

Risk Interconnectivity: Increasing Risk Intelligence at the Canada Revenue Agency

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“Neither market oversight nor prudential supervision were [*sic*] able to stem excessive risk-taking or take into account the interconnectedness of the activities of regulated and non-regulated institutions and markets.” —International Monetary Fund, *Lessons of the Financial Crisis for Future Regulation of Financial Institutions and Markets for Liquidity Management* (Feb. 4, 2009)

1. Introduction

The idea that events do not happen in isolation is not new; the notion of systems, that is, a set of entities interacting, is based on it. This is reflected in the comprehensive terminology that has been developed to express the effect that events have on each other: domino or downstream effects, unintended consequences, causality, catalyst or inhibitor, synergy, network, etc.

If the idea of events being interconnected is accepted, the idea that risks are also interconnected should naturally be acknowledged and considered in their analysis and management. This reasoning stems from the fact that risks materialize in the form of events that carry or introduce other risks. Risks are therefore connected through the event they can potentially trigger (see Fig. 1). More importantly, if the interconnectedness of events is frequently at the root of large-scale failure, it begs the question of why risks are still largely analyzed and managed independently or in isolation. While there has been

progress in looking at risks from a portfolio perspective and balancing the total amount of risk, more needs to be done to factor dependencies and linkages in the assessment of risks and how they are addressed.



Figure 1: Risks Connected through Events

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Recent years have brought interconnectivity to the forefront of management issues. The recession triggered by the global financial crisis is one of the most telling stories about the interconnectivity of systems and the lack of understanding of the aggregate effect of individual events. Failing to adequately identify and communicate the integrated nature of financial markets and transaction decisions between the United States and European countries contributed to a decline across the scale of large and small enterprises (International Monetary Fund 2009). In other words, no one realized that when the housing bubble in the United States burst, a global crisis would ensue, triggering failures in sectors as diverse as construction, banking, and automobile manufacturing and provoking a sovereign debt crisis in the Eurozone.

As a result, some organizations are starting to look into the relationships entertained by risks. For example, the World Economic Forum, in its *Global Risks 2011* report, charted a range of global risks arising from the new reality of interconnected challenges, interdependent stakeholders, and an accelerating speed of change. The report emphasizes the need to appreciate and understand how global risks are evolving, how they interact to create potential impacts on stakeholders, and what trade-offs are involved in managing them.

2. Implementing Risk Interconnectivity

One of the key objectives of the Canada Revenue Agency (CRA) Enterprise Risk Management program is to provide ever-improved *intelligence* in the management of risks. Intelligence is a notion derived from the power of association. It implies that pieces of information alone carry little insight; it is when the pieces are brought together that true comprehension, awareness, and *intelligence* are gained. This premise played an important role in establishing the need for better understanding of how the CRA's enterprise risks were interconnected.

At the CRA, risk interconnectivity refers to *the analysis that identifies and qualifies the relationships between risks*. The analysis converts perceptions into quantitative scores, providing an assessment of the strength of relationships, therefore highlighting risks with strong affinities. The analysis was piloted as part of the development process for the CRA's Corporate Risk Profile 2011. The goal was to provide another lens through which to view and analyze risk information.

Two main advantages are derived from risk interconnectivity.

- 1) *Avoid unintended or unanticipated consequences*: Enterprise risks of moderate risk exposure can be highly interconnected and, therefore, have significant ripple effects on other risks if not adequately contained.

The more interconnected a risk, the less tolerant the organization should be about its exposure. Traditional risk management approaches usually rely solely on exposure to determine whether mitigating actions are required. This can lead to overlooking certain risks for which the aggregated impact is not well understood, and thus could be understated.

- 2) *Inform risk responses and increase the effectiveness and efficiency of risk action plans*: Interconnectivity provides key information when determining which risks need to be addressed and which should simply be monitored. It also allows for better directing of resources when mitigating risks. Understanding how risks influence each other and, sometimes, their sequence of materialization provides an opportunity to implement well-thought-out and integrated actions where and when they are needed most from a portfolio perspective.

Interconnectivity was used to inform the management of all CRA enterprise risks. For example, one of the risks facing the Agency relates to organizational responsiveness and agility. While the exposure to this risk was not substantial, its high level of interconnectivity contributed to the decision to mitigate it. The interconnections also allowed the CRA to look at areas that influenced, or were influenced by, the risk. This information was leveraged to determine risk accountabilities. At the CRA, each risk is assigned an office of primary interest (OPI)¹ and may or may not have one or several offices of collaborative interest (OCI).² The highly interconnected and horizontal nature of the organizational responsiveness and agility risk explains the fact that the OPI is supported by six OCIs. Comparatively, this is the highest number of OCIs assigned to any risk at the CRA.

2.1. Methodology

When conducting a risk interconnectivity exercise, it is important to gather individuals with horizontal perspectives and knowledge who are able to establish relationships between risks at the enterprise level. It is also important to resist the temptation to select subject matter experts who have an in-depth knowledge of a topic. While these individuals provide great *input into specific risks*, they might not be well suited to establish the *linkages* between risks. For the CRA's risk interconnectivity pilot, 11 experienced risk analysts with diverse backgrounds and business and operational knowledge of the Agency were selected as participants to complete the exercise. Based on the experience of this pilot approach, it was established that increasing the number of participants to 20–30 would further improve results accuracy.

With the help of a questionnaire³ developed by the CRA Enterprise Risk Management team, participants were asked to identify up to six risks that they judged as most related to the risk being assessed. Once the related risks were identified, participants ranked them from 1 to 6, where 1 indicated the strongest relation. Inverse weighting was used to establish a score indicative of the strength of relation. Participants were also asked to identify the direction of influence for each risk pairing. With 31 enterprise risks to assess, the participants identified more than 300 risk connections.

Thresholds were established to determine the assessed level of strength (i.e., very strong, strong, medium, or weak) for each connection and to retain the most meaningful relationships (i.e., those identified by a minimum number of participants). Results were visually represented on a risk interconnectivity map and validated through a series of “sanity checks,” that is, discussions with risk and business experts to establish soundness of judgment for the overall results.

While risk assessment results vary, the relationships between risks tend to stay fairly stable over time, unless significant changes in the environment cause the risks to evolve in nature (that is, a risk having a causality relationship with another risk will tend to maintain that type of influence over time). However, adjustments to the risk interconnectivity map are being implemented as necessary when

¹ An office of primary interest (OPI) is the lead work unit that has the overall accountability for the management of a risk and is responsible for ensuring that risks are reviewed periodically, controls remain effective, and actions to manage risks are implemented and reported on.

² Offices of collaborative interest (OCIs) are work units that support OPIs in the management of a given risk. OCIs can contribute to managing a risk by providing input and guidance or by taking responsibility for managing specific aspects of a risk. Actions undertaken by OCIs are led and coordinated by OPIs.

³ A questionnaire was included as part of a step-by-step participant guide on risk interconnectivity. A series of four questions prompted participants to consider the following when judging whether two risks were related: risk drivers, risk impacts, common mitigation means, and their own personal experience and knowledge.

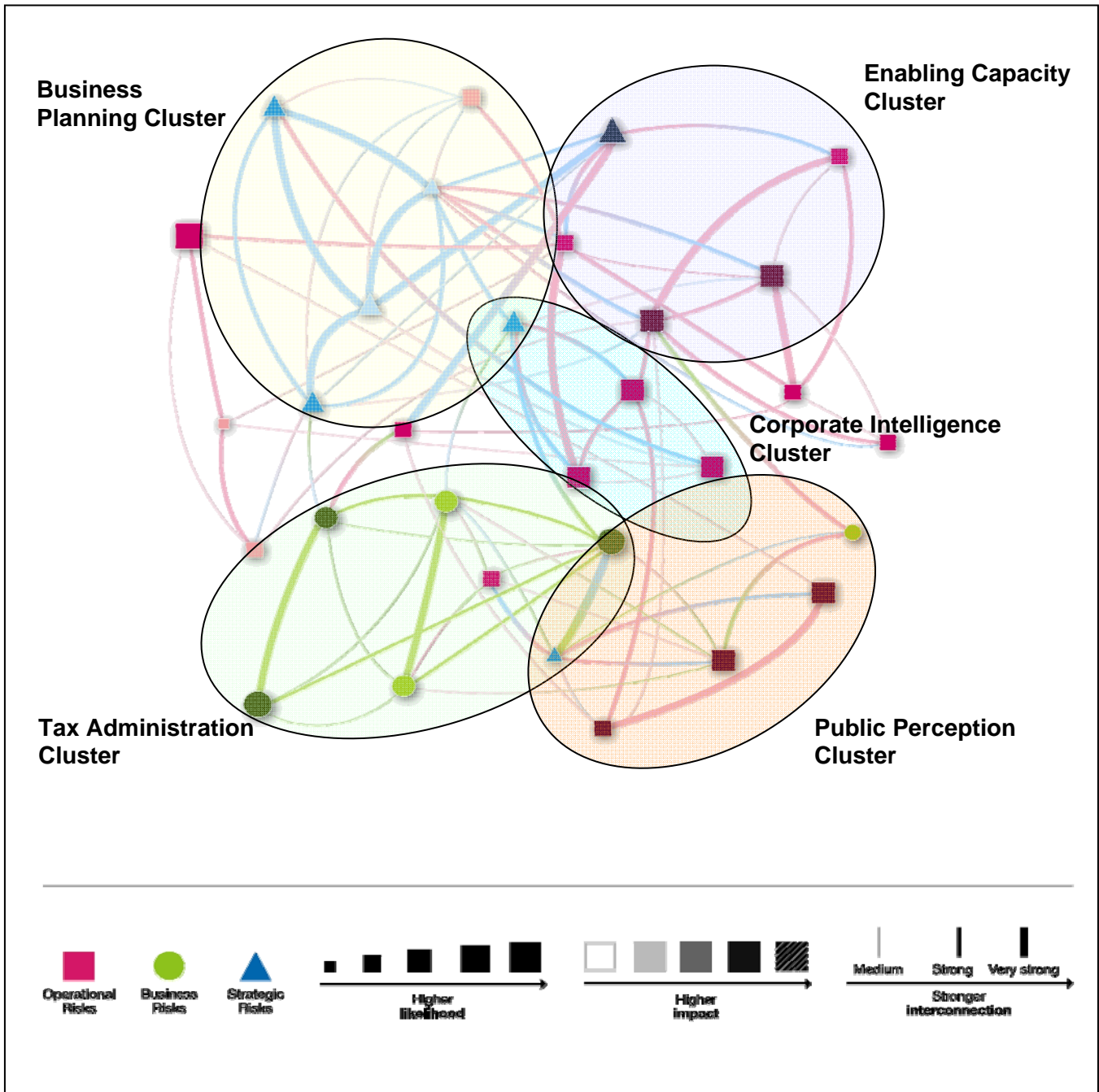
environmental changes or new information is brought to light and as enterprise risks are added to or eliminated from the corporate profile. The Agency anticipates revisiting the overall interconnectivity profile yearly, to ensure its continued relevance and accuracy and that it is aligned with the corporate risk assessment cycle.

2.2. Results and Interpretation

The interconnectivity exercise resulted in a map of 87 medium to very strong connections linking the 31 CRA enterprise risks. To avoid introducing noise into the analysis and interpretation results, weak connections were not retained on the map. The complete map was subject to an overall analysis. In addition, to better understand the risk landscape of the organization, risk clusters were extracted from the map and further examined. The clusters were identified by looking at the number and strength of connections linking certain risks as well as by the emerging themes between interconnected risks. Consideration was also given to looping connections that pointed to ongoing influences within a specific group of risks. An example of looping connections is a group of three risks where each risk is directly connected to the other two. Figure 2 displays the CRA risk interconnectivity map and highlights the five clusters that were identified.

In analyzing the results of the overall interconnectivity exercise, several conclusions were drawn and used to inform risk responses and the appointment of OPIs and OCIs:

- *No risk is an island:* Each enterprise risk was significantly connected to at least three other risks. This highlights the importance of collaboration and partnerships in the management of interconnected risks, as well as the need to explore integrated risk responses. It is also worth noting that the risk with the greatest number of interconnections had 10 medium to very strong connections, which means that it influences—or is influenced by—one-third of the CRA’s entire enterprise risk universe.
- *Some risks are positively correlated:* When the exposure to one risk increases, the exposure to the other risk follows. In these cases, opportunities to address common drivers with common control measures should be sought.
- *Some risks are negatively correlated:* When the exposure to one risk increases, the exposure to the other risk decreases. In these cases, discussions on risk tolerance or trade-offs with regard to the risk exposure should be held.
- *Some risks have a causality relationship:* This means that, generally, there is an order of precedence in the materialization of risks. For example, a variety of risks might need to materialize before the reputation risk of an organization is meaningfully affected. In these cases, consideration was given to addressing primary risks, given that measures would also reduce the exposure to secondary or end-of-spectrum risks.
- *Some risks are highly interconnected:* When a risk is directly connected to many other risks, it has a large breadth of influence on the overall risk profile of the organization. At the CRA, several of these risks were found in the Enabling Capacity cluster. The level of interconnectivity of a risk was factored into the risk response decision-making process. It was also considered when implementing concrete mitigation measures. When required, action plans related to highly interconnected risks need to be undertaken with extra care to avoid, as much as possible, negative ripple effects on other risks.



Source: Canada Revenue Agency.

Note: Risk names have been removed from the map for reasons of confidentiality.

Figure 2: CRA Risk Interconnectivity Map

- *Some clusters of risks are homogeneous and others are heterogeneous:* As shown in Figure 2, some clusters primarily comprise one category of risks (e.g., Business Planning cluster), while others are composed of a variety of risk categories (e.g., Public Perception cluster). This finding explained and partially informed the determination of OPIs and OCIs. While homogeneous clusters are managed by a smaller group of stakeholders, the heterogeneous ones require a more coordinated and horizontal—or organization-wide—approach, given the diversity of stakeholders involved in their management.

Discussions continue to take place on the type of connections linking risks and the implications for enterprise strategies. For example, the CRA is exposed to risks related to taxpayer noncompliance. However, the more aggressive the organization's efforts to address these risks, the more exposed it becomes to taxpayer objections that need to be settled. By gaining an understanding of the strength of the connections and the negative correlation of these risks, management is in a much better position to develop integrated, efficient, and effective courses of action to mitigate them.

3. Challenges

While the ability to establish associations between risks provided the CRA increased intelligence concerning their management, the risk interconnectivity exercise evokes a number of challenges as well:

- *Integration into the culture:* The risk interconnectivity results, and the information they carry, trigger a cultural shift in the way an organization approaches risks. Clear explanations need to be provided to stakeholders to demonstrate how risk interconnectivity supports and feeds into the need for integrated decision making. The results themselves are complex, as they carry numerous pieces of information and, upon first examination, can be overwhelming without proper guidance and reflection on their interpretation. The complexity of the information makes it challenging to communicate results at a level that is easily understood by a diverse audience.
- *Managing changes:* Any number of connections can be identified, and this number increases exponentially as the quantity of identified risks increases. As the results are communicated to wider and more specialized audiences, requests to change the risk interconnectivity map by adding or removing connections, or by modifying the strength of an established connection, need to be managed. Changes should be considered in the context of the organization and multiple stakeholders and addressed in a consistent manner that justifies change requests and prioritizes their implementation to add the most value at the enterprise level.
- *Multiple stakeholders:* Though integrated action plans provide increased efficiency, the involvement, coordination, and accountability of multiple stakeholders in the management of risks complicates what has been historically an insular approach where risks were managed largely in silos, without consideration of interdependencies.

4. Conclusion

Risk interconnectivity is a relatively recent concept that will continue to evolve as an increasing number of organizations recognize its importance and take steps to clearly describe how their risks, and the events they carry, interact. As a result, the methodology and tools to support the exercise, the interpretation of results, and their dissemination to a larger audience will become more sophisticated and

tailored over time. It should not be viewed as a project that once completed, is filed away; it is a continuous journey toward robust, informed, and evidence-based decisions about risk management.

The increased intelligence gained by establishing associations between risks has been an invaluable contribution to the way in which the CRA manages enterprise risks and has implications that extend beyond risk management activities. It is a tool to build a more aware organization whose actions are integrated across programs and taken with a horizontal perspective that considers both downstream and upstream effects. Once the thinking is embedded in the culture, it can lead to a more efficient and effective organization by increasing awareness and collaboration while reducing duplicative efforts.

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About the Authors

Brian Philbin is responsible for providing strategic advice and executive oversight with respect to horizontal and integrated enterprise risks across the CRA and plays a key role in enabling major change management processes within the Agency. Mr. Philbin has over 25 years of experience in enterprise and operational risk management, finance, operations, technology, strategic planning, compliance, and governance. He has held senior executive financial and operational management positions in the public and private sectors. Mr. Philbin is a chartered accountant and holds a Bachelor's degree in business administration from the École des Hautes Études Commerciales of the Université de Montréal.

Valérie Bournival has played a lead role in designing and implementing the CRA's Enterprise Risk Management program. Before joining the CRA, Valérie worked for various government organizations, including the Treasury Board of Canada Secretariat (TBS) and Human Resources and Social Development Canada (HRSDC). Her experience encompasses project development and project risk analysis, funding agreement negotiations, and strategic policy development and evaluation, mainly in the areas of risk management and performance measurement. Ms. Bournival graduated from the Université du Québec à Montréal in 2001 with a Master's degree in Project Management and a specialization in risk management.

Kristen Petrushka provides expert guidance and advice in risk management to a broad spectrum of Agency clients undertaking major initiatives. Ms. Petruska was responsible for developing the methodology and conducting the analysis for the CRA's risk interconnectivity pilot exercise. She is a graduate of Carleton University with a B.Sc. in Psychology and a minor in Statistics. Ms. Petruska joined the CRA in 2006 and has held a variety of corporate positions in the areas of strategic policy and relationship management. In 2008 Ms. Petruska was selected from 1,700 applicants as one of 150

participants for the federal government's strategic foresight exercise for young public servants, known as *Canada 150*.