How augmented and virtual reality are changing the insurance landscape

Seizing the opportunity

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The Future of Commercial Insurance

Commercial insurance is characterized by complex buying processes in a large and valuable market, making the sector ripe for disruption, with technology acting as both an enabler and accelerator. We believe disruption is likely to be fueled by seven key trends, each of which will be discussed in the following articles, with this paper's topic highlighted in purple:

1 **The rise of risk aggregators[1]**

2 **Demand for new products and solutions as businesses develop different risk profiles**

3 **The future of excess capacity**

4 **Customers demanding broader solutions, rather than just insurance products**

5 **Collaborative development of solutions to meet emerging customer needs**

6 **Cognitive computing advancements creating value through sophisticated analysis**

7 **The changes to business models and requirements for more agile operating models**

In this series of articles we examine the likely market impact and resulting opportunities from each of the seven trends. One particular phenomenon is the emergence of new risks that could change the demand for new products and solutions, as businesses develop different risk profiles. With intangible assets making up approximately 84 percent of Standard & Poors (S&P) 500 market value in 2015 (compared to 17 percent in 1975[2]), businesses are shifting their attention to a spectrum of technology related risks. Cyber insurance has quickly become one of the fastest growing insurance, while the internet of things (IoT) and artificial intelligence (AI) bring a similar level of uncertainty.

This article discusses the emergence of risks related to the development of augmented and virtual reality, and looks at how the changed risk landscape could drive demand for new products and solutions.

Augmented and virtual reality: seizing the opportunity

Augmented and virtual reality (AR and VR) are expected to become multi-billion dollar industries in the next few years and should create a multitude of new risks for individuals and businesses. We estimate that these risks could result in annual net losses of around US$ 20 billion, some of which could be covered by the insurance industry, presenting a new growth opportunity.

As AR and VR products and services become more widely accepted by society, a range of major risks are likely to evolve, including information security, privacy violation, virtual harassment and motion sickness. All these risks need to be considered when making underwriting decisions.

For example, the recently successful AR game, Pokémon Go, has been associated with multiple accidents, as reported:

– A car crashing into a tree in New York driven by a US Pokémon Go gamer.[3]

– A pair of men falling off a cliff while playing Pokémon Go.[4]

We believe this is just the beginning of losses related to AR and VR. By swiftly addressing growing customer concerns, the insurance industry has a potentially significant revenue opportunity.

What are augmented and virtual reality?

Augmented reality:

"A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view."[5] In this article, we categorize 'mixed reality' (believable virtual objects visible in the real world) as 'augmented reality.'

Virtual reality:

"The computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment (such as a helmet with a screen inside, or gloves fitted with sensors)."[6]

Why are augmented and virtual reality 'the next big thing'?

Since Stanley G Weinbaum's 1935 book *Pygmalion's Spectacles*[7] gave the first comprehensive insight in the concept of virtual reality, there have been many attempts at developing and launching a user friendly technology.

The hype has skyrocketed recently with consumer launches of Facebook's Oculus Rift and the HTC Vive, as well as investments of approximately US$ 1.4 billion in the augmented reality start-up Magic Leap and other new ventures.[8]

The industry could develop in many different directions over the next 5 years. We envisage six distinct segments across AR and VR industries, each with its own unique characteristics and growth potential (see exhibit 1):

Exhibit 1: Augmented and Virtual reality landscape and the expected growth potential

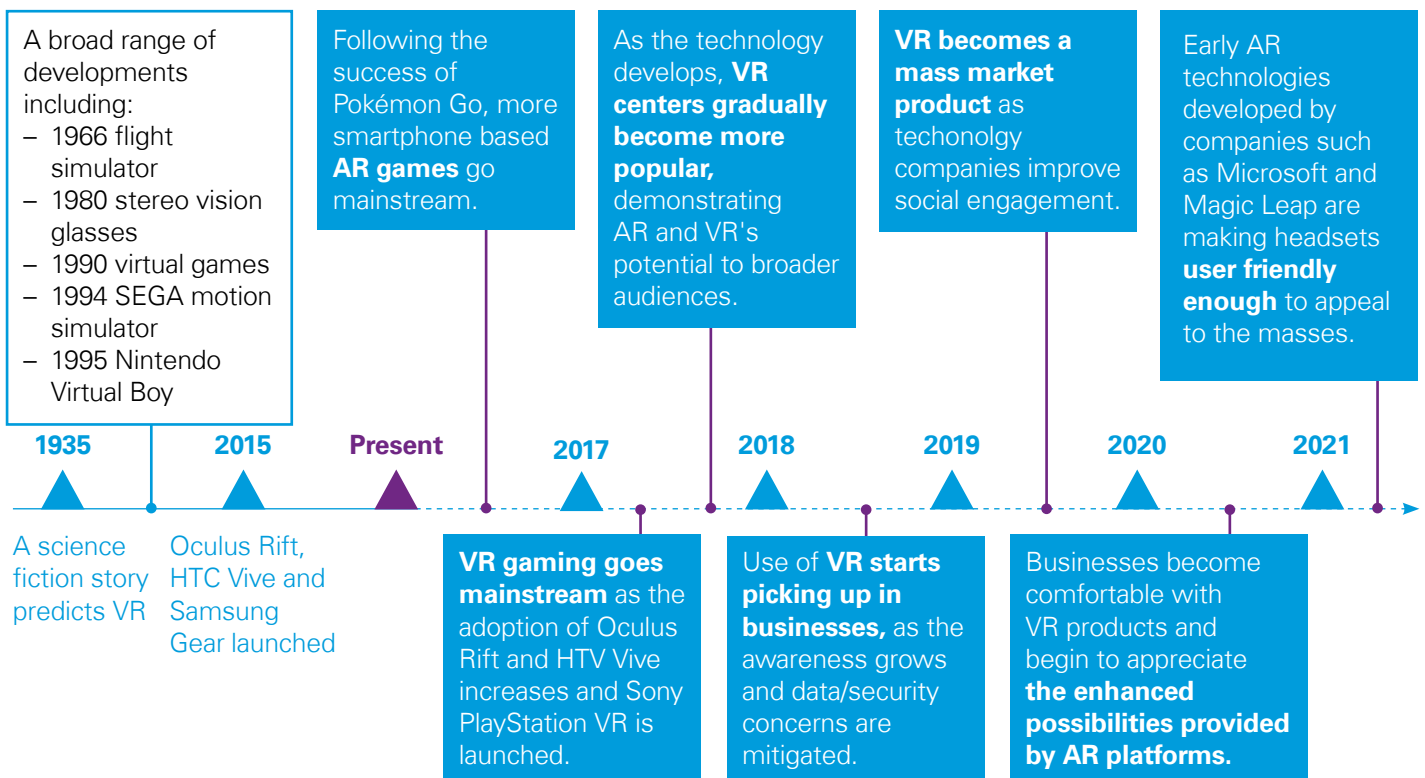|	AR and VR product segments	Expected developments
Consumers — VR for mass market	**User friendly and affordable virtual reality devices:** to improve home entertainment experience. These may be an extension to smartphones and existing gaming consoles, to gain quick access to the mass market.	Increases **gradually** but only reaches its true potential once **social interaction is enabled.**
VR for advanced gaming	**High tech, expensive gear to redefine gaming experience:** proving full immersion into VR. Comprised of high-end gear requiring large gaming spaces at user's physical location.	**Fast growing, but limited to niche** (gaming), gradually increasing as price becomes more affordable.
AR for mass market	**User-friendly, convenient, 'cool' and inexpensive technology:** initially smartphones, later headsets, eye implants, etc. that can be used unobtrusively to improve everyday experiences.	**High potential** via smartphones. **Limited uptake of AR headsets unless they are considered 'cool.'**
AR and VR centers	**Sophisticated AR and VR centers (cinemas, theme parks, etc.) that blend the real world with the digital:** placing participants into hyper-reality experiences.	**Launched in a matter of months** (similar to 'The Void' in the US) but staying niche over the next 5 years.
Businesses — VR for businesses	**Products similar to 'VR for mass market' but with more emphasis on safety and security:** applicable across many industries, particularly for training, communication and visualization purposes.	**High potential but slow adoption rates** as overall awareness grows.
AR for business	**Products similar to 'AR for mass market' but with less emphasis on passing the 'cool' test,** and more focus on advanced technological functionality. Applicable across most industries.	**High potential but delayed uptake** as the technology is not there yet.

We expect the initial AR and VR push to come from gaming, mainly because it is the most developed application for both technologies.

But our discussions with consumers and businesses suggest that widespread use of AR and VR is not that far behind gaming. As other cutting-edge technologies test AR and VR, they will go mass-market in many industries. In fact, commercial uses of AR and VR technologies are already visible across many industries (for example, VR flight simulators, VR tours, VR workspaces and AR in advertising).

These technologies also exist in the insurance industry, where existing applications include Australia's NRMA

(National Roads and Motorists' Association) Insurance and the US's Liberty Mutual Insurance using car crash and breakdown simulations; Zurich Insurance providing staff training; and Axa Insurance using VR as an advertising tool. A combination of rising market awareness and technological sophistication should lead to significant adoption rates. In the not-too-distant future, AR and VR are likely to be widely used to simulate battlefields in military, redefine education experience in classrooms, perform complex surgeries in hospitals and design architectural objects.

Exhibit 2: Expected augmented and virtual reality timeline

A broad range of developments including:
– 1966 flight simulator
– 1980 stereo vision glasses
– 1990 virtual games
– 1994 SEGA motion simulator
– 1995 Nintendo Virtual Boy

Following the success of Pokémon Go, more smartphone based **AR games** go mainstream.

As the technology develops, **VR centers gradually become more popular,** demonstrating AR and VR's potential to broader audiences.

VR becomes a mass market product as technonolgy companies improve social engagement.

Early AR technologies developed by companies such as Microsoft and Magic Leap are making headsets **user friendly enough** to appeal to the masses.

1935   **2015**   **Present**   **2017**   **2018**   **2019**   **2020**   **2021**

A science fiction story predicts VR

Oculus Rift, HTC Vive and Samsung Gear launched

VR gaming goes mainstream as the adoption of Oculus Rift and HTV Vive increases and Sony PlayStation VR is launched.

Use of **VR starts picking up in businesses,** as the awareness grows and data/security concerns are mitigated.

Businesses become comfortable with VR products and begin to appreciate **the enhanced possibilities provided by AR platforms.**

Emerging risks on the rise

As this exciting new industry develops, we expect to see major opportunities arising, as well as significant changes in the risk landscape. You will have read about some of the health and security issues linked to Pokémon Go including several serious personal accident cases as well as personal, corporate and state security risks and data privacy fears.

We believe the risk landscape will continue to shift as public awareness grows and the popularity of specific AR and VR technologies increases. Although some risks should be mitigated by appropriate regulatory measures, insurance solutions are likely to emerge to address the anticipated – and significant – levels of personal and corporate losses.

The risks arising from AR and VR can be classified in four broad categories:

Health risks

Personal accidents caused by negligent players may have hit the headlines, but VR experiences can also cause serious side effects including nausea and dizziness. A VR session could affect your ability to drive safely or carry out hazardous workplace tasks. Companies are already faced with high costs associated with sickness and we believe employers will be keen to avoid additional absences created by AR and VR.

Information security risks

In the short term (2016-2017), risks should be mostly related to AR games, which, by their nature, involve interaction with the real world. AR users increasingly engage actively with the technology, taking photos and capturing videos on devices that often track geo location data. The safety of this information depends largely on user behavior; how actively they share their AR experiences on social media (e.g. a photo of a restricted government area featuring a Pokémon) and how freely they share their information with AR application providers. The experience of Pokémon Go suggests that both aspects are likely to drive serious security risks.

Looking ahead to 2017-2018, expect similar information security risks from VR applications. Furthermore, as VR usage grows and the reputation of VR avatars becomes more important, virtual avatar impersonation cases could start to damage reputations and even cause direct financial losses.

Behavioral risks

There are already reports that female users of VR spaces experience frequent harassment; a problem that could escalate when VR becomes mainstream. We believe the perception of 'limited responsibility' in a virtual environment, which is already prevalent on the internet, might cause frequent destructive behavior, including in business situations.
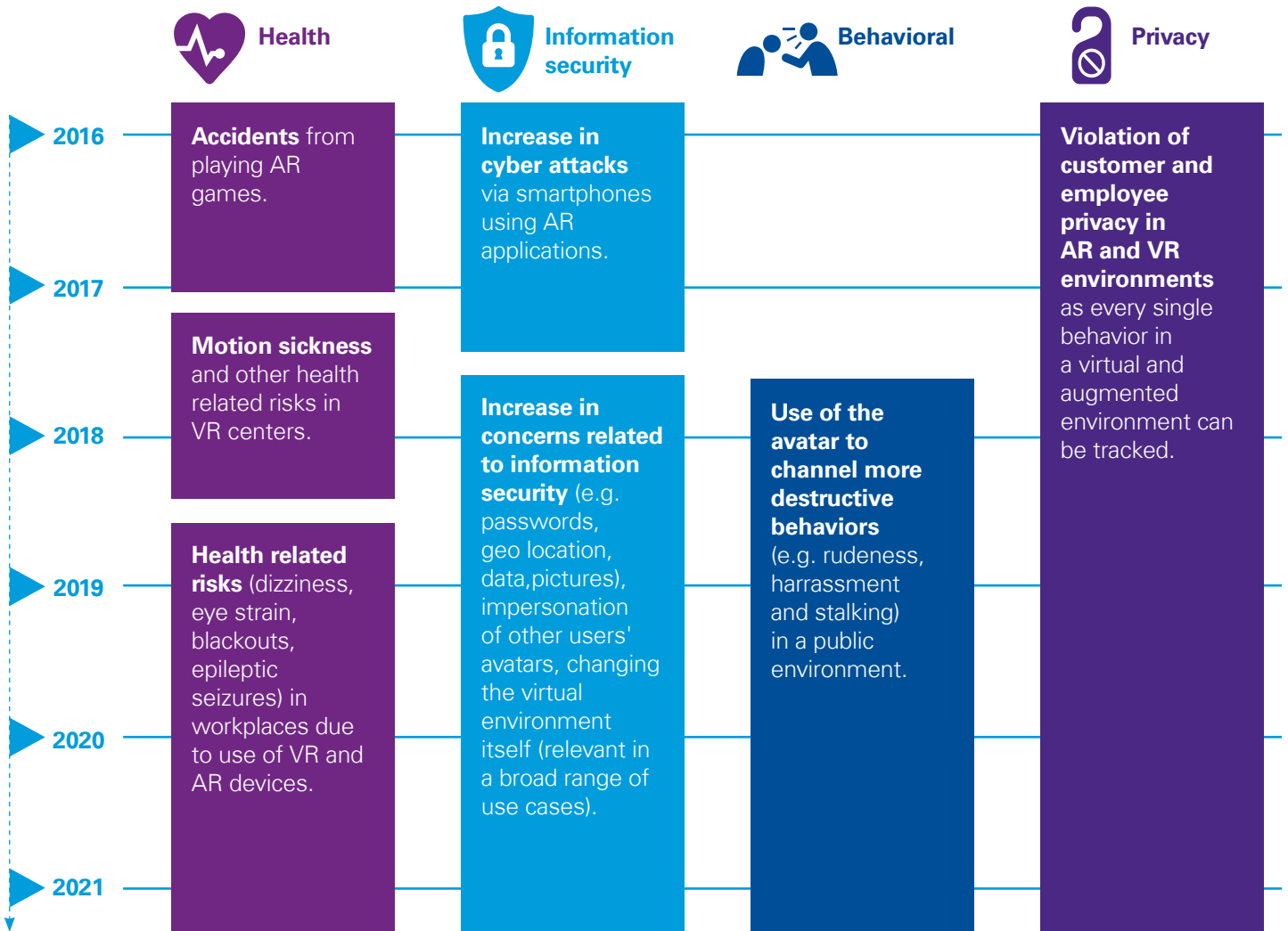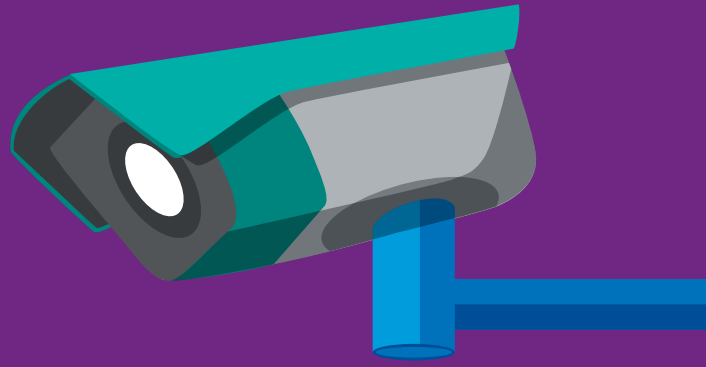
Privacy risks

We are entering an environment where every head/eye movement is tracked, every conversation in a virtual environment can be recorded, and this data is shared with any AR and VR app provider. Serious data leaks are likely to become more frequent and impactful, as relatively unsafe applications start storing unprecedented amounts of behavioral characteristics of their users.

Exhibit 3: Emerging risk landscape

	Health	Information security	Behavioral	Privacy
2016	**Accidents** from playing AR games.	**Increase in cyber attacks** via smartphones using AR applications.		**Violation of customer and employee privacy in AR and VR environments** as every single behavior in a virtual and augmented environment can be tracked.
2017				
2018	**Motion sickness** and other health related risks in VR centers.	**Increase in concerns related to information security** (e.g. passwords, geo location, data,pictures), impersonation of other users' avatars, changing the virtual environment itself (relevant in a broad range of use cases).	**Use of the avatar to channel more destructive behaviors** (e.g. rudeness, harrassment and stalking) in a public environment.	
2019	**Health related risks** (dizziness, eye strain, blackouts, epileptic seizures) in workplaces due to use of VR and AR devices.			
2020				
2021				

Emerging opportunity for insurers

Early market observations indicate that insurance carriers and brokers could take further steps to fully embrace AR and VR opportunities. Our experience in the market suggests that only a few insurers are actively following AR and VR developments and considering how to adapt existing products evolved to address the changing risk landscape. If they do not move fast, many insurance players could miss a significant opening in a growing industry – and experience unforeseen insurance claims for existing policies.

According to Lloyd's estimates, cybercrime costs businesses around US$ 400 billion annually[9] and Juniper Research predicts costs to exceed US$ 2 trillion by 2020.[10] Even assuming that only 1 percent of these costs would come through AR and VR enabled processes (which is possible considering that people are, on average, already spending more time playing augmented reality game

Pokémon Go than visiting Twitter or Facebook), we can estimate annual losses of around US$ 20 billion, of which some could be covered by the insurance industry. This excludes additional losses caused by physical accidents and other health related costs – particularly, due to sickness absence at work.

US$ 20 billion

annual expected losses

Insurance carriers and brokers are well placed to seize the opportunity and begin addressing these emerging risks. But if they delay their response, we expect three market developments could drive disintermediation of traditional insurers.
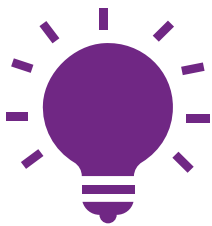
Market disruption from outside the industry – or insurtech

Augmented and virtual reality companies could form cross-sector partnerships or even establish their own insurance arms, leveraging their customer networks and detailed customer behavior data. Technology companies are attempting to enter the insurance industry and further sector convergence is likely.

Third party specialists could seize prevention and response support services

In an environment where insurance cover is not available, customers may seek alternative means of mitigating their exposure. Prevention and response solutions (for example, measures to minimize data security or privacy risks) will be key. Specialized agencies are already actively involved in providing risk management and response services for other risks, and would be well placed to step in.

Influx of alternative capital as carriers unwilling to provide capacity

Alternative capital solutions could show inflated rates, as insurance carriers hesitate to provide capacity until they are more familiar and comfortable with risk quantification. This could incentivize alternative capital holders to step in as some AR and VR risk categories might provide uncorrelated returns that would be used for diversification purposes.

Growth in AR and VR insurance could potentially match the spectacular increases in cyber security insurance, which rose by 27 percent annually between 2012-2015,[11] and is forecast to continue to increase by 20 percent in the coming years.[12]

But a lack of reliable data, standardized definitions and products could see the insurance industry struggle to cope with demand. This will provide opportunities for bold market players to gain a first mover advantage in this space and establish a strong position in the market.

The way forward for insurers

The key to extracting value from AR and VR is to understand the emerging risks from these technologies. We believe there are several areas executives need to address to seize this significant opportunity:

Market intelligence

Invest in market intelligence in emerging AR and VR trends and pioneer the development of new solutions - instead of reacting to customer issues too late. A critical success is to understand how the industry drivers are changing the future risk landscape, as well as identify and profile future customers.

Underwriting discipline

Consider how various applications of AR and VR technologies are changing risk profiles for existing products; and determine whether underwriting policies and specific product wordings need to be realigned. We expect AR and VR technologies to significantly impact the loss ratio of existing products (e.g. for categories like personal accident and liability, cyber insurance may intentionally or unintentionally cover some of the AR and VR related risks). Therefore, some adjustments might be needed to price these policies accordingly. Furthermore, some specific AR and VR technologies might require 'spin-off' products that provide customers with optimal coverage.

Example impact on existing products

Accident & health	☑	☑	
Motor	☑		
Property	☑		
Cyber	☑	☑	☑
Liability	☑	☑	
MAT	☒		
Life	☑		

Strategy and tactics

Identify those AR and VR risks likely to be too big to ignore in particular markets at specific times, and decide where to play and how to win. For example, analyze the take-up rates of various AR and VR technologies across industries and segments, and consider user behavior differences, to assess the likelihood and potential impact of various risk factors.

Business enhancement

Utilize AR and VR technologies to improve the effectiveness and efficiency of insurance businesses. Real time information for claims adjusters, 3D modeling and simulations are some of the applications that might improve customer appeal and drive profitability for insurance players.

We believe the usage of AR and VR devices should increase exponentially in both the consumer and commercial space over the next few years. For many businesses, these technologies could be seen as an interesting new tools to improve customer experience and drive efficiency but also recognize that customers require peace of mind that they are protected should something go wrong. Insurance solutions provide a suitable response to these emerging risks, and the opportunity is likely to be there for the taking.

Endnotes

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2. Annual Study of Intangible Asset Market Value from Ocean Tomo, LLC, 4 March 2015.

3. *A car crashing into a tree in New York driven by a US Pokémon Go gamer,* The Independent, 14 July 2016. http://www.independent. co.uk/life-style/gadgets-and-tech/gaming/pokemon-go-car-crash-new-york-a7137261.html.

4. *Pokemon Go: Two men fall more than 50ft off cliff while playing mobile game,* The Independent, 14 July 2016. http://www. independent.co.uk/news/world/americas/pokemon-go-men-fall-off-cliff-san-diego-android-ios-app-a7136986.html.

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7. Weinbaum, Stanley G., Pygmalion's Spectacles, Kessinger Publishing, 10 September 2016.

8. *Magic Leap Valued at $4.5 Billion With Funding From Alibaba*, Bloomberg Technology, 2 February 2016.

9. *Lloyd's CEO: Cyber attacks cost companies $400 billion every year*, Fortune, 23 January 2015.

10. *Cybercrime will Cost Businesses Over $2 Trillion by 2019*, Juniper Research, 12 May 2015.

11. *Growth in Cyber Coverage Expected as Underwriting Evolves*, Insurance Journal, 4 April 2016.

12. *Cyber Insurance Market Growing From $2.5 Billion In 2015 To $7.5 Billion By 2020*, Forbes, 24 December 2015.

About KPMG Global Strategy Group

KPMG Global Strategy Group works with private, public and not-for-profit organizations to develop and implement strategy from 'Innovation to Results' helping clients achieve their goals and objectives. KPMG Global Strategy professionals develop insights and ideas to address organizational challenges such as growth, operating strategy, cost, deals and transformation.

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