition of risk
- Improperly quantifies risk
- Does not distinguish between “likely” case and “extreme” case downside
- Understates risk
- Often omits extreme downside events

Uses a simplistic definition of Risk

In CSA, Risk is defined as Likelihood x Impact (L x I). For each risk type identified in the risk register through the interview process, the person is also asked to assess the likelihood of the downside and the impact of that risk incident. The risk type / incident is then placed in the risk map, which is typically a 4 x 4 matrix. For each risk, there is only one assigned likelihood and impact.

At first blush, the CSA definition is logical and appealingly simple. However, in reality, a risky position can result in a range of different outcomes with varying likelihoods or probabilities. Put differently, if your outcome is not guaranteed, there is a risk,

and your expected outcome is only one of many possibilities. Understanding your risk profile means being able to depict the full range and probability distribution of possible outcomes.

CSA is too simplistic and incomplete – by asking for a single L x I, it cannot capture the nature of uncertainty, which is the distribution of different outcomes. In many cases the CSA definition is simply wrong.

Let us illustrate using the following example of a manufacturing company interested in assessing the risk of production yields falling below target. CSA may define the risk of a production yield falling below the targeted 85% as a 6 (see Exhibit 1), with Likelihood of 2 and Impact of 3.

Risk of Production Yield Falling Short of Target

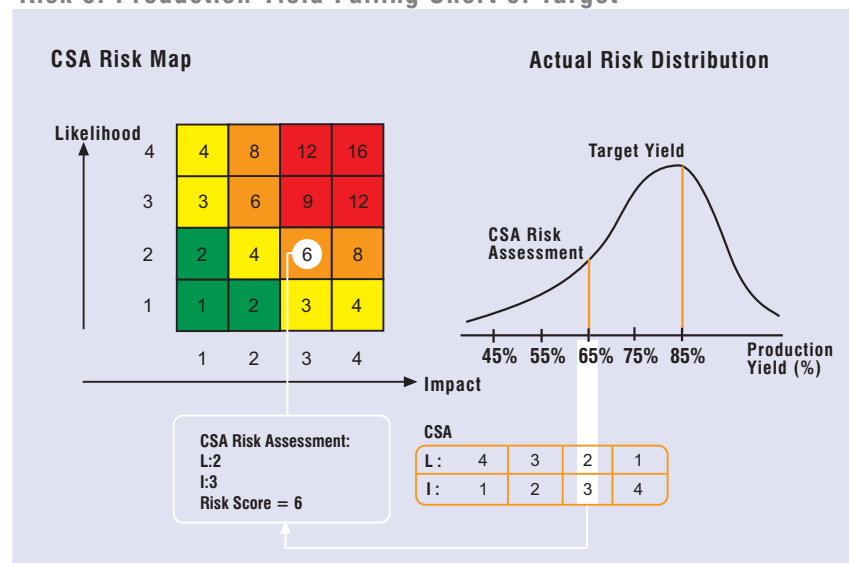
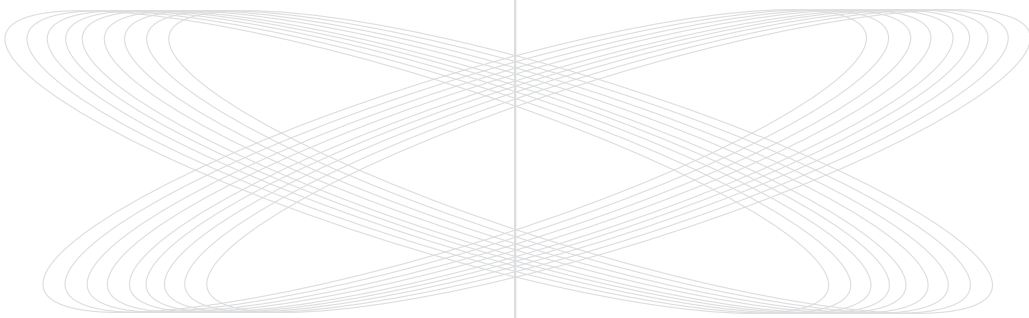


Exhibit 1



The actual risk however, is more accurately described by the probability distribution on the right of the exhibit – while the target yield is 85%, the actual yield may be 75%, 65%, 55% or 45% and worse. As the exhibit shows, the CSA definition of risk (that it is a “6”) cannot adequately describe the nature of the uncertainty of production yield (the distribution of possible yields in Exhibit 1, right-side).

How CSA Quantifies Risk

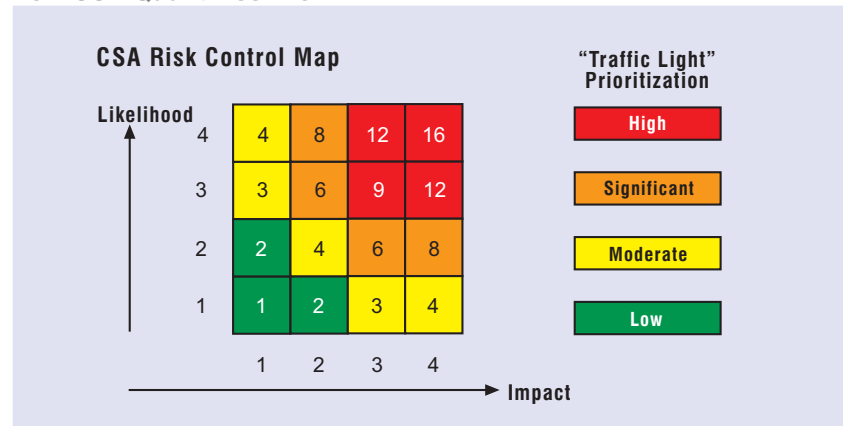


Exhibit 2

Improper Quantification of Risk

CSA quantifies risk by assigning risk ratings or scores to each box forming a risk control map. Typically the boxes are assigned ratings of 1, 2, 3, 4, from lowest likelihood to highest and from lowest impact to highest. The boxes show the product of the two dimensions – Likelihood and Impact -- the highest risk rating would therefore be $4 \times 4 = 16$. A “traffic-light” prioritization scheme is then used to sort the ranked scores – red for the highest risks; green for the lowest risks (see Exhibit 2).

best approximation / alternative. Some even suggest that $L \times I$ is the most appropriate method of quantification for all risks except for financial instruments (where Value at Risk is used).

Notwithstanding that it may be hard to quantify risks such as operational or reputational risks, we will show that the CSA approach is improper, if not downright spurious. In the following example, we will see how CSA quantifies the risks of 2 investment projects (see exhibit 3). Using CSA, both projects A and B are assessed with the same risk score of 6

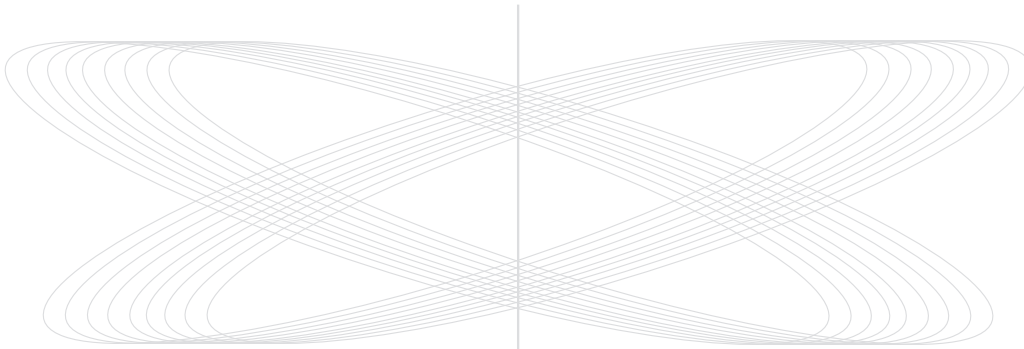
an analysis of the distributions of project returns for A and B will show:

- The project downsides are very different – A’s downside is a 4% ROI whereas B’s is 0%. A’s downside is not as bad as B’s but their CSA risk scores are identical (suggesting that A and B are equally risky when they are not).
- On further analysis, B is in fact a far riskier project across-the-board than A
- A has an expected ROI of 12% and a worst case ROI of 0%.
- B has a (lower) expected ROI of 8% and a worst case ROI of negative 4%.

“Quantification Error Stems From CSA’s Simplistic Approach of Risk Scoring”

Proponents of CSA argue that this methodology is needed because some risks cannot be quantified – and that $L \times I$ is the

(with L, I of 2, 3). Both A and B will be shown as an “Orange” risk (see exhibit 2). But the CSA quantification is improper –



Distribution of Project ROIs

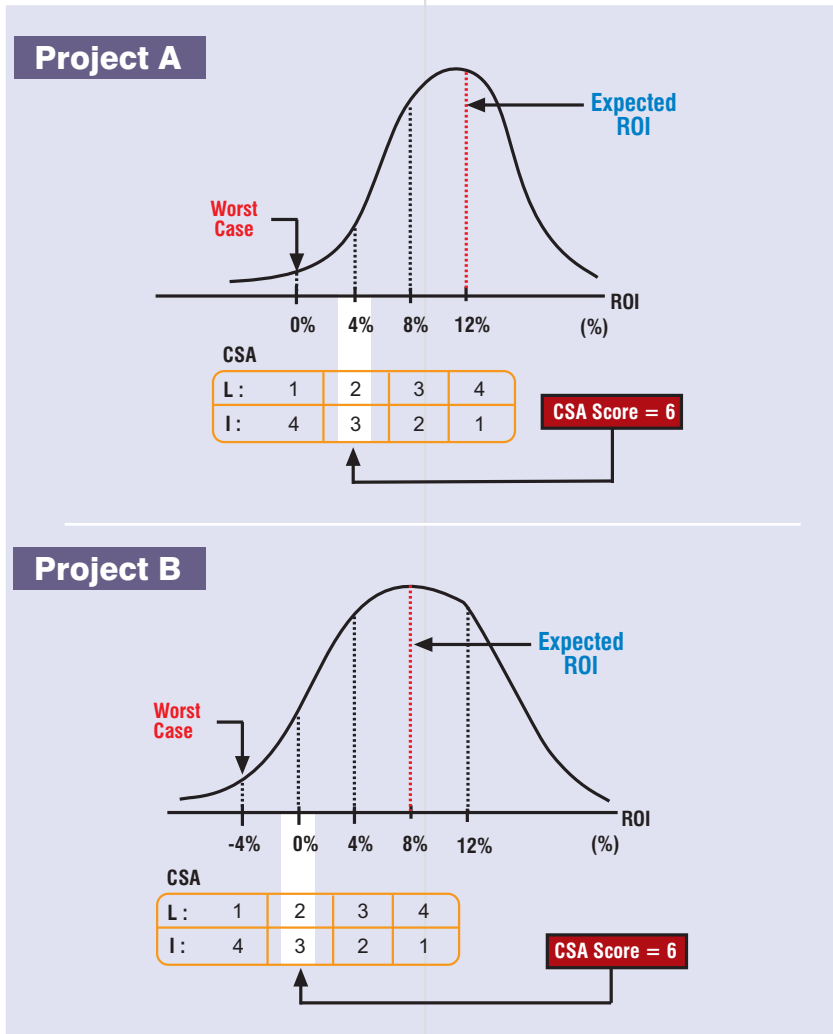


Exhibit 3

Does Not Distinguish Between “Likely” Case and “Extreme” Case Downside

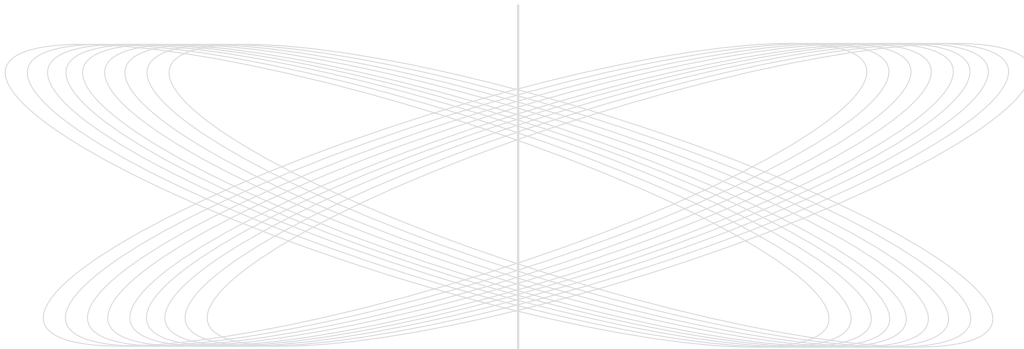
The downside risks of an activity can be segmented into two classes – “likely” case and “extreme” case. Let’s define for illustration, a “likely” case as an event with a 33% probability of occurrence and an “extreme” case as an event with a 1% probability of occurrence.

We illustrate this in exhibit 4, which shows the distribution of possible accident rates for a large construction project. The CSA approach does not distinguish between these two very different levels of risk (or probability of occurrence). In fact, two different persons might assess the project’s accident risk very differently – the first person might be estimating what the “likely” accident rate would be. In this exhibit he could have picked an L of 4 and an I of 1 giving a risk score of 4. The second person might have been looking for the “extreme” case accident rate – assigning an L of 1 and an I of 4 (also giving a CSA risk score of 4).

This quantification error stems from CSA’s simplistic approach at quantification using risk scoring (likelihood x impact) rather than accurately depicting and quantifying the nature and magnitude of the distribution of outcomes. The implications on decision-

making are serious – because CSA improperly assesses the 2 projects as having the same risk it would lead management to require the same returns from the investments when in fact it should require a higher return from project B.

Both levels of risks are important to measure and evaluate, but since the CSA approach does not distinguish between the two, it would be unlikely that both will be assessed. Further we would never really know which



Construction Project Worksite Accidents

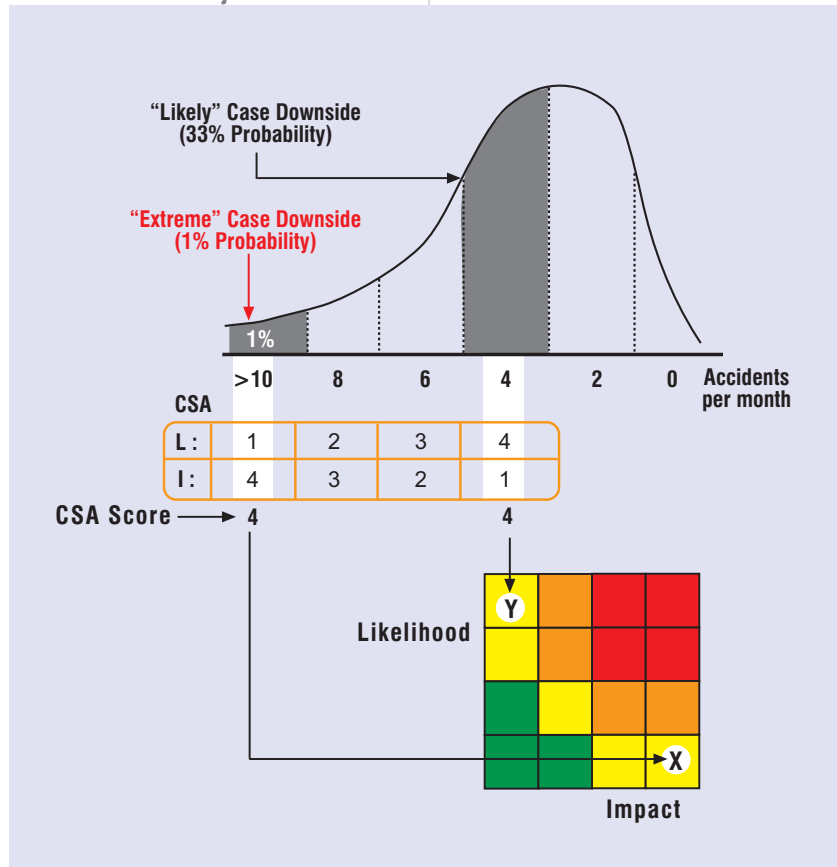


Exhibit 4

10 accidents per month. While “extreme” case events are very low probability, they can have highly severe direct costs and lead to additional damage from legal, reputational and regulatory ramifications. Therefore in addition to the typical safety and control processes, contingency plans, crisis management/communication protocols, use of insurance and some financial reserves may all be necessary.

In practice, it is not only crucial to distinguish between “likely” and “extreme” case events but to ensure that the risk quantification methodology specifies which level(s) of risk to measure and further to ensure that it is done consistently across-the-board. But, as we have shown, the CSA approach is not designed to do that – it uses too simplistic a definition of risk; it does not quantify risks properly.

Understates Risk

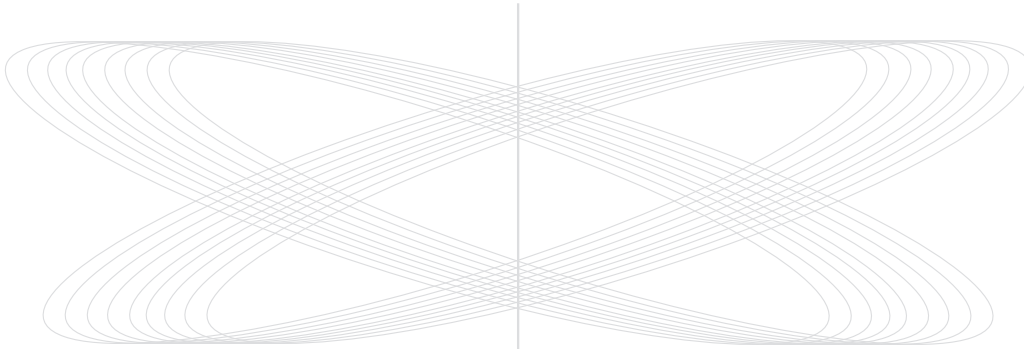
Another serious flaw in the CSA methodology is that the risks of low probability-high severity events are systematically understated. Using CSA, the maximum risk score for any low probability event is 4. Even for the highest impact events (rated 4), when multiplied with the low likelihood of occurrence (rated 1), it will produce a risk score of only a 4 -- which is low compared with the highest risk score of 16. This extreme event

one is picked and whether we are assessing risks consistently across different activities.

This distinction is important as the risk management implications of “likely” and “extreme” events are strikingly different. In this example the “likely” case event has a relatively modest impact – 4 accidents a month, medical expenses, some counseling and physical rehabilitation.

However, since it is much more likely to happen, safety control processes, tracking and incentive programs must be in place and well-executed all the time. As it has a high likelihood of happening, it is more frequent and may be more predictable. Typically there are more options for managing this type of risks.

In the same example, there is only a 1% chance that the project suffers from over



quantified as a 4, would translate into a yellow ranking under the “traffic light” risk mapping approach, and therefore attract little management attention. This is misleading as such risks can have severe downside. Like a hurricane for example, when it hits, it can be catastrophic.

We illustrate this in exhibit 5 where the risk of a terrorist attack will show a CSA score of 4, ranked “yellow”. But as the distribution shows, the actual risk – the cost of a terrorist incident is very high to catastrophic. In addition, the indirect costs, such as reputational and legal ramifications can be even higher and long lasting. For example, terrorism can cause a country’s credit rating to plummet, increase equity market volatility and weaken economic confidence.

Omits Most Extreme Downside Events

By now we would begin to suspect that a CSA approach will tend to omit many extreme downside events as it does not

Since most of us, when we think about risk tend to be biased towards “likely” downside events, the results of CSA interviews would tend to omit low probability but severe downside risks. We gain most of our perspectives from our day-to-day

“The Risk of Low Probability - High Severity Events is Systematically Understated”

identify the full distribution of outcomes, but takes one downside measurement for each risky activity. Further, CSA’s interview approach makes it difficult to ensure uniform and consistent calibration of risks across users and participants.

experience and the downside we experience or deal with most often. Also, most of us value optimism and generally prefer to paint a positive picture to ourselves and to senior management. This is reinforced by the typical mandates given to the businesses -- for investment decisions, senior management typically asks the business lines about “likely” outcomes.

To illustrate, in Exhibit 5 most CSA users would assess the risk of a terrorist attack as the possibility of a single damaging incident rather than the very low-probability event of a massive catastrophic attack (left tail of distribution).

Distribution of Cost of Terrorist Attack

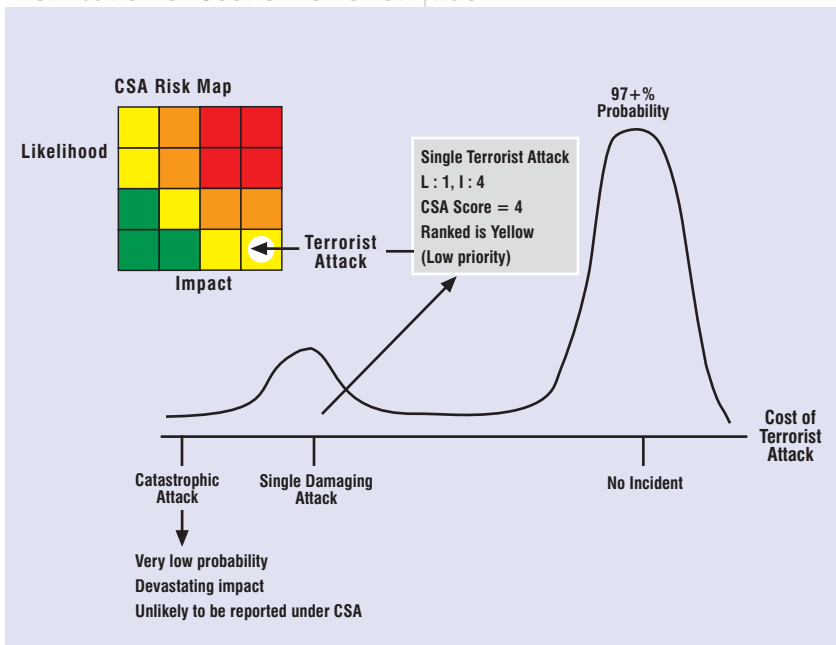


Exhibit 5

How

CSA Produces Misleading Decisions

CSA Produces Misleading Decisions Because of

- **Overemphasis on controls & mitigation**
- **Mistaken conclusion that risks taken are lower than actual**
- **False sense of comfort in degree of mitigation success**

So, what does this mean for the CEOs, investors and regulators?

The true test of a good risk management process is in the kind of decisions it can help us make, the kind of behaviors it encourages or discourages, and the extent to which it aligns risk-taking with the objectives and capabilities of the firm. Effective risk management would prepare decision makers to be

- Mistaken conclusion that risks taken are lower than actual
- False sense of comfort in degree of mitigation success

Overemphasis on Controls and Risk Mitigation

The CSA approach is to “treat” the risks identified by finding ways to reduce the

“Control Self Assessment Creates An Audit or Risk Policing Culture”

more resilient in uncertainty. By helping us take smarter risks, we can more likely capture the upside potential and maximize returns.

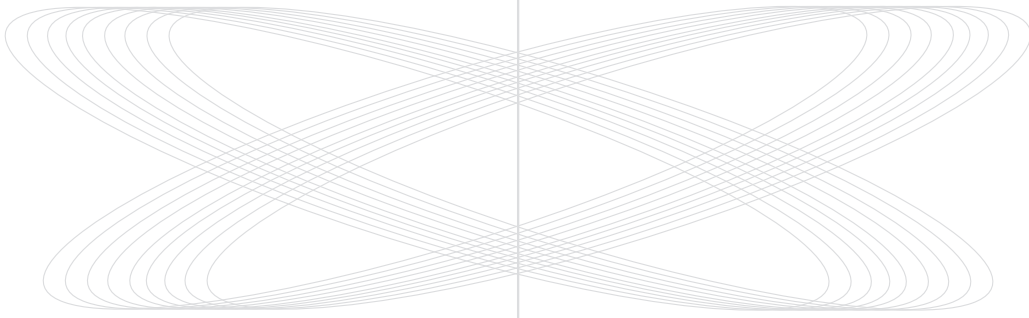
Unfortunately CSA does not provide the necessary tools to do this because of its flawed methodology and weakness in quantification. Consequently, the CSA approach may lead to misleading business and risk decisions:

- Overemphasis on controls and mitigation

likelihood and / or impact, thereby reducing the number of risks shown as “Reds” and “Oranges” in the firm’s portfolio. This tends to regard all risks as undesirable – to be controlled, mitigated, and reduced.

As a result, whether intentional or not, the risk management processes take on an audit or “risk police” tone. Even the name, “Control Self Assessment” reinforces this perspective.

While controls and risk mitigation are important tools, they should not be overemphasized. A sounder risk management approach is to evaluate the risk-return profile (range of upside and downside) of different business choices to consider:



- What level and mix of risks to take? What is the firm's risk appetite in different environments?
- Which risks to take? To what extent are we qualified to take them? What risks are we paid adequately to take?
- What are the capital adequacy, financial target, strategic and marketing considerations?
- How does risk impact pricing, product structuring, the design/configuration of operational processes?

The "Control Self Assessment" approach tends to overemphasize controls and mitigation rather than providing data and analysis to support these critical and complex business decisions.

Mistaken Conclusion that Firm's Risks are Lower than Actual

With CSA, users may conclude, incorrectly, that a firm is not taking substantial risks. For well-run firms it can even be misleading since (as we have shown earlier in this

"CSA Overemphasizes Controls and Mitigation -- It Does Not Support Risk-Return Decisions"

article) the CSA methodology is unlikely to produce many risks in the "red", or even "orange" categories. This is because management of well-run firms would have dealt effectively with most high likelihood events. If the risk is high likelihood, it is usually somewhat predictable and the causal drivers are more observable. As a result the CSA approach would not show much risk.

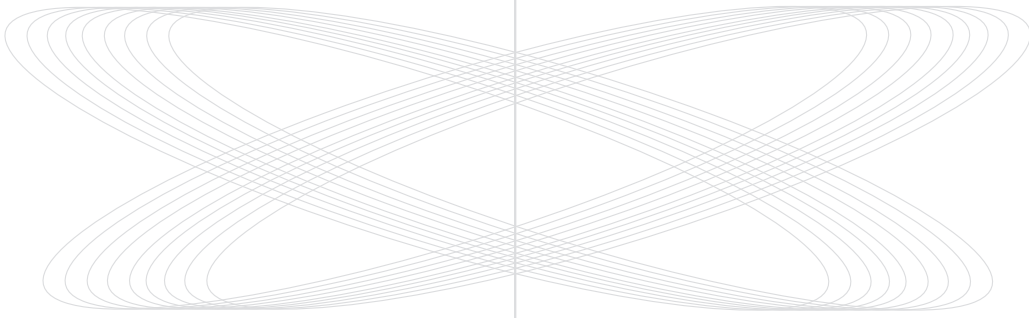
At the same time the CSA approach systematically understates the lower likelihood risks by assigning them low risk scores. As we have seen earlier:

- Many severe downside events tend to have low likelihood (and hence

low CSA risk scores, shown as "yellows") when in fact the risk is draconian. Example – risk of a terrorist attack would be "yellow" when in fact it is a high downside impact event.

- "Extreme" case risks may be systematically ignored and omitted. The large downside level may not be captured since CSA does not evaluate or depict the full distribution of possible outcomes. For example, the risk of an investment project risk may be depicted as a sub-par IRR when in fact there is a small chance that it could result in a loss of principal -- a more severe risk that would be omitted.

"With CSA You Cannot Aggregate The Amount of Risk In Your Portfolio"



False Sense of Comfort in Mitigation

The emphasis on risk mitigation in CSA, as well as the name of the process itself, --“control self assessment”, lulls management into a false sense of comfort. It suggests that risks once identified, can be mitigated through hedges and control processes. The resulting environment is assumed to be well-controlled, implying there is little risk.

However, having strong controls does not necessarily mean taking low risk. Further, not all risk mitigation attempts are sustainable; worse, some do not actually reduce the overall risk for the user. Instead, the risk is transformed from one risk type to another. Risk still remains in the firm but in a different form. This phenomenon is often not obvious to the unsophisticated user.

For example, a firm might manage the counterparty risk of its vendors and contractors by setting tough legal policies, with terms and conditions such as penalties for non-performance. However, if the vendor cannot perform and cause delays that are disruptive to the business, it may lead to reputational risk irrespective of the compensation for financial losses.

Risk is not Mitigated, Only Transformed

Risk Mitigation Process	Intended to Reduce Risk of	But Increases Other Risks
Collateral	Credit	Operational, Tracking
Netting	Credit	Operational, Concentration
Straight Through Processing	People	Technology
Diversification	Market/Credit	Operational, Complexity
Increase Fee Business	Principal Risk	Operational, Processing
Innovate Products	Margins, Market Share	Operational, Start-up & Critical mass
Stronger Contracts	Legal	Performance, Credit, Reputational

Exhibit 6

Exhibit 6 shows cases where even when risk is mitigated it is actually transformed into another risk type. Risk does not disappear. It is either shifted to another

party or transformed into another risk type. Hence risk mitigation may provide a false sense of security for CEOs, regulators and investors.

“CSA Does Not Help With Risk Appetite or Capital Allocation Decisions”

Imperatives

for Directors & CEOs

Although the flaws inherent in the CSA methodology are serious and could lead to erroneous risk conclusions and decisions, they are not well known. The simplicity of the approach and the ease of implementation -- especially for consultants not experienced with quantitative methods has made CSA common. This makes the situation worse especially for investors and regulators.

We do want to recognize that CSA has helped increase risk awareness among corporates and have been used by some institutions to build their risk management functions. Nevertheless, it is critical to recognize the hazards and serious consequences of using the CSA approach. This article aims to show how and why the CSA methodology is flawed:

- Simplistic definition of risk
- Inadequate method of quantification
- Understates and omits risks

This article also shows how CSA produces misleading decisions and a false sense of comfort in a firm's ability to manage its risks:

- Overemphasis on controls and mitigation
- Mistaken conclusion that risks are lower
- False sense of comfort in degree of mitigation

Directors and senior management must be warned that continued reliance on CSA could blindside the firm. Many major financial debacles were triggered by extreme case – low probability events – which is one of CSA's blind-spots. With CSA we certainly cannot “sleep well at night”!


US and in Asia. With our clients we have proven that this methodology works and that it facilitates more effective risk-return decisions.

The limitations, problems and dangers of relying on the CSA approach need to be

***“With CSA You Certainly
Cannot Sleep Well at Night”***

There is an alternative to CSA that is a robust and sound approach to enterprise risk management – for all risk types, and for corporates – not just for financial institutions. Unfortunately it is not widely known and is often mistakenly perceived as overly complex or onerous. It is both quantitative and qualitative. Unlike CSA it does however require more in-depth analysis and understanding of a firm's activities and the factors driving its results – and it cannot be developed by just a series of self-assessment workshops. It is based on the RAROC methodology or its variants.

urgently dealt with. We urge directors and senior management of firms that have been using CSA to consider a more robust and accurate risk management approach right away. Their firms can retain some of the benefits and information from the CSA work but need to rethink the risk framework and properly go about quantifying their risks.

For firms that have not begun building a comprehensive enterprise risk process we urge that they do it right from the start – do not rely on CSA. Develop and use a robust quantification approach right away. 

Dragonfly's founders were among the pioneers developing and institutionalizing this approach in the late 1980s in New York. More recently Dragonfly has expanded, adapted and customized the RAROC-based know-how to build risk management for clients in different industrial and service sectors both in the

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