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Cyber security: protection for the digital environment

Key take aways

- Cyber security is of direct relevance for the trends that have emerged during the pandemic – specifically the growing use of technology, smart working, and the increase in online interactions.
- As the world continues becoming more closely connected via digital infrastructure, artificial intelligence and 5G there will be greater demand for investments and rules to protect data and increase the security of all online interactions.
- Cyber security is linked to different topics: ranging from technology and laws, new rules of collaboration, critical infrastructure protection, cyber privacy, "security of things", cyber war, IT systems resilience and cybercrime.

01 Introduction

The share of the world's population using the internet increased from 0.05% in 1990 to 49% in 2017[1] to over 3.4 bn.

Global internet coverage is generating more and more data and information, with the total volume for 2021 estimated at 79 Zettabytes (ZB or 10^{21})[2] and expected to more than double to 181 ZB in 2025.

With data volumes and online transactions on the rise questions are being asked about the protection of all our internet interactions because data threads, security breaches, costs related to breaches, and in general the associated lost business for companies[3] are growing concerns for citizens, governments, and companies around the globe.

These concerns are backed up by the costs generated by rising cybercrime rates,[4] estimated at USD1.5tn in 2018, growing numbers of data theft (+160% in 2020 vs. 2019), unauthorised server access (+233% in 2020 vs. 2019)[5] and the rising average cost of mega breaches (category between 50 and 65 mn sets of data) to USD401mn in 2019 (from USD388mn in 2018).

The Covid-19 pandemic had an impact on a variety of market trends and also necessitated mass usage of remote working, which drove up the average cost of data breaches to USD4.96mn (over 24% higher than normal).[6]

The U.S. remains the country with the highest average costs for data breaches (USD9.05m) followed by Middle East (USD6.93mn), Canada and Germany.[5]

Looking at the situation in Europe, which varies widely from country to country (with the highest costs in Germany and among the lowest in Scandinavia), we notice that the public and government sector was a major target in the period April 2020 – July 2021, while the healthcare sector was also targeted significantly with an increased number of attacks during the same period.[7]

The healthcare sector warrants particular attention because at the global level it had the most costly breaches (USD9.23mn) in 2021, having risen by some 30% in one year.

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Another noteworthy statistic is the time taken to identify an issue, which grew 30 days since 2017 to 287 days in 2021.[6]

In order to gain a complete overview, it's important to look at the types of records compromised by breaches. Customers' personally identifiable information (PII) is the largest category, representing 44% of the overall records, while breaches of employee PII are a critical problem for companies and represent 26% of the data.[6]

02 Geopolitics and international trade

The study of the impact of Earth's geography on politics and international relations is known as geopolitics. However, the ongoing digitalisation of all areas of daily life, as well as the world's growing dependence on the internet, has transformed cyberspace into an extra domain in which sovereign nations may collaborate with and compete against one another. To put it another way, the digital environment has bridged or broke down geographical barriers as we know them. The speed of this digital transformation has accelerated even faster since the Covid-19 pandemic, culminating in a growing reliance on the digital sphere for how we live, work, and interact.

As a result, cyber security is no longer only a technological concern, but it has also entered the geopolitical domain. Critical technologies, from basic information and communication infrastructure to emerging ones like 5G, cloud computing, artificial intelligence, and quantum computing – and the related cyber risks they foreshadow – provide pathways for impacting a country's national security, economic growth, and societal values. Cyber capabilities and key technologies are emerging as tools of state power that may be used against enemies. At the same time, hostile actors have systematically targeted essential assets and critical infrastructure – such as healthcare – causing massive economic and reputational consequences for enterprises and governments. These developments underline the growing need for protection against cyber-attacks.

Cyber security is increasingly being mentioned as a cornerstone of "national security". National cyber security concerns can be viewed from four main perspectives: military, political, economic, and socio-cultural security threats. At the same time, however, most institutions, including both businesses and governments, are becoming increasingly reliant on global supply networks, which include both digital and physical supply chains. The cyber risks associated with digital and physical supply chains, such as the increased number of channels that can be targeted by cyber-attacks and data leaks, exacerbate cyber security problems. It is important to note that national cyber security and supply chain cybersecurity are intrinsically intertwined. Issues around cyber security in the supply chain for vital sectors/services will heighten national cyber security concerns. Fears regarding national cyber security, on the other hand, influence attitudes about supply chain risk, particularly supply chain cyber security.

For instance, as infrastructure in numerous sectors (from water to electricity to transportation) becomes digitally connected, the potential for large-scale breakdowns and other harm has grown. Examples of this are the NotPetya cyber-attack on Ukraine's power grid, which caused power outages,[8] the Colonial Pipeline ransomware attack in May 2021 affected the billing infrastructure of the operating company, the pipeline operation was shut down as a precautionary measure, which lead to fuel shortages, panic buying, reschedules flights and the declaration of the state of emergency in 17 states as well as Washington DC and a ransomware attack that denied access to data, forcing hospitals in the United Kingdom to cancel operations and redirect patients to other facilities.[9] In addition, the 5G network will become an integral part of this vital infrastructure since it is used to deliver critical services such as healthcare, energy, and transportation, implying that an interruption in the 5G network might result in a loss of access to critical services.

Countries can intervene in cyberspace with cyber security policies and laws that strengthen their offensive and defensive capabilities to safeguard institutions, corporations, and individuals from future cyber assaults. There is little question that these rules and regulations will have an influence on cyber space, not just for the nations involved, but also for the entire global internet community.

Since it is unrealistic to scrutinise the millions of lines of software or firmware in every single product, governments and organisations all over the world have sought to devise defensive strategies to protect themselves against cyber threats and to prevent trade from generating new attack vectors. It is been estimated that at least 50 countries have introduced cyber security laws and policies to enunciate their national online security strategy.[10] One common method that has been recommended informally is imposing an import ban on potentially harmful items from risky nations. However, this gives rise to numerous policy considerations, such as

1. how to define a risky country given the globalised value chain for almost every product,
2. which products are of critical importance, and
3. assuming that such restrictions rapidly become global policies which are met with retaliation, what could be the effect on international trade and the economy?

Many international trade restrictions have been implemented due to of security fears, such as LinkedIn's restriction in Russia[11] or the limitation of data flows to India from the European Union[12] and so on. Government agencies may establish rules that might result in cyber disputes without a clear grasp of the bigger implications, while corporations struggle to adapt to increasing cyber security concerns and constraints. In the international economic arena, for example, the "National Security Exception" principle allows governments to intervene when required in circumstances of "essential security interest".

As a result, we may anticipate data localisation rules that limit cross-border data transfer throughout the world becoming a major topic during trade agreement negotiations in the guise of "data protection" and national security. Incidents such as the 2017 Equifax Data Breach,[13] which compromised the personal information of 143 mn individuals, are still a vivid memory for many people. Cyber security measures are therefore likely to act as roadblocks to data transfers and digital trade. in the supply chain for digital services, however, data is seen as a crucial enabling asset.

Indeed, the digital sector and developing technologies rely on global data flows for innovation as well as access to hardware and software for manufacturing and distribution. Consider artificial intelligence (AI), a data-driven breakthrough that has the potential to add trillions of dollars to global output over the next ten years and hasten the move to a service-based global

economy. According to the McKinsey Global Institute, artificial intelligence (AI) might increase global productivity by 16% or USD13tn by 2030.[14] Data is also progressively being stored in the cloud, which is comprised of globally dispersed data centres that transfer data to users as well as to other data centres for backup and safety.

Global data flows also enable the online distribution of products and services, both direct-to-consumer and business-to-business across global supply chains. International e-commerce already accounts for around 12% of global merchandise trade.[15] According to a 2019 United Nations Conference on Trade and Development (UNCTAD) estimate, worldwide e-commerce was valued at USD29tn in 2017, with around 1.3bn consumers purchasing online – a 12% increase from the previous year.[16] E-commerce also has the potential to significantly enhance small company engagement in international trade. For example, having a website provides small firms with an instant international profile without the need to create a physical presence in another country.

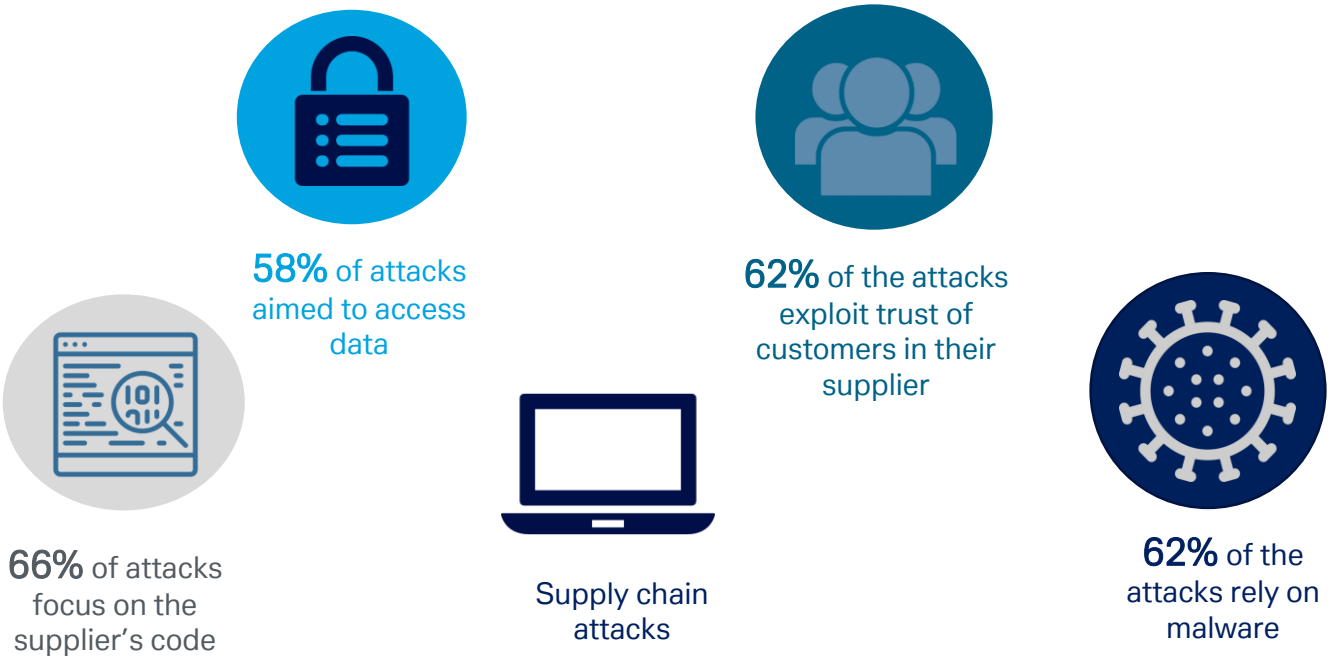
It should be clear by now how global data flows underly global supply networks, opening up new avenues for international economic engagement. Global supply chain involvement is being influenced by data and digital technology in a variety of ways, facilitated by interconnectivity and cross-border data transfers that ease communications and may be used to manage logistics. Global data flows are also enabling "supply chain 4.0", in which information flows are interconnected and omnidirectional rather than linear, opening up new options for boosting productivity and enhancing employment.

Going forward, the introduction of 5G networks and technologies will significantly accelerate the growth of the digital economy and digital trade. 5G will increase data speeds and capacity, facilitating the development of new technologies such as autonomous vehicles, virtual reality and biomedical applications. It will also enable significant growth in the IoT – the linking of billions of products to the network,[17] from homes to industries. Cisco predicts that by 2030, 500bn devices will be connected to the network . The Internet Protocol will be utilised in network design and by applications that operate on it. As everything becomes an IP app, 5G will essentially transform everything into data, meaning ever-increasing cyber security concerns and risks for enterprises.

Cyber security problems in international trade should be regarded a business strategy issue, not merely a regulatory compliance matter. Businesses in the global supply chain must respond to normative pressures from policies that impact their international trade activities. On the other hand, cyber security concerns in the international supply chain are forcing companies to reconsider their global supply chains – not just the physical supply chain, but also the digital supply chain – in order to safeguard organisational assets. The business architecture and organizational boundaries have shifted in this digital supply chain scenario. Threats can emerge from both inside and outside a company. In the digital supply chain, vendors, consumers, and partners are linked to one another. Aside from its economic and social potential, the global digital network gives rise to new hazards in the form of online fraud, abuse, crime and security concerns.

Some supply chain deficiencies that can be exploited to introduce these threats include "purchasing information technology products or parts from independent distributors, brokers, or the gray market", "lack of adequate testing for software updates and patches", "incomplete information on IT suppliers" and "use of insecure supply chain delivery and storage mechanism[s]".[18]

Chart 1: Supply chain attacks on the rise



Source: ENISA Threat Landscape for Supply Chain Attacks as of July 2019.

These trends have intensified the need for joint regional and global actions to construct a safe, trustworthy, and adaptable cyberspace over the last three to four years. Because cyber threats are global and not constrained by borders, nations must collaborate – both internationally and regionally – to protect the cyber security of our essential infrastructure, companies, and people. A rules-based order is crucial because it ensures the trust, predictability, and stability required by all states, large and small, for economic advancement, job creation, and technological adoption. As things currently stand, we need more international collaboration, not less, to establish the ground rules for our digital commons. The future of cyber security in international trade will define not only cyberspace for individual nations, but also for the larger globalized society.

03 Conclusion

Market trends, internet and technological developments linked to the internet of things and the growth in online interactions highlight the importance of data protection, connection security and more broadly the protection of internet infrastructures and the security of all online transactions.

On one hand, governments, institutions and companies around the world are now more concerned about data protection and the reliability of internet infrastructures because their own growth is heavily dependent on the development of technological / communication systems. On the other hand, privacy and security are of such paramount importance to so many individuals that some customers say they will not do business with a company that has data security issues.[19]

The overarching message is that cyber security is such an important topic because it's a priority for consumers, companies and governments given that data sharing and information storage are central to everyday life.

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Glossary

Personally identifiable information (PII) is information used by any organization to confirm an individual's identity.

The Internet of Things (IoT) is comprised of computers and other devices with embedded electronics that allow them to collect and share data.

The United Nations Conference on Trade and Development (UNCTAD) was established in 1964 as an intergovernmental organisation to promote the interests of developing states in world trade.

USD is the currency code for the U.S. Dollar.

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