Identify emerging risks before it's too late

We live in an increasingly interconnected world. Interconnectedness—technologically, financially, economically, socially, and environmentally—gives rise to interdependencies, making our risk landscape inherently more dynamic.

The interdependencies within the value chain for delivery of products and services, combined with the pace of change in technology, render these functions and processes fundamentally different today than a decade ago. Recent health, social, and economic events illustrate this, and challenge us to think more broadly and view the business environment as a system[1].

A system's parts interact with each other, giving rise to nonlinear behavior, such as exponential growth or decline, or effects resulting from an action. Therefore, to understand a system's behavior, analyzing the relationships between its parts is often just as important as identifying these parts. This means that traditional tools, such as statistical models that rely on the often implicit assumptions of independence and other forms of constancy, could be useless or even dangerous. Moreover, these models often rely on quantitative data. Yet, today's interconnected world will regularly see new challenges for which no precedent, and so no reliable past data, exists. How to manage risks in such an unpredictable business environment?

[1] Definition: System—A system is an interconnected set of elements that is coherently organized in a way that achieves something. (Source: Thinking in Systems—A Primer, By Donnella H. Meadows, p. 11.)

Background

The best way for an organization to prepare for possible unprecedented events is to detect risks as they emerge, as opposed to when they fully materialize. An effective assessment and response to emerging risk requires systems perspective. From this perspective, we can see an entity or unit as a whole, which then provides us not only with a complete overview of all internal relationships, but also the interrelations with its environment. Putting this mental shift into practice requires a sophisticated combination of Data & Analytics (D&A) capabilities, tools that tap into human foresight, and the right organizational structures.
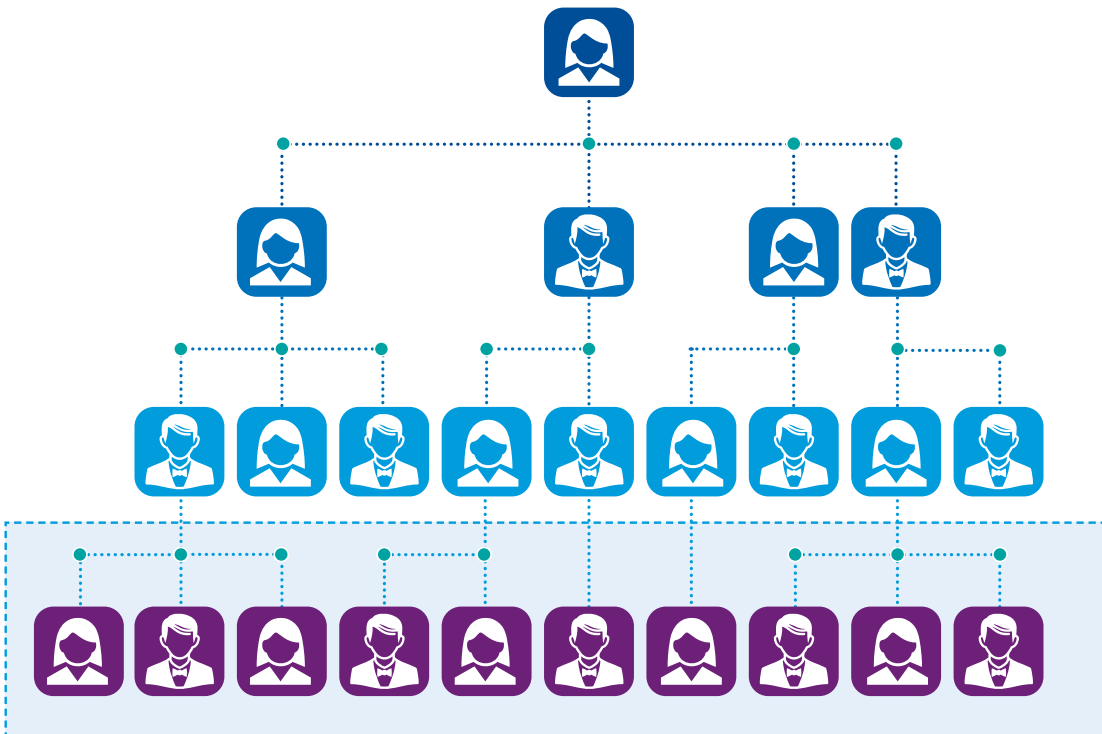

The bulk of an organizations' sensing capacity resides at this level, but it is routinely cut off from decision-making, which happens at the top.

Figure 1. By Leith Sharp. Adapted under creative commons CC BY-AS 4.0.

Tools

Big data and D&A offers the possibility of gaining knowledge on emerging issues, especially those that have precursors that are relatively easy to quantify. Additionally, social research shows that within each organization there is a wealth of knowledge and experience that could lead to the human foresight required to anticipate new or changing risks before they fully emerge. However, this knowledge or "sensing capacity" does not always make it up to leadership. For this to happen, an organization needs the right organizational structures.

D&A

Human foresight

Organizational structures

D&A
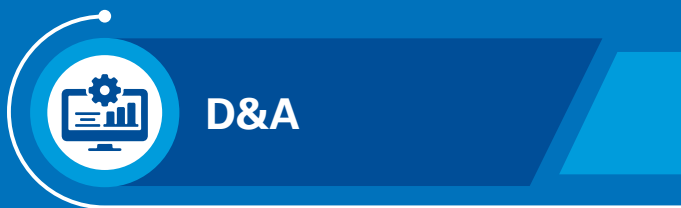
Because systems are dynamic, management today requires ongoing surveillance and a deep understanding of the various facets of the environment that could present both risks and opportunities to the organization. Emerging risks by nature are likely to be difficult to quantify, but some have the "precursors" that can show up in data. Such ongoing, multi-dimensional surveillance requires the ability to ingest vast amounts of data and use increasingly sophisticated D&A tools and approaches.

Internal data sources

Technological developments in data storage and in sensors, including the Internet of Things (IoT), allow organizations to collect more data than ever. Often data can be collected in real-time, including those from their customers, workers, and suppliers. Examples on internal sources of data include supply chain, customer behaviors and transactions, supply and demand, inventory, ecommerce, IoT sensors and mobile apps, and human resources.

External data sources

There are also more external data sources than ever before. For example, social media data can provide clues about reputational risks and opportunities. Macro data on economic, health, demographic, and many other indicators, often provided by government and global organizations, can contain information about an organization's operating environment. Examples include publicly and privately available data sources like social media, community income levels, travel patterns, crime rates, mortgage and housing, job postings, medicare, and location-based mobility.

Artificial Intelligence (AI)

The right technologies, internal processes, and workforce capabilities can then derive meaningful insights from these external and internal data. Sophisticated, adaptive algorithms may quickly pick up on changes in data streams, driven by certain emerging risks, quickly. This ability to collect, curate and analyze this vast amount of data in combination with AI, Machine Learning, advanced D&A, and predictive modeling, allows leaders to gain new insights about risks and opportunities and make more informed decisions positively impacting their employees, organizations, communities, and society in general.

Human foresight

Emerging risks and opportunities are often not yet readily quantifiable or even measurable, but they are stored to some extent in people's minds. This qualitative data can contain information about all the interlinkages that make up today's business environment. After all, the impact from board decisions and external trends and vice versa are not always linearly proportional, nor always felt and responded to immediately, and they do not neatly stay within department, company, or industry boundaries. The qualitative data in people's minds can be extracted with surveys, interviews, group workshops, or a combination thereof. To minimize people's inherent biases, such extraction should be done with a sufficiently diverse group of people. The following tools are established methodologies of tapping into an organization's sensing capacity in a way that preserves knowledge of interlinkages, which, amongst other things, could help identify easier to measure precursors to risks that are potentially emerging.

Pre-mortem assessment

A Pre-mortem is a methodology that uses "prospective hindsight", i.e., a group imagines that an event has already occurred. This event can be a headwind or an approaching disaster, and the group casts back how this could have happened to find opportunities for success or failure not considered before.

Expert elicitation

Expert elicitation is the methodological synthesis of opinions from a group of expert authorities on an issue with a high degree of uncertainty. This uncertainty can be due to insufficient or a complete lack of data, for example because the circumstance that is studied involves a very rare event or a one that is unprecedented. Expert elicitation is scientific and forward looking planning method to view emerging trends in their context. That is why the World Economic Forum, for example, uses expert elicitation for its annual Global Risks Report.

Scenario analysis and wargaming

Scenario analysis is a process of analyzing possible future combinations of events (or storylines) by considering multiple alternative trend developments. In wargaming some participants take on the role of the competition and go through rounds of iterative strategy setting, creating alternative future paths to be analyzed. Scenario analysis and wargaming are not based on extrapolation of the past, but rather use various possible futures. That is why many organizations advocate using these tools to gain insights into future developments marked by high uncertainty. For example, the Task Force on Climate-related Financial Disclosures recommends scenario analysis to organizations for gauging the economic and financial impacts from climate change.

System Dynamics modeling

System Dynamics (SD) is an approach to understanding the nonlinear behavior of a system, e.g., a business operating system, over time. It is a model built on input from a group of people with knowledge of how a system's interactions work. The relationships between all factors are laid down using stocks, flows, internal feedback loops, table functions and time delays. SD offers the highest level of quantification amongst the tools here, but is also the most labor intensive. It is an effective way to analyze complex problems with high stakes.

Tools for different horizons and levels of quantification

Level of quantification

There are various tools to assess emerging risk based on desired level of quantification and time horizon. Tools with a higher quantification potential also remain useful for a longer analysis horizon. However, their increased costs typically only merit use for longer horizons.

1. **Pre-mortem assessment**
2. **Expert elicitation**
3. **Scenario analysis and wargaming**
4. **System Dynamics modeling**

Time horizon

Organizational structures

Research shows that the combination of D&A and human insights works best in forecasting in a dynamic environment. In order to achieve an optimal synergy between human foresight and data-driven solutions, the right organizational structures need to be in place. The latest academic insights tell us which structures can foster a nimble work culture and agile organization. These structures will enable flows of both quantitative and qualitative information, and as such must be established more as "feedback loops" rather than "hierarchies" (which tend to impede the flow of information, especially when the information is unfavorable to the organization). In essence, organizations need to be structured more like the way that events, including risks, behave: not in a hierarchy, but rather flowing as in a network.

CCS and AOS combination

We are familiar with the Command and Control Structure (CCS): it is the official authority structure, the rules and hierarchy, which shape our interactions within an organization. According to Harvard researcher Leith Sharp, the CCS needs to be complemented with an internal Adaptive Operating System (AOS) to be agile and in touch with emerging issues. An AOS consists of flat relationships, group clusters, with a community structure. Innovative responses to emerging issues can be invited into the company only through the AOS. Once ready, promising innovative ideas can be further developed and scaled through the CCS. The aligning force between the AOS and CCS is a company's purpose.

Learning organization

According to Peter M. Senge, author of *The Fifth Discipline*, an organization is a system, not a machine. From this perspective, a well-managed organization is a "learning organization". In a learning organization, people work together collectively to enhance their capacities to create results they really care about. The mental model underlying such management frameworks is one where people are assumed to be responsible, curious, and naturally inclined to work towards a common purpose. In a learning organization, people are constantly expanding thinking patterns, making them collectively in touch with emerging issues. When employees are empowered and information and feedback is flowing with the right organizational structures and policies, the resulting generative thinking and innovative problem solving is faster and more effective than that of any individual.

Human foresight

D&A

The right organizational structure

Valuable insights

Conclusion

D&A tools and emerging technologies should facilitate data collection, aggregation, and analysis to inform decision makers in near real-time. Equally important are the insights from people throughout the organization, which will be based on this data as well as each individual's unique experience. Then, the right organizational structures will enable flow of both kinds of information through clear and frictionless communication processes and channels so that an organization is agile: in touch with emerging risks, monitoring them in near real-time, and able to adapt quickly.

What is the optimal combination of the data-driven tools and human insight-driven ones? What organizational structures support this combination optimally? The answer differs for each organization. KPMG can help you determine which one will work best for you.
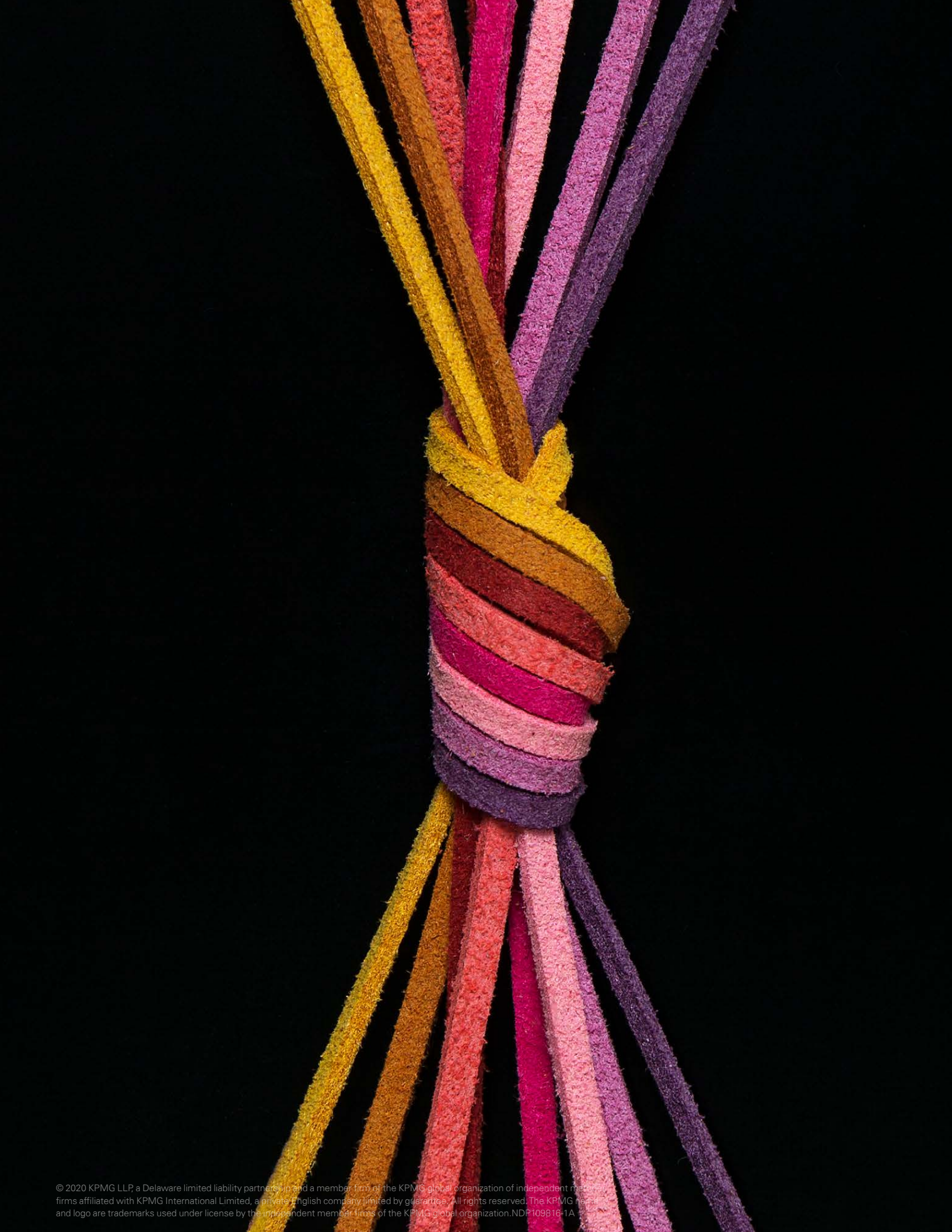
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