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Risk Practice

The risk-based approach to cybersecurity

The most sophisticated institutions are moving from a “maturity based” to a “risk based” approach for managing cyberrisk. Here is how they are doing it.

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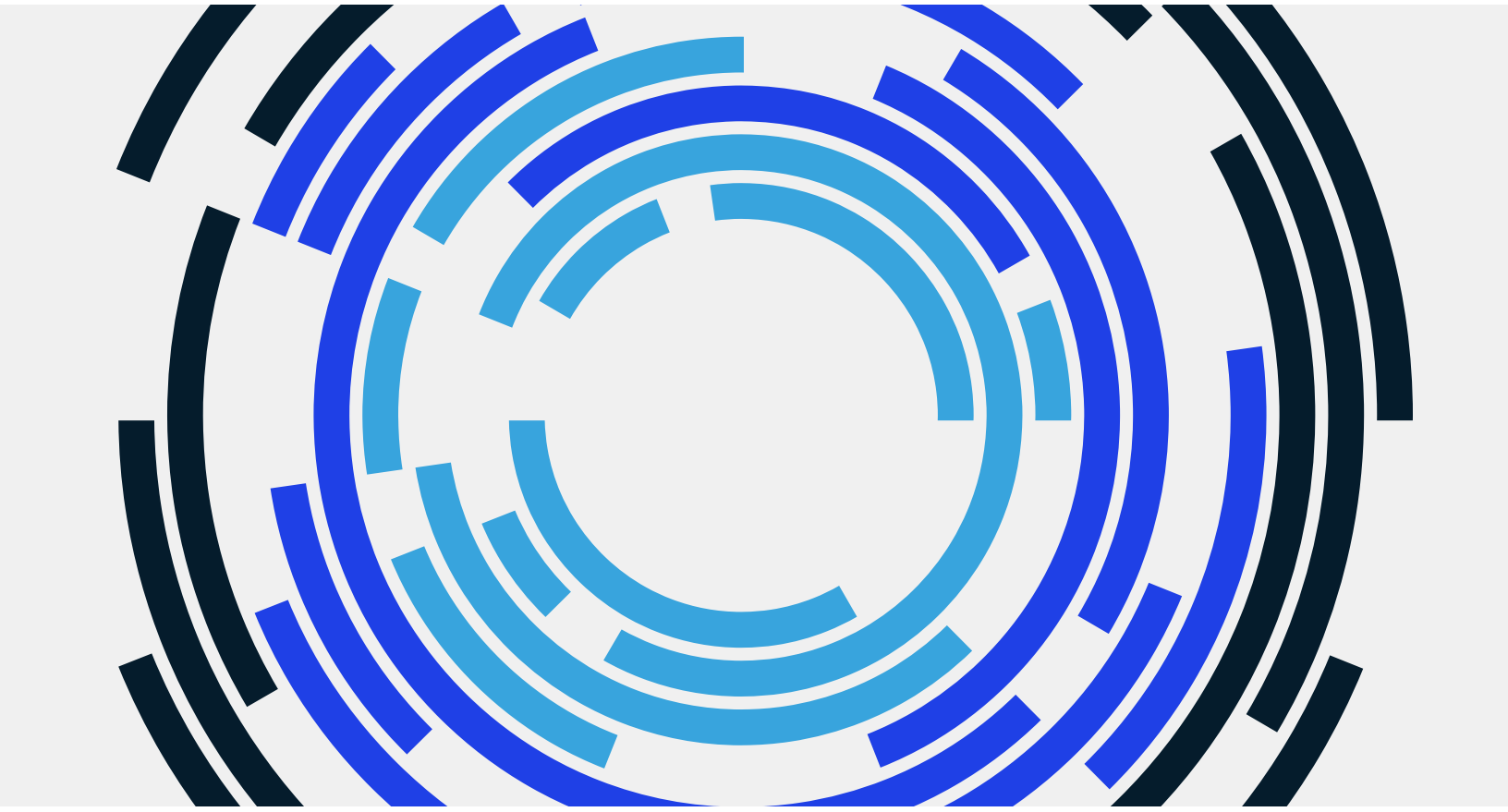

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Top managers at most companies recognize cyberrisk as an essential topic on their agendas. Worldwide, boards and executive leaders want to know how well cyberrisk is being managed in their organizations. In more advanced regions and sectors, leaders demand, given years of significant cybersecurity investment, that programs also prove their value in risk-reducing terms. Regulators are challenging the levels of enterprise resilience that companies claim to have attained. And nearly everyone—business executives, regulators, customers, and the general public—agree that cyberrisk is serious and calls for constant attention (Exhibit 1).

What, exactly, organizations should do is a more difficult question. This article is advancing a "risk based" approach to cybersecurity, which means that to decrease enterprise risk, leaders must identify and focus on the elements of cyberrisk to target. More specifically, the many components of cyberrisk must be understood and prioritized for enterprise cybersecurity efforts. While this approach to cybersecurity is complex, best practices for achieving it are emerging.

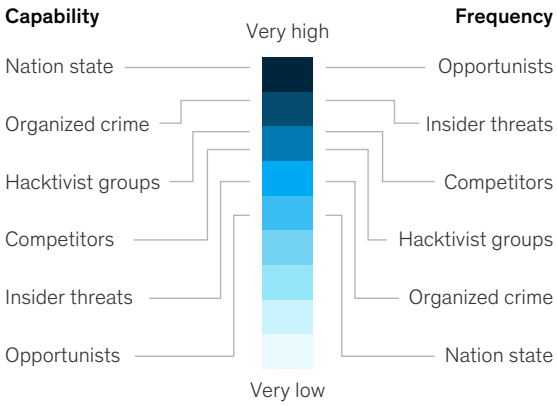
To understand the approach, a few definitions are in order. First, our perspective is that cyberrisk is "only" another kind of operational risk. That is, cyberrisk refers to the potential for business losses of all kinds—financial, reputational, operational, productivity related, and regulatory related—in the digital domain. Cyberrisk can also cause losses in the physical domain, such as damage to operational equipment. But it is important to stress that cyberrisk is a form of business risk.

Furthermore, cyberrisks are not the same as cyberthreats, which are the particular dangers that create the potential for cyberrisk. Threats include privilege escalation, vulnerability exploitation, or phishing.[1] Cyberthreats exist in the context of

Exhibit 1

Cyberthreats are growing in severity and frequency.

Cyberthreat capacity and frequency today, threat actor



enterprise cyberrisk as potential avenues for loss of confidentiality, integrity, and availability of digital assets. By extension, the risk impact of cyberthreats includes fraud, financial crime, data loss, or loss of system availability.

Decisions about how best to reduce cyberrisk can be contentious. Taking into account the overall context in which the enterprise operates, leaders must decide which efforts to prioritize: Which projects could most reduce enterprise risk? What methodology should be used that will make clear to enterprise stakeholders (especially in IT) that those priorities will have the greatest risk reducing impact for the enterprise? That clarity is crucial in organizing and executing those cyber projects in a focused way.

At the moment, attackers benefit from organizational indecision on cyberrisk—including the prevailing lack of clarity about the danger

[1] Privilege escalation is the exploitation of a flaw in a system for purpose of gaining unauthorized access to protected resources. Vulnerability exploitation is an attack that uses detected vulnerabilities to exploit (surreptitiously utilize or damage) the host system.

and failure to execute effective cyber controls. Debilitating attacks on high-profile institutions are proliferating globally, and enterprise-wide cyber efforts are needed now with great urgency. It is widely understood that there is no time to waste: business leaders everywhere, at institutions of all sizes and in all industries, are earnestly searching for the optimal means to improve cyber resilience. We believe we have found a way to help.

The maturity-based cybersecurity approach: A dog that's had its day

Even today, "maturity based" approaches to managing cyberrisk are still the norm. These approaches focus on achieving a particular level of maturity by building certain capabilities. To achieve the desired level, for example, an organization might build a security operations center (SOC) to improve the maturity of assessing, monitoring, and responding to potential threats to enterprise information systems and applications. Or it might implement multifactor authentication (MFA) across the estate to improve maturity of access control. A maturity-based approach can still be helpful in some situations: for example, to get a program up and running from scratch at an enterprise that is so far behind it has to "build everything." For institutions that have progressed even a step beyond that, however, a maturity-based approach is inadequate. It can never be more than a proxy for actually measuring, managing, and reducing enterprise risk.

A further issue is that maturity-based programs, as they grow organically, tend to stimulate unmanageable growth of control and oversight. In monitoring, for example, a maturity-based program will tend to run rampant, aspiring to "monitor everything." Before long, the number of applications queued to be monitored across the enterprise will outstrip the capacity of analysts to monitor them, and the installation of monitors will bog down application-development teams. The reality is that some applications represent more serious vulnerabilities—and therefore greater potential for risk—than others. To focus directly on risk reduction, organizations need to figure out how to move from a stance of monitoring everything to one in which particular applications with high risk potential are monitored in particular ways.

Another issue related to the monitor-everything stance is inefficient spending. Controls grow year after year as program planning for cybersecurity continues to demand more spending for more controls. But is enterprise risk being reduced? Often the right answers lie elsewhere: for example, the best return on investment in enterprise-risk reduction is often in employee awareness and training. Yet a maturity-based model does not call for the organization to gather enough information to know that it should divert the funding needed for this from additional application monitoring. Spending on both will be expected, though the one effort (awareness and training) may have a disproportionate impact on enterprise-risk reduction relative to the other.

If the objective is to reduce enterprise risk, then the efforts with the best return on investment in risk reduction should draw the most resources. This approach holds true across the full control landscape, not only for monitoring but also for privileged-access management, data-loss prevention, and so forth. All of these capabilities reduce risk somewhat and somehow, but most companies are unable to determine exactly how and by how much.

The final (and most practical) drawback of maturity-based programs is that they can create paralyzing implementation gridlock. The few teams or team members capable of performing the hands-on implementation work for the many controls needed

become overloaded with demand. Their highly valuable attention is split across too many efforts. The frequent result is that no project is ever fully implemented and program dashboards show perpetual "yellow" status for the full suite of cyber initiatives.

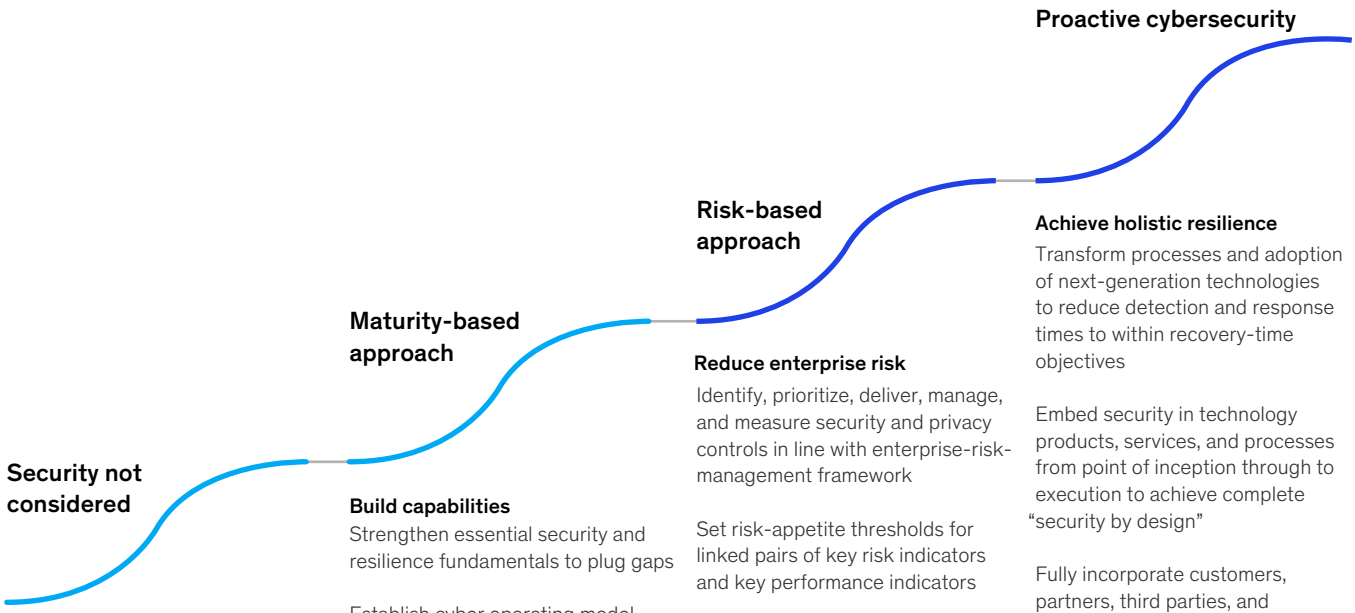
The truth is that in today's hyperconnected world, maturity-based cybersecurity programs are no longer adequate for combatting cyberrisks. A more strategic, risk-based approach is imperative for effective and efficient risk management (Exhibit 2).

Reducing risk to target appetite at less cost

The risk-based approach does two critical things at once. First, it designates risk reduction as the primary goal. This enables the organization to prioritize investment—including in implementation-related problem solving—based squarely on a cyber program's effectiveness in reducing risk. Second, the program distills top management's risk-reduction targets into precise, pragmatic implementation programs with clear alignment from the board to the front line. Following the risk-

Exhibit 2

For many companies, the risk-based approach is the next stage in their cybersecurity journey.



based approach, a company will no longer "build the control everywhere"; rather, the focus will be on building the appropriate controls for the worst vulnerabilities, to defeat the most significant threats—those that target the business's most critical areas. The approach allows for both strategic and pragmatic activities to reduce cyberrisks (Exhibit 3).

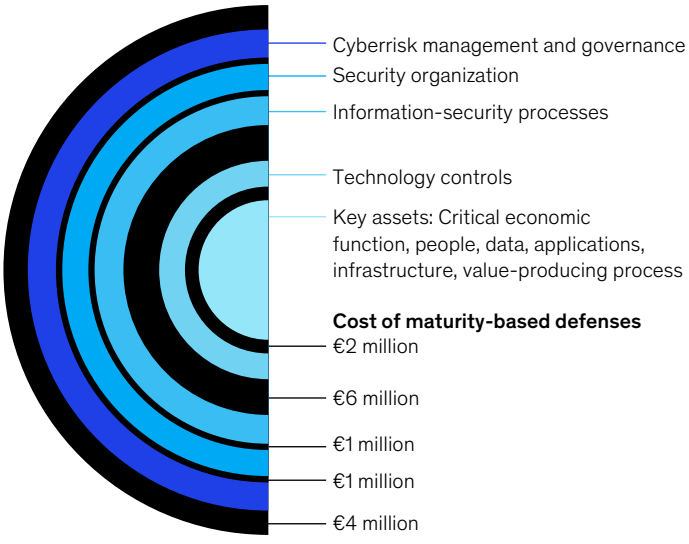
Companies have used the risk-based approach to effectively reduce risk and reach their target risk appetite at significantly less cost. For example, by simply reordering the security initiatives in its backlog according to the risk-based approach, one company increased its projected risk reduction 7.5 times above the original program at no added cost. Another company discovered that it had massively overinvested in controlling new software-development capabilities as part of an agile transformation. The excess spending was deemed necessary to fulfill a promise to the board to reach a certain level of maturity that was, in the end, arbitrary. Using the risk-based approach, the company scaled back controls and spending in areas where desired digital capabilities were being heavily controlled for no risk-reducing reason. A particular region of success with the risk-based approach has been Latin America, where a number of companies have used it to leapfrog a generation of maturity-based thinking (and spending). Instead

Exhibit 3

A risk-based approach builds customized controls for a company's critical vulnerabilities to defeat attacks at lower overall cost.

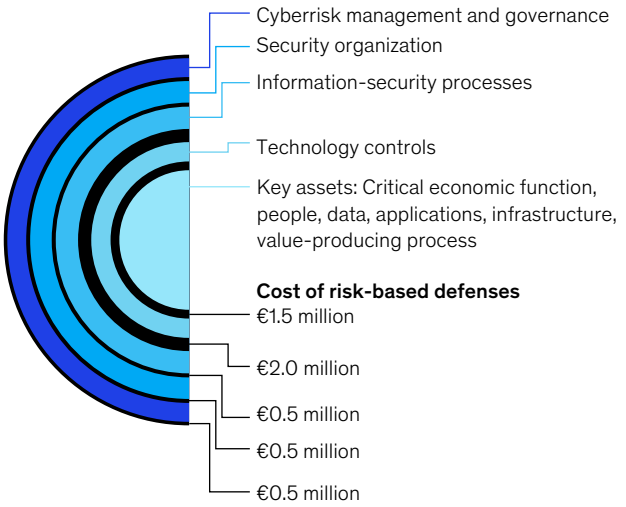
Maturity-based versus risk-based cybersecurity

Maturity-based approach: Builds highest level of defense around everything.



Total cost
€14 million

Risk-based approach: Optimizes defensive layers for risk-reduction and cost. Critical assets are highly protected, but at less expense and in ways that improve productivity.



Total cost
€5 million

Note: Costs are illustrative but extrapolated from real-world examples and estimates.

of recapitulating past inefficiencies, these companies are able to build exactly what they need to reduce risk in the most important areas, right from the start of their cybersecurity programs. Cyber attackers are growing in number and strength, constantly developing destructive new stratagems. The organizations they are targeting must respond urgently, but also seek to reduce risk smartly, in a world of limited resources.

A transformation in sequential actions

Companies adopting the risk-based approach and transforming their "run" and "change" activities accordingly inevitably face the crucible of how to move from maturity-based to risk-based cybersecurity. From the experience of several leading institutions, a set of best-practice actions has emerged as the fastest path to achieving this transformation. These eight actions taken roughly in sequence will align the organization toward the new approach and enable the appropriate efforts to reduce enterprise risk.

1. Fully embed cybersecurity in the enterprise-risk-management framework.
2. Define the sources of enterprise value across teams, processes, and technologies.
3. Understand the organization's enterprise-wide vulnerabilities—among people, processes, and technology—internally and for third parties.
4. Understand the relevant "threat actors," their capabilities, and their intent.
5. Link the controls in "run" activities and "change" programs to the vulnerabilities that they address and determine what new efforts are needed.
6. Map the enterprise risks from the enterprise-risk-management framework, accounting for the threat actors and their capabilities, the enterprise vulnerabilities they seek to exploit, and the security controls of the organization's cybersecurity run activities and change program.
7. Plot risks against the enterprise-risk appetite; report on how cyber efforts have reduced enterprise risk.
8. Monitor risks and cyber efforts against risk appetite, key cyberrisk indicators (KRIs), and key performance indicators (KPIs).

1. Fully embed cybersecurity in the enterprise-risk-management framework

A risk-based cyber program must be fully embedded in the enterprise-risk-management framework. The framework should not be used as a general guideline, but rather as the organizing principle. In other words, the risks the enterprise faces in the digital domain should be analyzed and categorized into a cyberrisk framework. This approach demystifies cyberrisk management and roots it in the language, structure, and expectations of enterprise-risk management. Once cyberrisk is understood more clearly as business risk that happens in the digital domain, the organization will be rightly oriented to begin implementing the risk-based approach.

2. Define the sources of enterprise value

An organization's most valuable business work flows often generate its most significant risks. It is therefore of prime importance to identify these work flows and the risks to which they are susceptible. For instance, in financial services, a loan process is part of a value-creating work flow; it is also vulnerable to data leakage, an enterprise risk. A payment process likewise creates value but is susceptible to fraud, another enterprise risk. To understand enterprise risks, organizations need to think about the potential impact on their sources of value.

Identifying the sources of value is a fairly straightforward exercise, since business owners will have already identified the risks to their business. Cybersecurity professionals should ask the businesses about the processes they regard as valuable and the risks that they most worry about.

Making this connection between the cybersecurity team and the businesses is a highly valuable step in itself. It motivates the businesses to care more deeply about security, appreciating the bottom-line impact of a recommended control. The approach is far more compelling than the maturity-based approach, in which the cybersecurity function peremptorily informs the business that it is implementing a control "to achieve a maturity of 3.0."

The constituents of each process can be defined—relevant teams, critical information assets ("crown jewels"), the third parties that interact with the process, and the technology components on which it runs—and the vulnerabilities to those constituent parts can be specified.

3. Understand vulnerabilities across the enterprise

Every organization scans its infrastructure, applications, and even culture for vulnerabilities, which can be found in areas such as configuration, code syntax, or frontline awareness and training. The vulnerabilities that matter most are those connected to a value source that particular threat actors with relevant capabilities can (or intend to) exploit. The connection to a source of value can be direct or indirect. A system otherwise rated as having low potential for a direct attack, for example, might be prone to lateral movement—a method used by attackers to move through systems seeking the data and assets they are ultimately targeting.

Once the organization has plotted the people, actions, technology, and third-party components of its value-creating processes, then a thorough identification of associated vulnerabilities can proceed. A process runs on a certain type of server, for example, that uses a certain operating system (OS). The particular server–OS combination will have a set of identified common vulnerabilities and exposures. The same will be true for storage, network, and end-point components. People, process, and third-party vulnerabilities can be determined by similar methodologies.

Of note, vulnerabilities and (effective) controls exist in a kind of reverse symbiosis: where one is present the other is not. Where sufficient control is present, the vulnerability is neutralized; without the control, the vulnerability persists. Thus, the enterprise's vulnerabilities are most practically organized according to the enterprise-approved control framework.[2] Here synergies begin to emerge. Using a common framework and language, the security, risk, IT, and frontline teams can work together to identify what needs to be done to close vulnerabilities, guide implementation, and

[2] This can include the National Institute of Standards and Technology Cybersecurity Framework (NIST CSF), NIST National Vulnerability Dataset (NIST 800-53), International Organization for Standardization 27001/2 (standards for information-security-management systems), and Federal Financial Institutions Examination Council Cybersecurity Assessment Tool (FFIEC CAT).

Experience confirms that when the entire organization shares a common way of thinking about vulnerabilities, security can be significantly enhanced.

report on improvements in exactly the same manner and language. Experience confirms that when the entire organization shares a common way of thinking about vulnerabilities, security can be significantly enhanced.

4. Understand relevant threat actors and their capabilities

The groups or individuals an organization must worry about—the threat actors—are determined by how well that organization's assets fit with the attackers' goals—economic, political, or otherwise. Threat actors and their capabilities—the tactics, techniques, and procedures they use to exploit enterprise security—define the organization's threat landscape.

Only by understanding its specific threat landscape can an organization reduce risk. Controls are implemented according to the most significant threats. Threat analysis begins with the question, Which threat actors are trying to harm the organization and what are they capable of? In response, organizations can visualize the vulnerabilities commonly exploited by relevant threats, and appropriate controls can then be selected and applied to mitigate these specific vulnerability areas.

In identifying the controls needed to close specific gaps, organizations need to size up potential attackers, their capabilities, and their intentions—the threat actors' strength and will (intention) to create a risk event. This involves collecting information on and understanding how the attackers connect, technically and nontechnically, to the people, process, and technology vulnerabilities within the enterprise.

5. Address vulnerabilities

To defeat threat actors, vulnerabilities discovered in the third action we describe will either be closed by existing controls—normal run activities or existing change initiatives—or will require new control efforts. For existing controls, the cyber governance team (for "run") and the program management team (for "change") map their current activities to the same control framework used to categorize vulnerabilities. This will show the controls already in place and those in development. Any new controls needed are added to the program backlog as either stand-alone or composite initiatives.

While an organization may not be able to complete all initiatives in the backlog in a single year, it will now be able to choose what to implement from the full spectrum of necessary controls relevant to the enterprise because they are applicable for frustrating relevant threat capabilities. The risk-based approach importantly bases the scope of both existing and new initiatives in the same control framework. This enables an additional level of alignment among teams: delivery teams charged with pushing and reporting on initiative progress can finally work efficiently with the second and third lines of defense (where relevant), which independently challenge control effectiveness and compliance. When the program-delivery team (acting as the first line of defense) sits down with the second and third lines, they will all be speaking the same language and using the same frameworks. This means that the combined groups can discuss what is and is not working, and what should be done.

6. Map the enterprise-risk ecosystem

A map of enterprise risks—from the enterprise-risk-management framework to enterprise vulnerabilities and controls to threat actors and their capabilities—makes visible a "golden thread," from control implementation to enterprise-risk reduction. Here the risk-based approach can begin to take shape, improving both efficiency in the application of controls and the effectiveness of those controls in reducing risks.

Having completed actions one through five, the organization is now in a position to build the risk-based cybersecurity model. The analysis proceeds by matching controls to the vulnerabilities they close, the threats they defeat, and the value-creating processes they protect. The run and change programs can now be optimized according to the current threat landscape, present vulnerabilities, and existing program of controls. Optimization

here means obtaining the greatest amount of risk reduction for a given level of spending. A desired level of risk can be "priced" according to the initiatives needed to achieve it, or the entry point for analysis can be a fixed budget, which is then structured to achieve the greatest reduction in risk.

Cybersecurity optimization determines the right level and allocation of spending. Enterprise-risk reduction is directly linked to existing initiatives and the initiation of new ones. The analysis develops the fact base needed for tactical discussions on overly controlled areas whence the organization might pull back as well as areas where better control for value is needed.

By incorporating all components in a model and using the sources of value and control frameworks as a common language, the business, IT, risk, and cybersecurity groups can align. Discussions are framed by applying the enterprise control framework to the highest sources of value. This creates the golden-thread effect. Enterprise leadership (such as the board and the risk function) can identify an enterprise risk (such as data leakage), and the cybersecurity team can report on what is being done about it (such as a data-loss prevention control on technology or a social-engineering control on a specific team). Each part is connected to the other, and every stakeholder along the way can connect to the conversation. The methodology and model is at the center, acting both as a translator and as an optimizer. The entire enterprise team knows what to do, from the board to the front line, and can move in a unified way to do it.

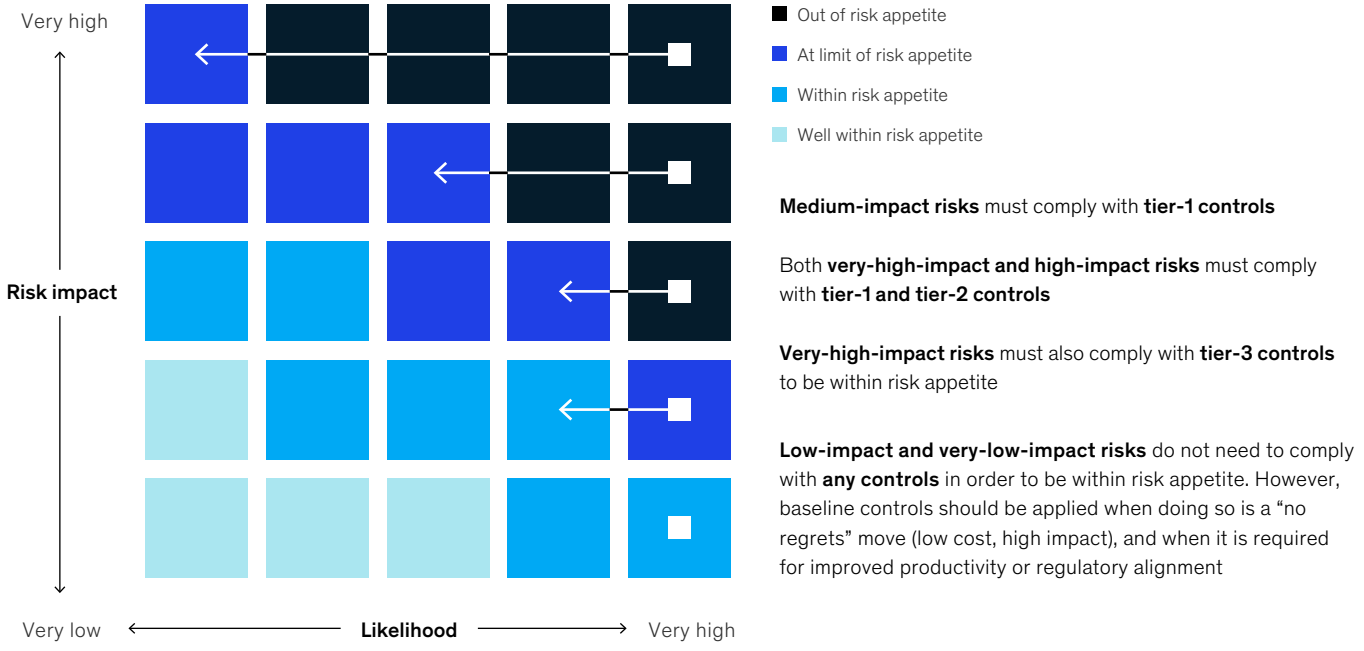
7. Plot risks against risk appetite; report on risk reduction

Once the organization has established a clear understanding of and approach to managing cyberrisk, it can ensure that these concepts are easily visualized and communicated to all stakeholders. This is done through a risk grid, where the application of controls is sized to the potential level of risk (Exhibit 4).

Exhibit 4

The risk-based approach applies controls according to the risk appetite and the likelihood and potential impact of a risk event.

Risk events by size of impact and likelihood of occurrence



The assumption in this use of the classic risk grid is that the enterprise-risk appetite has been defined for each enterprise risk. The potential impact for each enterprise-risk scenario can then be plotted on the risk grid. Once the relationships among the threats, vulnerabilities, and applied controls are modeled and understood, the risks can be evaluated according to their likelihood. As more controls are applied, the risk levels are reduced to the risk appetite. This is the way the cyber program can demonstrate impact in terms of enterprise-risk reduction.

As new threats emerge, new vulnerabilities will become apparent. Existing controls may become ineffective, and enterprise risks can move in the opposite direction—even to the point where risk-appetite limits are exceeded. For information-security-management systems, the risk grid allows stakeholders to visualize the dynamic relationships among risks, threats, vulnerabilities, and controls and react strategically, reducing enterprise risks to the appropriate risk-appetite level.

8. Monitor risks and cyber efforts using risk appetite and key cyberrisk and performance indicators

At this point, the organization's enterprise risk posture and threat landscape are understood, and the risk-based cybersecurity program is in place. The final step is to monitor and manage for success.

Many companies attempt to measure cyber maturity according to program completion, rather than by actual reduction of risk. If a security function reports that the data-loss-prevention (DLP) program is 30 percent delivered, for example, the enterprise assumption is that risk of data leakage is 30 percent reduced. If a multifactor authentication initiative is 90 percent implemented, the assumption is that the risk of unauthorized access is almost eliminated. These assumptions are false, however, because actual risk-reducing results are not being measured in these examples.

Sidebar

Linking a KRI to a KPI

A data-loss-prevention program (DLP) is a helpful control to reduce the enterprise risk of data leakage. The critical assets identified by the enterprise-risk-management function as requiring DLP coverage can become the output metric, or key risk indicator (KRI). Assuming that the KRI is not 100 percent, then the linked input metric, or key performance indicator (KPI) could be the proportion of critical assets covered since the last reporting period versus the total expected to be covered. Enterprise leaders will see these two metrics on the reporting dashboard. They can then assess the progress toward the appetite-linked thresholds and with delivery teams discuss what if anything is needed to continue meeting (or possibly exceeding) expectations.

With KRIs and KPIs systematically incorporated into a digital dashboard, executives have complete risk-based measurement and reporting at their fingertips. They can actively participate in risk-reduction efforts—influencing their progress, projections, performance, and achievement of risk thresholds.

Metrics need to measure both inputs and outputs; inputs in this case are risk-reduction efforts undertaken by the enterprise, while the output is the actual reduction in enterprise risk. The input metric here is a key performance indicator (KPI): measuring the performance of a program or a "run" function. The output metric is really a key risk indicator (KRI), measuring the risk level associated with a potential risk scenario. The thresholds for the KRIs must be tied directly to risk-appetite levels (the KPI thresholds can also be linked in this way). For example, if risk appetite for data leakage is zero, then the systemic controls (and corresponding "red" thresholds) must be higher than they would be if a certain percentage of leakage is allowed over a certain period. Of course, tolerances for cyber incidents may be not always be set at zero. In most cases, it is impossible to stop all cyber attacks, so sometimes controls can be developed that tolerate some incidents.

One way to think about KRIs and KPIs is with regard to the relationship between altitude and trajectory. A KRI gives the current risk level of the enterprise (the "risk altitude") while the KPI indicates the direction toward or away from the enterprise-risk-appetite level ("risk trajectory"). An enterprise may not yet have arrived at the leadership's KRI target but a strong KPI trajectory would suggest that it will soon. Conversely, an enterprise may have hit the desired KRI threshold, but the KPIs of the run activity may be backsliding and give cause for concern.

Executives are often forced to make sense of a long list of sometimes conflicting metrics. By linking KRIs and KPIs, the cybersecurity team gives executives the ability to engage in meaningful problem-solving discussions on which risks are within tolerances, which are not, and why (see the sidebar, "Linking a KRI to a KPI").

The risk-based approach to cybersecurity is thus ultimately interactive—a dynamic tool to support strategic decision making. Focused on business value, utilizing a common language among the interested parties, and directly linking enterprise risks to controls, the approach helps translate executive decisions about risk reduction into control implementation. The power of the risk-based approach to optimize for risk reduction at any level of investment is enhanced by its flexibility, as it can adjust to an evolving risk-appetite strategy as needed.

Many leading companies have a cyber-maturity assessment somewhere in their archives; some still execute their programs to achieve certain levels of maturity. The most sophisticated companies are, however, moving away from the maturity-based cybersecurity model in favor of the risk-based approach. This is because the new approach allows them to apply the right level of control to the relevant areas of potential risk. For senior leaders, boards, and regulators, this means more economical and effective enterprise-risk management.

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