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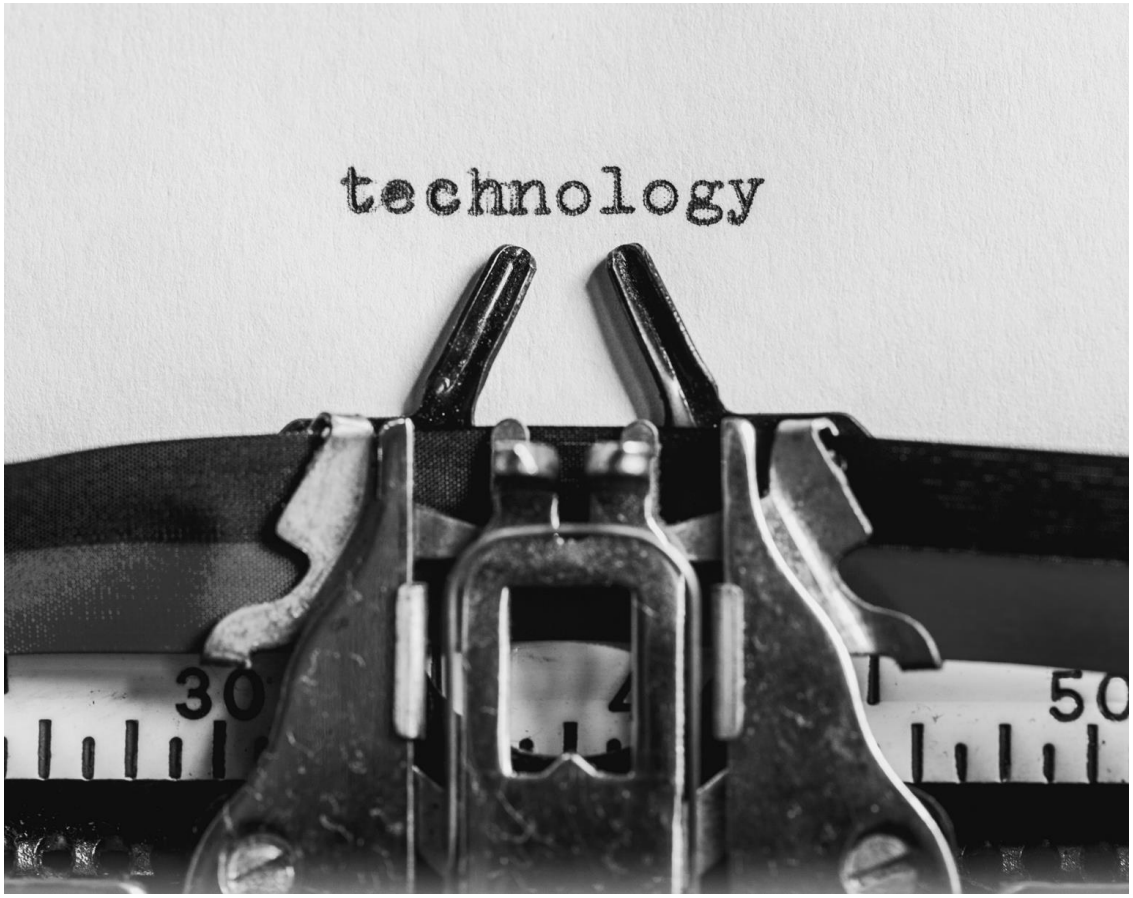

IUA Survey on Developing Technologies

Published by the IUA's Developing Technology Monitoring Group

March 2022

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Executive Summary

The IUA's Developing Technology Monitoring Group (DTMG) was formed in December 2016 as the focal group considering developing technology within the IUA committee structure. The 2021 Survey is the second survey to be conducted by the group.

The key points arising from the survey are summarised as follows:

- IUA member companies are continuing to develop insurance solutions for new and evolving technologies, with each of the technologies captured within the survey being covered by insurance products provided by at least two companies.
- Over 50% of IUA member companies surveyed are providing products for Unmanned Aerial Vehicles (UAVs) and Internet of Things (IoT) devices, with around 30% already insuring Smart Medical Devices and Artificial Intelligence (AI).
- The majority of insurance products provided sought to cover the commercial use of the technologies, but several products have emerged to support their testing.
- The most common reason for insurers not providing coverage for the technologies listed is that they were considered out of appetite, with other key reasons identified being a lack of demand for the product and insufficient data surrounding the technology.
- On-demand insurance solutions are available for 7 out of 10 of the technologies surveyed, confirming that insurers are reviewing their distribution of insurance in light of evolving exposures.
- Insurance products are available globally for UAVs, New Realities, IoT and Smart Medical Devices, whilst insurance solutions for each of the technologies are available in North America and for 9 out of 10 of the technologies in the UK.
- Systemic risk remains a key focus point when considering new technology-based exposure, most notably in respect of IoT, AI, Smart Medical Devices, Automated Vehicles and Cryptocurrency.
- Micromobility is in mainstream use for the transportation of people, but Automated Vehicles and Autonomous Vessels, and most notably UAVs, are several years from widespread use.
- Automated Vehicles and Autonomous Vessels are likely to be used sooner to transport goods than people, although Micromobility is the method of transportation that is closest to widespread use for the transport of goods.
- Cryptocurrency, Automated Vehicles and Artificial Intelligence may experience the most significant obstacles to their broad use, particularly in their lack of regulation, the unavailability of trusted data and public perception.
- Sufficient regulatory frameworks do not yet exist for a number of the technologies featured within the survey.
- The value of trusted data is even more important for insurers when evaluating new technology than in respect of well-established exposures.

Introduction

Objectives

As part of the DTMG's remit, the group ran an initial survey in 2018 to assess the response and product offerings of IUA member firms in respect of developing technologies. Following the success of this initiative, an expanded scope was applied to a second survey undertaken in 2021.

In line with the DTMG objectives, this survey intended to:

- ascertain an understanding of the types of products provided in the market in respect of new and evolving technologies;
- establish the underwriting challenges brought by these technologies;
- contrast the rate at which insurance products for new and evolving technologies are emerging; and
- capture the opinion of practitioners on a range of matters in respect of these technologies, such as systemic risk, regulation and data.

Methodology

The survey was conducted via an online questionnaire. This allowed opinions to be sought from a wide range of member contacts, with responses not limited to those firms or individuals involved in the underwriting of new and evolving technologies. Opportunities to participate were communicated via both an IUA member circular and articles in the IUA's newsletter.

A total of 11 questions were asked in the survey, which were structured into seven sections: Product Provision, Nature of Coverage, Systemic Risk, Regulation, Timescales, Obstacles and Trusted Data. The Product Provision and Nature of Coverage sections were responded to predominantly by IUA members (with only one non-member company response), whilst the remaining five sections were also open to non-IUA members. It should be noted that the non-IUA member company respondent did not state that coverage was being provided for the technologies listed.

A number of questions asked respondents to provide a ranking for their answer to indicate how strongly they agreed with a particular statement. In order to achieve a consistent set of results, all ranking questions utilised a scale of one to five.

Several of the questions posed closely resembled questions asked during the DTMG Survey 2018, however it should be noted that the DTMG Survey 2018 only addressed Automated Vehicles, Automated Vessels and Unmanned Aerial Vehicles.

Respondent Details

A total of 50 individuals completed at least one question within the survey, representing 20 IUA member companies, one non-member company and one law firm.

Of the 20 IUA member company respondents, four companies were solely reinsurers. 'Insurers' is used to refer to all companies providing insurance and reinsurance throughout these survey results.

New and Evolving Technologies: Definitions

1. Autonomous Vehicles (AVs)

A vehicle that can drive itself from a starting point to a predetermined destination in "autopilot" mode using various in-vehicle technologies and sensors, including adaptive cruise control, active steering (steer by wire), anti-lock braking systems (brake by wire), GPS navigation technology, lasers and radar (Source: Gartner)

2. Autonomous Vessels (A.Vessels)

A water craft piloted by artificial intelligence (AI). These vessels can potentially be unmanned and function autonomously as a type of seafaring drone (Source: WhatIs.com)

3. Micromobility

Refers to the use of electronic scooters and bikes to travel shorter distances around cities, often to or from another mode of transportation (bus, train, or car). Users typically rent such a scooter or bike for a short period of time using an app (Source: Dictionary.com)

4. Artificial Intelligence (AI)

Computer systems able to perform tasks typically undertaken by humans (Source: Amelia Kallman (Futurist) and DTMG Interview 4)

5. Cryptocurrency

A digital currency produced by a public network, rather than any government, that uses cryptography to make sure payments are sent and received safely (Source: Cambridge Dictionary)

6. Esports

Online form of competitive sports within video games (Source: Amelia Kallman (Futurist) and DTMG Interview 4 (Link Here))

7. New Realities

- Virtual Reality

  uses a headset to immerse the user in a digital environment

- Mixed Reality

  interactive 360-degree 3D content overlaid onto real environments

- Augmented Reality

  overlays digital 2D content onto physical objects, people and environments

(Source: Amelia Kallman (Futurist) and DTMG Interview 4)

8. Internet of Things (IoT)

Network of interconnected devices with embedded software (Source: Amelia Kallman (Futurist) and DTMG Interview 4)

9. Smart Medical Devices

Including:

- Stationary smart medical devices
- Implanted smart medical devices (these may be active implantable smart medical devices or in vitro diagnostic smart medical devices)
- Wearable external smart medical devices and stand-alone service applications (to aid, diagnose and monitor health)

(Source: Karishma Paroha (Kennedys Law)

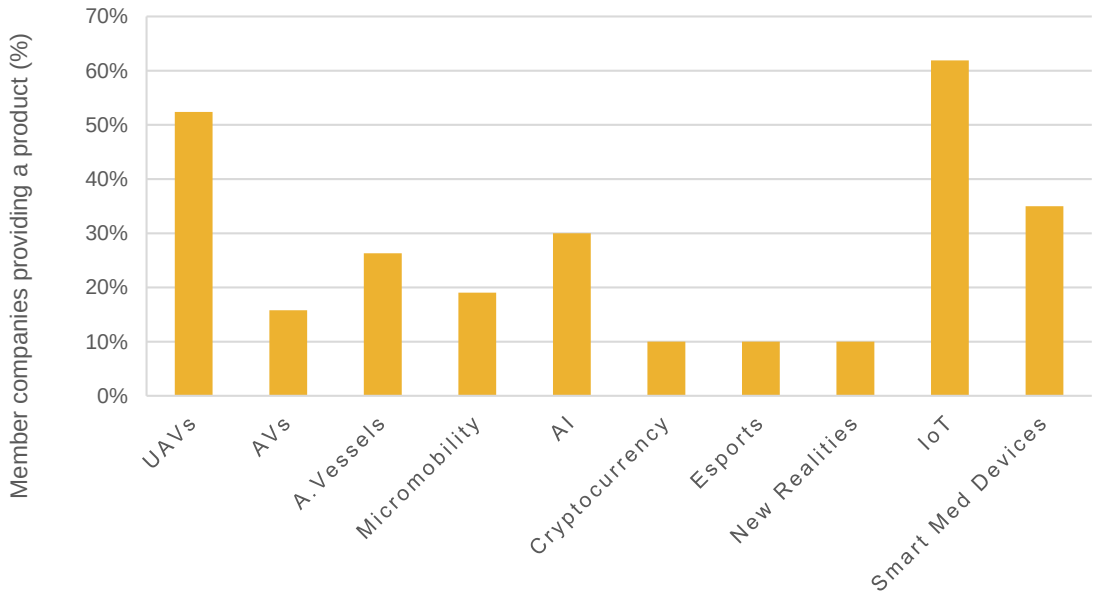
10. Unmanned Aerial Vehicles (UAVs)

An aircraft that is operated from a distance, without a person being present on it (Source: Cambridge Dictionary)

Section 1 – Product Provision

Are IUA member companies currently providing insurance products for new and emerging technologies?

The aim of this question was to gain an understanding of product development within the IUA's membership in respect of new and evolving technologies. These technologies have been identified by the DTMG as new and / or rapidly evolving areas of risk that are becomingly increasingly important to the businesses of insureds.



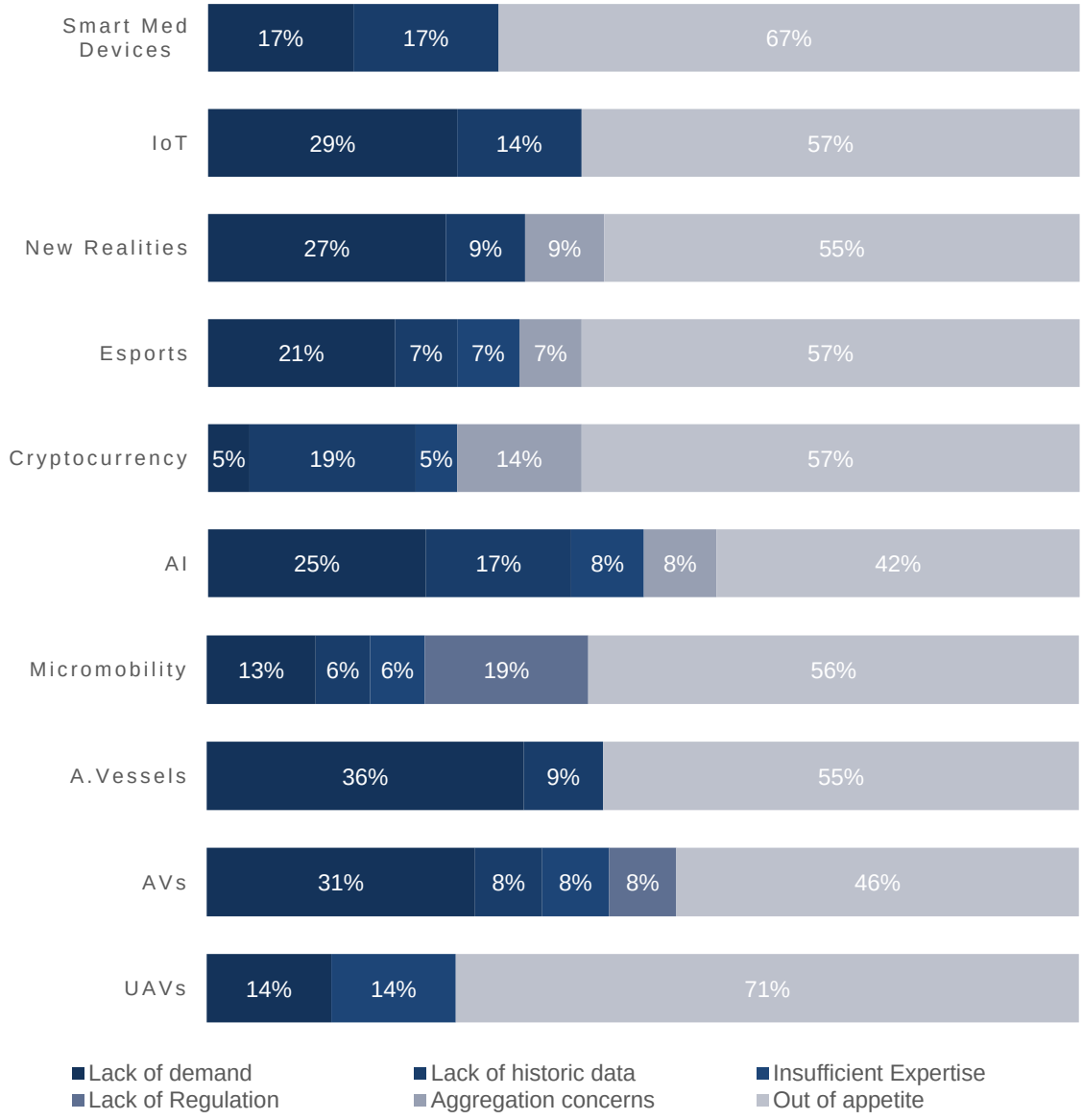
The responses received demonstrated that at least two IUA member companies were providing an insurance product for the ten technologies captured within the Survey. Between the 20 member respondents, there were a total of 55 individual affirmative responses provided to the question across the various technologies, highlighting that the London Market companies continued to address customer demand in respect of new and evolving risks.

Over half of the IUA member companies surveyed were already providing products for UAVs and IoT, while there were only a limited number of products available for technologies that have more recently emerged as a focus point for the industry, such as Cryptocurrency, Esports and New Realities. This may also be representative of the evolving expertise in the market in these areas, which has progressed since the DTMG Survey 2018.

In respect of UAVs, AVs and A.Vessels, the numbers of respondents providing products as compared to the findings of the DTMG Survey 2018 had increased most noticeably in respect of A.Vessels, which stands at 26% of respondent companies, compared to 6.25% in 2018.

If IUA member companies were not providing insurance products for new and emerging technologies, why not?

The aim of the question was to identify specific reasons for a company not providing an insurance product and included the following options: lack of demand, lack of historic data, insufficient expertise, lack of regulation, aggregation concerns and out of appetite. In this section, the respondents were able to select multiple reasons for each technology.

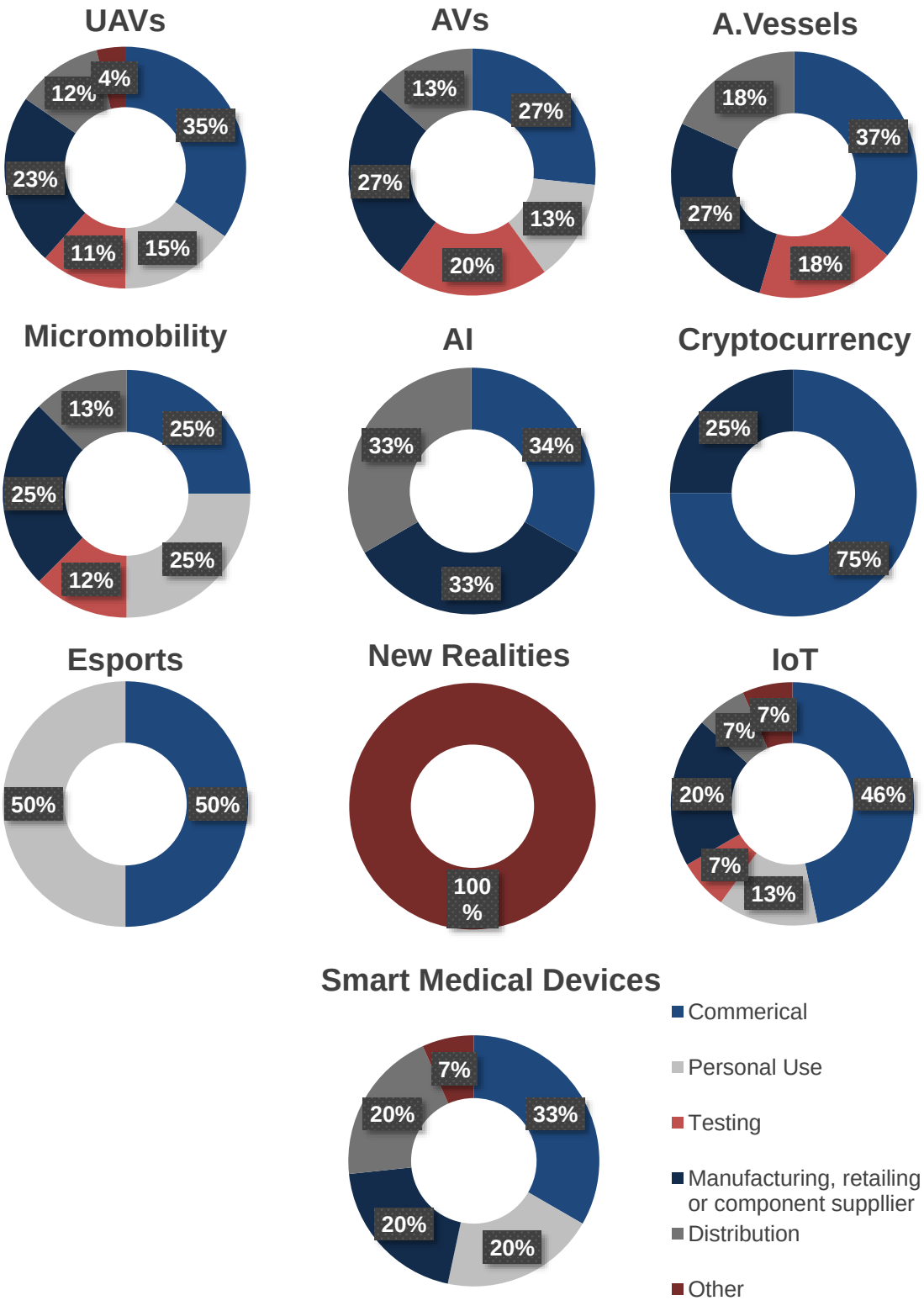


By far the most significant reason not to provide an insurance product was that the technology was out of appetite, with over half of responses making this selection. The second and third most notable reasons were a lack of demand (22%) and insufficient data (11%), which were also the most common reasons for IUA members not to insure AVs and A.Vessels. It is likely that the low demand and data available result from the relatively limited use of these technologies at present. Such use could be attributed to the evolving capability of the technologies and limited regulatory frameworks supporting their use.

In the DTMG Survey 2018, insufficient expertise was the most common reason for not providing an insurance product, with 41% of responses pointing to this reason followed by a lack of historic data (29%). This figure of 29% fell noticeably to 11% in the 2021 Survey, suggesting that data around technology use has evolved and it is expected that this trend will continue. Aggregation concerns and a lack of regulation were also not indicated to be significant reasons for firms not to provide an insurance product within the 2021 Survey, however the latter two points are explored in more detail in Sections 5 and 6.

Section 2 – Nature of Coverage

Which technology uses are IUA member companies providing products for?



In the DTMG Survey 2018, the most common type of technology use covered by policies was commercial use, achieving a total of 68% of responses. The average proportion of responses for commercial use across the technologies surveyed in 2021 dropped to around 33%, which was still the most significant use selected. Given the increase in the number of technologies addressed in the 2021 Survey, the reduction may be explained by the inclusion of new and evolving technologies that had not been surveyed previously, as well as the increasing breadth of coverage provided by IUA companies.

As indicated in the pie charts above, commercial use was most commonly selected in respect of Cyptocurrency (75%), Esports (50%) and IoT (47%), whilst New Realities was the only technology of the ten where responding member companies were not providing a product covering this use.

Manufacturing, retailing or component supply was a key area of coverage in respect of the majority of the technologies, with the exception of Esports and New Realities.

The results point to the fact that insurers have significantly expanded their support for the testing of new and evolving technologies, specifically for UAVs, A.Vessels, AVs, Micromobility and IoT. Within the DTMG Survey 2018, insurers were only providing insurance for testing of AVs which indicated that demand has increased for the provision of insurance products for the testing of these transport based technologies. This may be representative of the regulatory and commercial environments which these technologies exist in.

The responses to the DTMG Survey 2018 highlighted that there were no products provided for the distribution of the technologies surveyed, but this differed in 2021 with a total of 12% of overall products covering this risk.

In 2018, respondents indicated that they were not providing products for the distribution of the technologies, however, in 2021 this had also seen a significant increase with it being indicated that policies were available under the transport-based technologies, as well as IoT and Smart Medical Devices.

How are IUA members distributing the coverage provided?

To identify the evolving nature of insurance distribution, respondents were asked to advise how insurance was being distributed in respect of each of the new and evolving technologies. Respondents could confirm their method of insurance distribution in the form of traditional annual policies, monthly policies and even on-demand products.

Whilst annual insurance products still remained the dominant approach towards distributing insurance, insurers were exploring innovative methods to meet the needs of clients.

Esports, New Realities and IoT were the only technologies to be surveyed where on-demand insurance products were not being provided, highlighting the striking fact that on-demand products are now being utilised as an innovative solution to meet the needs of clients in respect of the majority of new and evolving technologies. Specifically, ten positive responses for on-demand insurance products were received, with three of those being in respect of UAVs and two each for Micromobility and AVs.

IUA has explored this evolving method to distribute insurance products in a DTMG Interview *'On-demand and Conquer: Is the future of insurance a pay-as-you-go one?'* (link here).

Which regions do new and evolving technology products provided by IUA members cover?

	UK	Europe (excl UK)	Africa	Asia	Australasia	North America	Middle East	South America
UAVs	43	38	10	10	14	24	5	5
AVs	24	24	0	5	10	14	0	0
A.Vessels	19	14	0	5	5	5	0	0
Micromobility	14	14	0	10	5	10	5	0
AI	0	0	0	0	0	5	0	0
Cryptocurrency	10	10	0	5	5	5	0	0
Esports	5	5	0	0	5	5	0	0
New Realities	5	5	5	5	5	5	5	5
IoT	19	19	10	10	10	14	10	10
Smart Med Devices	29	29	19	19	24	29	14	19

Figure: Table to show number of firms providing products in each region (% of company respondents)

The final question focussing on insurance provision looked to analyse the global distribution of coverage by IUA member companies.

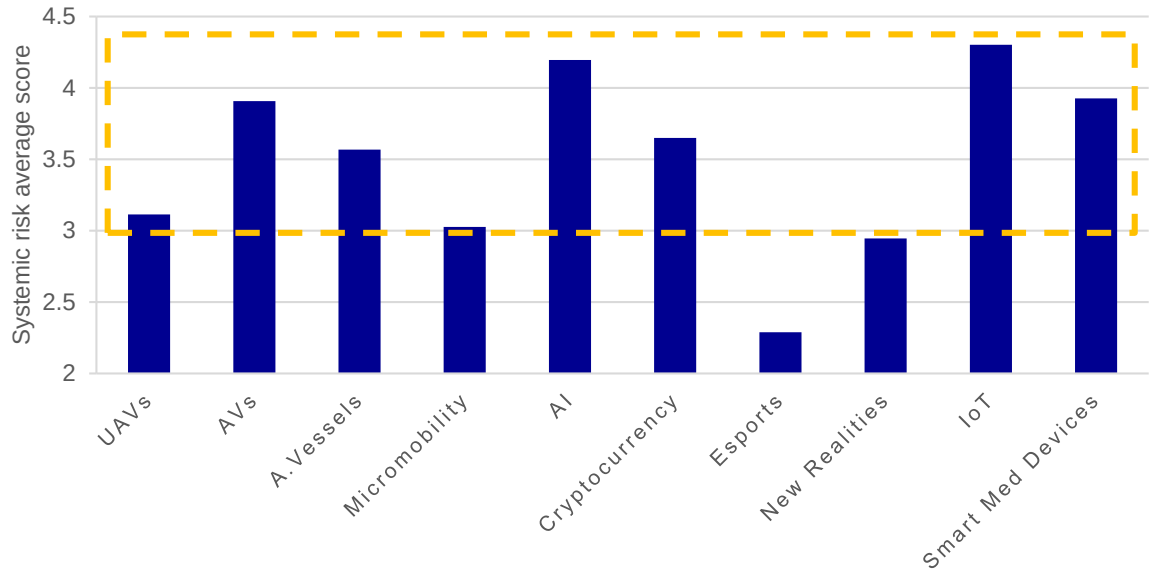
It was established that in respect of UAVs, New Realities, IoT and Smart Medical Devices, insurance products were available globally, with a positive response provided in respect of each of the eight regions listed.

Respondents confirmed that coverage was being provided for all of the technologies in North America, furthermore, other than for AI, member companies were providing coverage for each of the technologies listed within the UK, Europe (excl UK) and Australasia. A significant number of the technologies could be insured for use in Asia, however, products were only available for around half of the technologies in South America, the Middle East and Africa.

As the use of evolving technology grows in South America, the Middle East and Africa, it is likely that the reach of IUA member companies in supporting the needs of clients and their use of technology in these regions will also expand.

Section 3 – Systemic Risk

To what extent do respondents believe each of the new and evolving technologies presents a systemic exposure?



The misuse or failure of technology can cause individuals and companies to suffer damage and financial loss. The nature of new and evolving technologies means that individual devices may be interconnected and / or rely on a combined enabling element, such as a server, internet network or operating centre; each could represent a single point of failure. In response to this question, 8 out of 10 of the technologies received a score of over 3 (out of 5) with regard to the extent that each posed a systemic risk to insurers (highlighted by the yellow box above).

It continues to be paramount for insurers to monitor and understand key trends in causation and loss as technology and its associated risks continue to evolve. Additionally, it is key that insurers consider the potential for a single event to impact upon multiple technologies used by insureds across different industries, as well as how such an event could impact across an insurance portfolio.

The Top 5 technologies that respondents were most concerned about in respect of systemic risk were:

- IoT, which ranked highest, with 53% of votes ranked at a severity of 5 (out of 5).
- AI also ranked highly, with 44% of votes ranked at a severity of 5.
- Smart Medical Devices ranked the next highest with 37% of votes ranking it a 5.
- Automated Vehicles had an identical rating to Smart Medical Devices at 37%.
- Cryptocurrency made up the Top 5, with 28% of votes ranking it a 5.

It is also important to note that A.Vessels and UAVs also ranked above 3 on average, which may reflect an acknowledgement by the insurance market that systemic risks can be inherently associated with transportation networks.

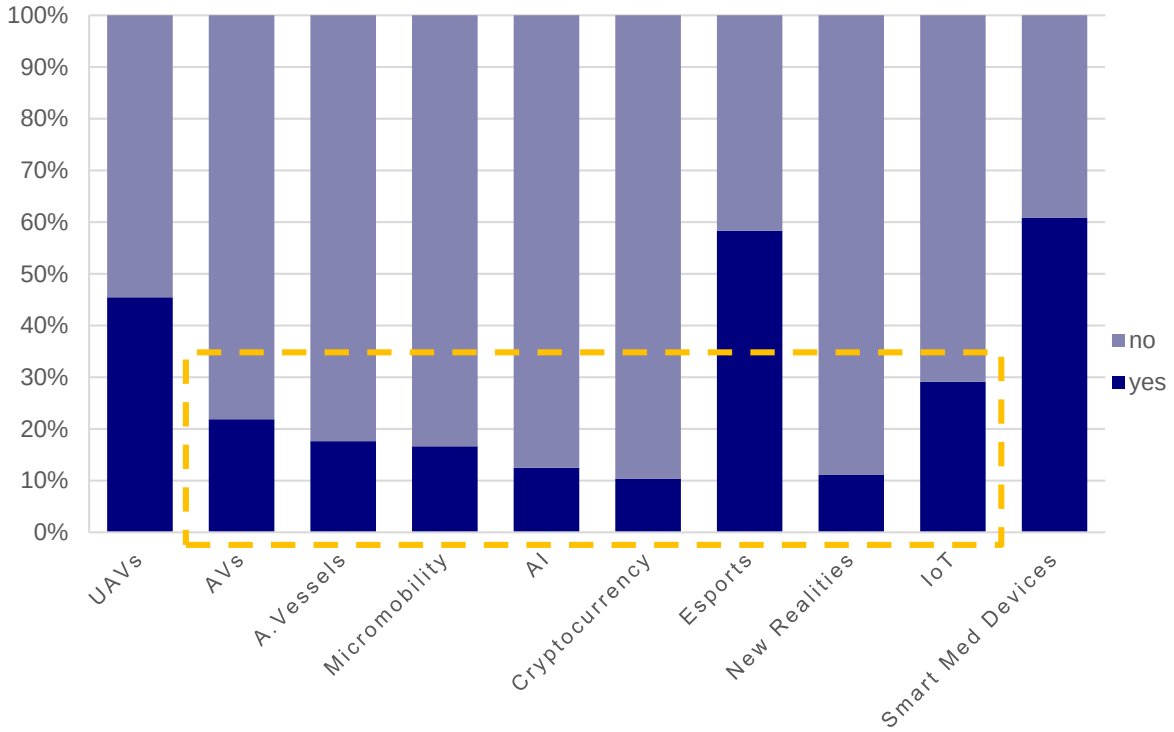
Given the importance of connectivity to facilitate the use of IoT and Smart Medical Devices, it is unsurprising that insurers remain concerned about and aware of the potential systemic risks that they pose. IUA has previously commented on the challenges arising from the development of IoT in a DTMG Blog *'DTMG Blog: The Internet of Things'* (link here).

The results may also indicate that the rapidly evolving use of AI and Cryptocurrency may prompt further attention from insurers; these technologies are used across a range of industries and as such were highlighted as a potential source of systemic exposure. However, Esports appeared at the opposite end of the spectrum, with the average result provided being just over 2 out of 5.

It would be interesting to hear more from members as to the key challenges that they anticipate in respect of these technologies and the systemic risks that they may present.

Section 4 – Regulation

Do respondents believe that current regulation is adequate in respect of the new and evolving technologies?



Notably, the DTMG Survey 2018 asked a number of questions on the importance of regulation at a global, regional and national level, as well as how comprehensive regulations were at those levels.

There are helpful parallels to draw from these results. In 2018, AVs, A.Vessels and UAVs each ranked poorly in respect of the quality of regulation, with A.Vessels ranking the lowest at a UK level, averaging just over 2.5 out of 5.

According to respondents to the 2021 Survey, there is not a sufficient regulatory framework in place for a large proportion of the technologies highlighted by the yellow box in the above chart, including AVs and A.Vessels, however there has been some perceived improvement in respect of UAVs.

Those technologies that ranked lowest in 2021 included Cryptocurrency, AVs, AI and Micromobility. By comparison, the only areas where more respondents thought that regulation was adequate than did not was in respect of Esports and Smart Medical Devices.

Evidently, views on regulation have not changed drastically, which could present a barrier to the widespread use and insurability of the technologies discussed. It is clear that a comprehensive regulatory framework for new and evolving technology is vital for insurers who wish to provide coverage for them. However, any framework must be proportionate to the risks posed and strike the right balance between ensuring safe use and allowing the technology to evolve, and associated benefits to be realised.

In 2022, significant developments are anticipated in the regulation of a number of these technologies, including Micromobility; it is anticipated that the UK government will develop and implement a permanent and comprehensive framework to regulate Micromobility following the rental E-scooters trials in the UK (as discussed in a DTMG Blog *'E-Scooters'* (link here)). Similarly, in early 2022 the Law Commission of England and Wales and the Scottish Law Commission published an Automated Vehicles Joint Report. This summarised the results of various consultations on automated vehicles, all of which were responded to by IUA. The report also set out various recommendations, one of which was for a new Automated Vehicles Act to be introduced by the UK, Scottish and Welsh governments to regulate automated vehicles on roads or other public places.

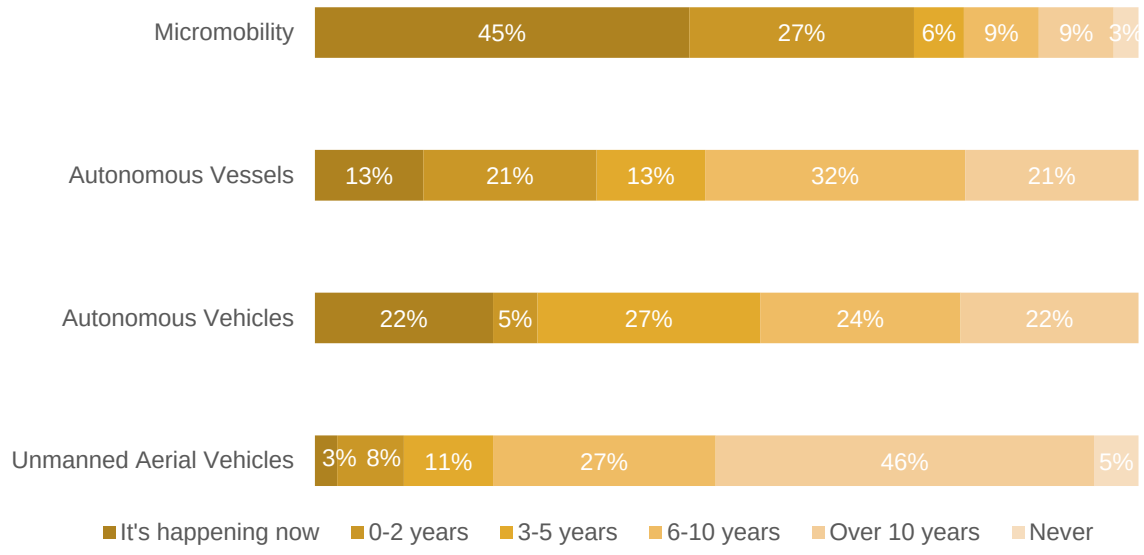
Additionally, AI will likely be a key technology of regulatory focus, as the UK pivots to develop a UK National AI Strategy (link here) that prepares the economy for integrating AI into the future economic landscape. As this technology becomes more entrenched into business models in all industries, an appropriate regulatory framework is vital.

A.Vessels remain an area in need of a framework that will facilitate wider use. Significant work continues to be undertaken by the National Physical Laboratory (NPL) and Lloyd's Register on assuring autonomy in the marine environment that will contribute to the development of an appropriate regulatory framework for Maritime Autonomous Surface Ships (MASS).

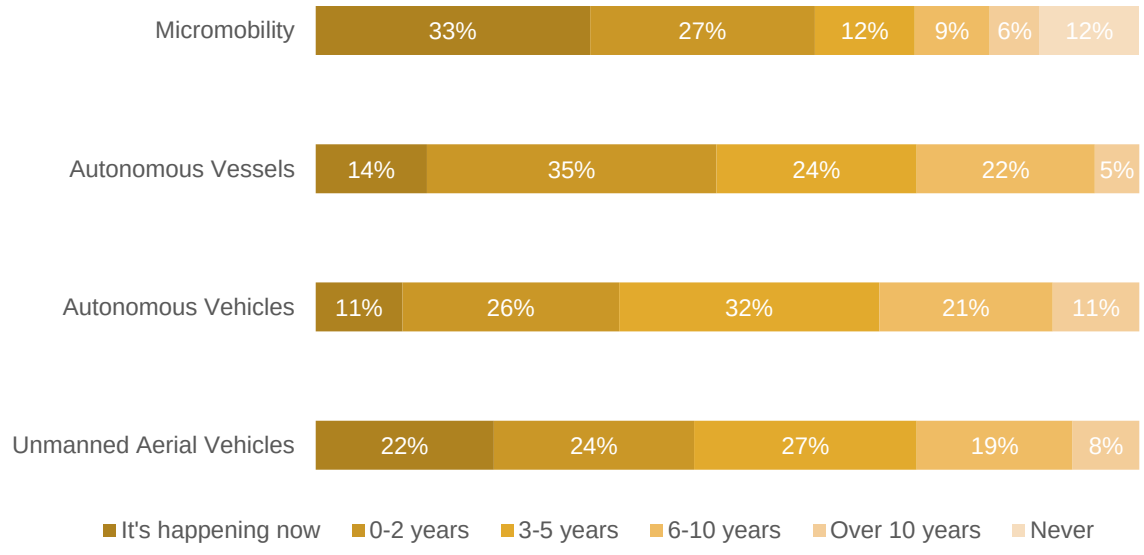
Whilst there is increasing pressure on governments to consider how best to regulate Cryptocurrency, which is by its very nature independent from national regulatory frameworks, IUA is unaware of any short-term plans to specifically regulate New Realities.

Section 5 – Timescales

When do respondents believe that new and evolving transportation technologies will be used for the commercial transportation of people?



When do respondents believe that new and evolving transportation technologies will be used for the commercial transportation of goods?

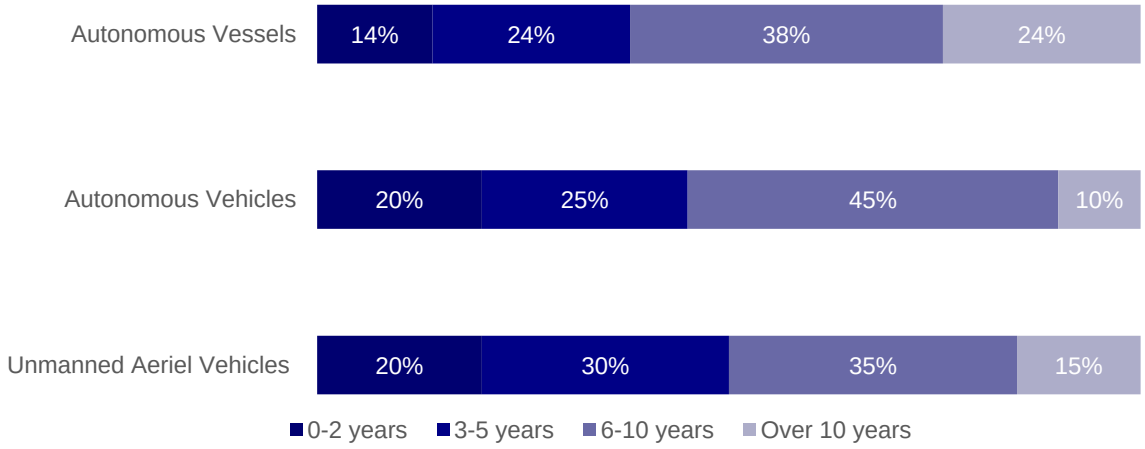


In the DTMG Survey 2018, a question was posed to address commercial transportation more broadly. Changes in technology and consumer preferences have led to Micromobility becoming a key area of focus for insurers, which resulted in its inclusion in the 2021 Survey. Respondents believe that this technology is the closest to seeing broad commercial use, which is perhaps reflected in the widely publicised attention that Micromobility has received from industry and government, particularly in 2021 and 2022.

Results from the DTMG Survey 2018 indicated that only 20% of respondents thought that UAVs would be in use commercially within 2 years, with around 50% indicating that this would take 6 years or more. There has been a more noticeable change in expected use to transport goods, with 22% of respondents indicating that the technology was already being used for this purpose and a further 24% suggesting that it would be in use in the next two years. Responses differed for use for the transportation of people, with 73% of respondents suggesting that it would take more than 6 years for them to be in use. The commercial use of UAVs will likely continue to emerge in light of various UK trials which may see the announcement of commercial drone delivery services, similar to those in operation in North America.

In response to the DTMG Survey 2018 62% of respondents thought that it would be over 6 years before A. Vessels were in widespread commercial use. By comparison, this figure fell in the 2021 results have in respect of transportation of goods (27%), but has remained relatively consistent with regard to the transportation of people (53%).

DTMG Survey 2018 Results: In which timeframe do practitioners think that the following technologies will be in wide use?

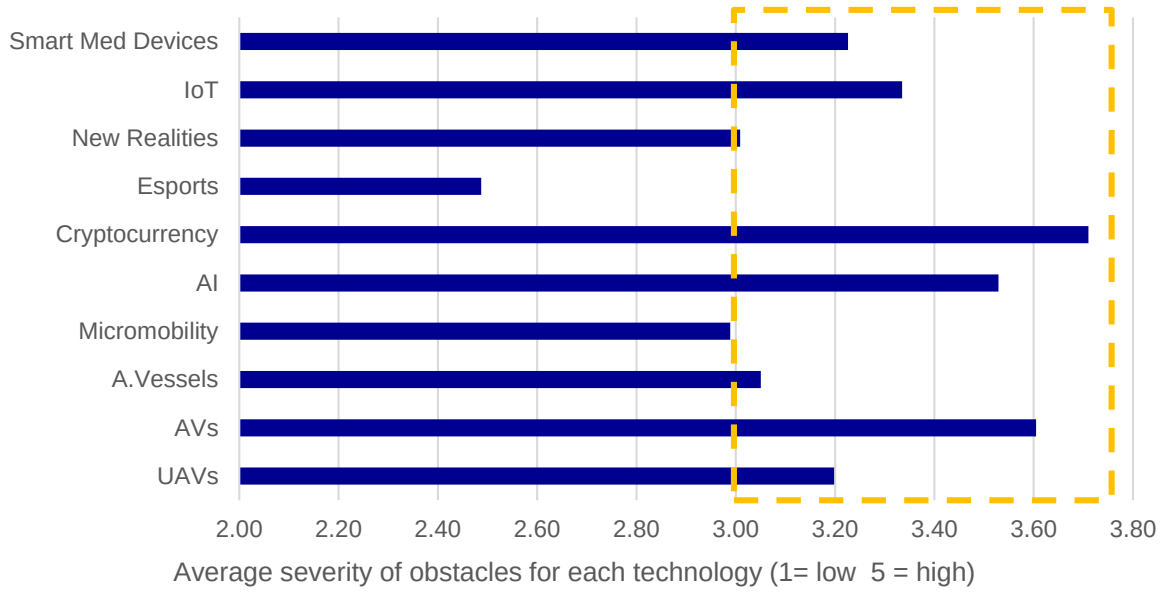


Regarding AVs, only 20% of respondents thought that they would be in wide use within two years in 2018. Both from a regulatory and technological perspective, the UK has made significant strides in this space over the past four years. However, the widespread use of full autonomy on UK roads is unlikely to materialise for some time. This is perhaps reflected in the 2021 results, which indicated that just 27% of respondents thought that the technology was currently being used for the transportation of people or would be within 2 years, whereas for the transportation of goods that figure was 37%. Realistically, it will be a number of years before widespread rollout of commercial vehicle automation, whether that be for goods in the form of truck platooning, or vehicles for personal use.

Section 6 – Obstacles

How concerned are respondents about key obstacles limiting the development and uptake of new and evolving technologies?

In this section of the survey, respondents were asked about a number of obstacles that may impact upon the take up of the technologies. Those included: the inability to access trusted data; lack of understanding of technology; lack of appropriate infrastructure; cost of the technology; technological capability; public perception of the risk and regulatory landscape.



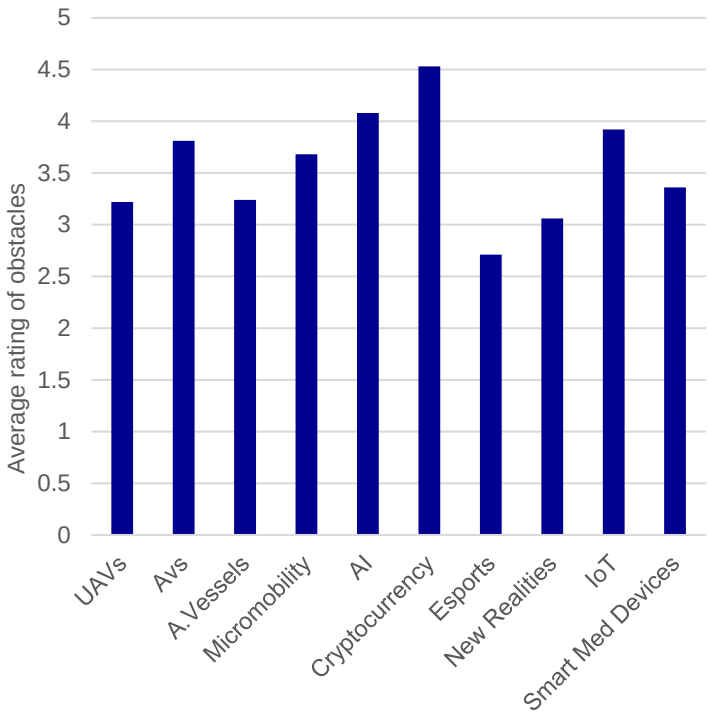
The yellow box in the chart above highlights that for 8 out of 10 of the technologies surveyed, the average severity score across each of the obstacles was higher than 3 (out of 5). Esports is the clear exception, surrounding which it is not anticipated that there will be significant challenges to overcome prior to its development and uptake. The average severity score in respect of Cryptocurrency was highest at over 3.7.

On average, of each of the obstacles, infrastructure was ranked as the most significant obstacle in respect of AVs (4.1), with regulation (3.8) and public perception (3.8) only marginally lower in respect of that technology. Whilst for UAVs, public perception ranked highest (3.5), followed by the inability to access trusted data (3.4) and lack of understanding (3.3).

Addressing other non-transport technologies, including AI, Cryptocurrency and IoT, regulation ranked notably as the number one obstacle. Public perception, a lack of understanding and limited access to trusted data each ranked highly.

A discussion on the Top 3 obstacles in respect of each technology follows:

1) Regulation as an Obstacle…



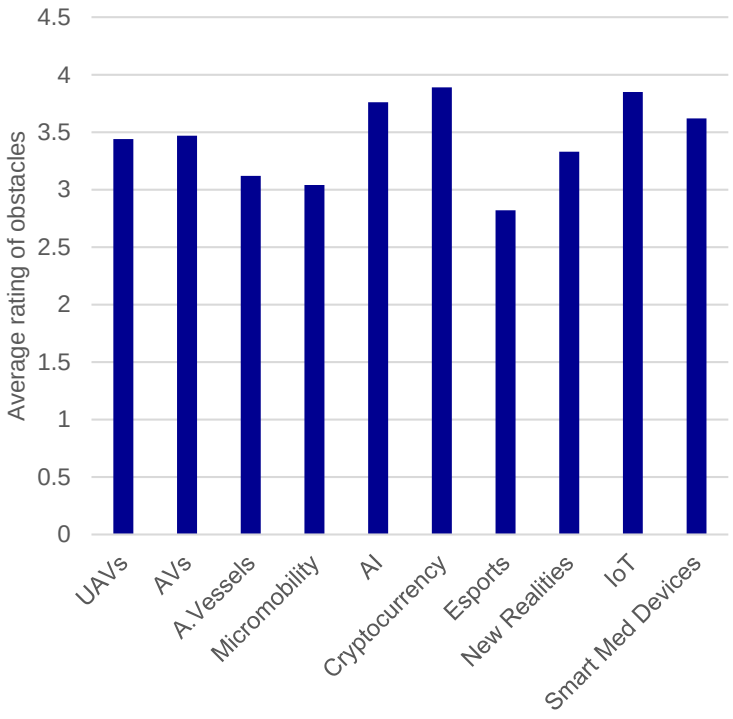
The need for regulation has received significant attention in the survey. To this end, it should be pointed out that on average, regulation ranked as the number one obstacle to the take up of the technologies, which reflects the importance of a balanced and proportional framework to enable widespread use.

Regulation may also limit the impact of other obstacles on technology, as it can require greater consistency in trusted data, more appropriate infrastructure, and assist in building public trust in technology.

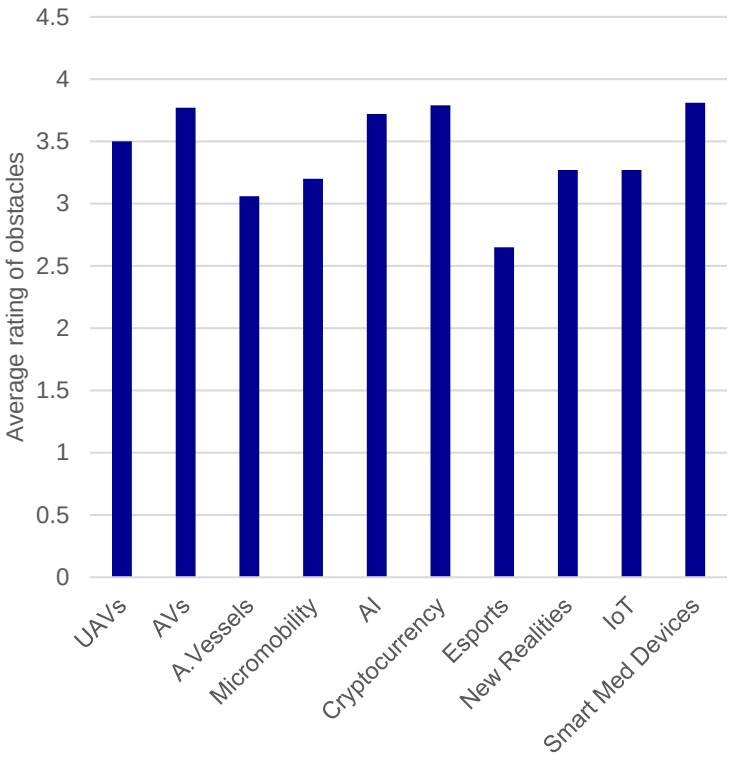
2) The Unavailability of Trusted Data as an Obstacle…

Unavailability of trusted data ranked second on the list of obstacles. This is identified as a key area when discussing new and evolving risks, especially in respect of AI, IoT, Cryptocurrency and Smart Medical Devices.

Given the increasing use of these technologies in society, it is concerning that there is a perceived lack of availability of the data required to support insurers in evaluating their risk profile.



3) Public Perception as an Obstacle…



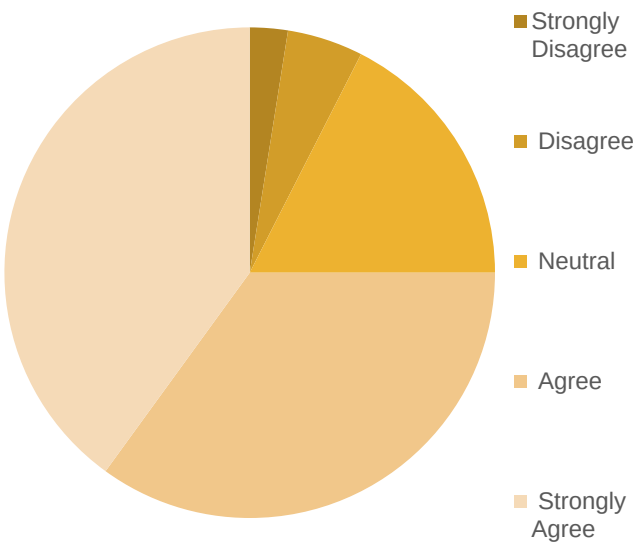
Public perception ranked third on the list of obstacles and was highlighted as a pertinent consideration particularly in respect of Smart Medical Devices, AI, Cryptocurrency and AVs.

Given widespread infiltration across industry and society, it is unsurprising that these technologies ranked highly as it is likely that the public will experience significant interaction with the technologies in the near future.

Section 7 – Trusted Data

Do respondents think trusted data is more important when evaluating new and evolving technology risks than 'traditional' exposures?

Emerging technology is changing the way that consumers and businesses operate. Society is becoming more reliant on data to make informed decisions and establishing that data can be trusted is therefore essential to the evaluation of risk. This statement was supported the identification of the unavailability of trusted data as a key obstacle to the uptake of technology within Section 6.



Over 75% of respondents thought that to some degree, trusted data is more important for new technology than for already established exposures. Creating tools to establish the provenance of data is paramount to ensure desired outcomes for insurers and their customers are achieved when developing insurance products for evolving technologies. This is particularly important where data may be less freely available.

There is significant work underway by the National Physical Laboratory in the UK on the topic of trusted data and collaboration on the subject with a range of stakeholders remains a necessity.

About the IUA's DTMG

In late 2016, it was acknowledged that a number of similar technology-based concepts were being discussed at several IUA committees. It was recognised that these subject matters had wide reaching cross-class implications for all IUA member companies.

In order to monitor these developing technologies, with a particular focus on AVs, A.Vessels, UAVs and IoT, a cross-class committee was constituted as a focal point for such risks at the IUA. More recently, the remit of the DTMG has expanded substantially to encompass a broad spectrum of new and evolving technologies and technology based risks.

The DTMG facilitates collaborative lobbying efforts in respect of government activities and potential regulatory developments and provided a forum for individuals from various IUA committees and members companies to come together to share their own opinions, concerns and experiences.

The following committees are identified as 'Parent Committees' of the DTMG and are invited to be consistently represented on the group:

- Aviation Technical Committee (ATC)
- Casualty Treaty Group (CTG)
- Cyber Reinsurance Committee (CRC)
- Cyber Underwriting Group (CUG)
- Liability Underwriters' Group (LUG)
- Marine Technical Committee (MTC)
- Professional Lines Underwriting Group (PLUG)

If you would like to find out more information about the IUA's DTMG, or to enquire about joining, please contact

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The International Underwriting Association of London (IUA) is the focal representative and market organisation for non-Lloyd's international and wholesale insurance and reinsurance companies operating in the London Market. It exists to promote and enhance the business environment for international insurance and reinsurance companies operating in or through London.