

# REPORT ON THE DIGITALISATION OF THE EUROPEAN INSURANCE SECTOR

EIOPA-BoS-24/139

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## EXECUTIVE SUMMARY

Over the past years, digitalisation has had an increasingly important role in enhancing the design, development and selling of innovative (re)insurance products and services through both traditional and new digital platforms and channels. Leveraging on the increasing availability of data in today's digital economy and the advent of new technologies such as Artificial Intelligence (AI), Blockchain or Internet of Things (IoT), digitalisation offers a wide range of opportunities for insurance undertakings, insurance distributors and customers.

However, digitalisation also brings new challenges, and can create frictions with market practices and regulations not designed with these innovations in mind. Given the diversity of initiatives and the high speed of developments, monitoring of digitalisation initiatives in the European insurance sector and assessing opportunities and risks have become an increasingly important priority for EIOPA and its Members.

Against this background, in 2023 EIOPA launched an EU market-wide survey aiming to better understand the dynamics, opportunities, and risks associated with ongoing digitalisation projects in the European insurance sector. The findings of this survey are summarised in this report and are complemented with inputs from a Eurobarometer survey providing customer's perspectives on certain digitalisation aspects. Some of the key findings are:

- ▶ The digitalisation of the European insurance sector is varied and, in most cases, is still at an incipient stage; there is a wide range of practices in the market and the level of digitalisation can substantially differ from one insurance undertaking to another.
- ▶ Pure digital distribution channels still play a secondary role in the distribution channel 'mix' of insurance undertakings, especially for life insurance; customers still predominantly purchase insurance products via physical channels, although online tools may be also used for comparison and information purposes; shopping behaviours may depend on factors such as the level of digital literacy of the customer.
- ▶ Telephone, email and face-to-face are the most popular communication channels used by customers to interact with insurance undertakings to date. Chatbots are used; this is expected to significantly increase in the near future, possibly related to the emergence of solutions based on Generative AI. A significant number of respondents have not implemented mobile phone applications.
- ▶ Most insurance undertakings are active in social media, mainly to interact with customers and to launch marketing and financial education campaigns, and in some cases also to cooperate with social media "influencers".

- ▶ There is a high concentration in the provision of relevant IT services such as cloud computing; almost 80% of the respondents outsource cloud computing data storage to BigTech cloud services.
- ▶ AI is used by 50% of the respondents in non-life insurance and by 24% in life insurance, and an additional 30% and 39% of respondents expect to use AI in the next 3 years in non-life and life insurance, respectively.
- ▶ The majority of AI use cases are developed in-house, with simpler and more explainable AI solutions currently used the most. From a governance and risk management perspective, AI is most often used with human oversight, and the Management / Executive Board is most often responsible for the approval of high-impact AI use cases.
- ▶ Other technologies such as Internet of Things (IoT), Blockchain (including crypto assets) and parametric insurance products are currently only used by a minority of insurance undertakings.
- ▶ Most insurance undertakings report a growth of cyber insurance markets in the past two years, although cyber insurance products still include marked coverage exclusions. Cyber insurance products are mostly marketed to corporate customers, including SMEs, rather than to retail customers.
- ▶ Acquiring adequate talent and skills is seen as a major enabler of (and barrier to) digital transformation, and cyber risks are perceived by insurance undertakings as the main risk arising from digitalisation.

Digitalisation brings significant opportunities both for customers and insurance undertakings, including faster, more efficient, and automated processes. While customers with different profiles have diverse shopping habits, they generally appreciate the convenience of more tailored products and faster processes or being able to shop and search for information about insurance products online on a 24/7 basis from any location. The trend towards the increasing digitalisation of the insurance sector is expected to progressively continue over the years to come. Major discontinuities in this process cannot be completely ruled out in view of rapidly evolving technological developments.

Taking into account the evolving nature of the digitalisation landscape as well as legislative developments such as the Artificial Intelligence Act, the Digital Operational Resilience Act or the Financial Data Act, the findings of the present report will support EIOPA in evaluating risks and benefits for the market and customers, assessing and designing regulatory measures where EIOPA is so empowered, enhancing supervisory convergence and supervisory oversight, and ensuring that stakeholders harness the benefits of digitalisation while safeguarding customer protection and financial stability in the markets. These inputs will feed into EIOPA's recently approved Digital Strategy, which sets out the Authority's strategic objectives in this area and guides its digitalisation work for the years to come.

## 1. INTRODUCTION

Article 8.1 (f) of the EIOPA Regulation<sup>1</sup> mandates EIOPA to “monitor and assess market developments in the area of its competence including where relevant, developments relating to trends in insurance, reinsurance and occupational pensions, in particular, to households and SMEs and in innovative financial services duly considering developments relating to environmental, social and governance related factors”.

EIOPA has been implementing its market monitoring mandate through several initiatives such as via its annual Consumer Trends reports, thematic reviews, public consultations, or with the organisation of InsurTech Roundtables and workshops with stakeholders from the insurance sector. In 2021 EIOPA also created a Consultative Expert Group on Digital Ethics in insurance, which concluded its term with the publication of a report on AI governance principles.<sup>2</sup>

In addition to the above-mentioned tools, and in line with its Annual Work Programme,<sup>3</sup> in 2023 EIOPA issued a Digitalisation Market Monitoring Survey to gather further empirical evidence on the state-of-play of the digitalisation of the European insurance sector and keep pace with the rapid changes which innovation brings to the insurance sector.

The survey was published on EIOPA’s website and was distributed to insurance undertakings via their respective National Competent Authorities, aiming to capture at least 60% of total Gross Written Premiums in each national market. It covered both life and non-life (re)insurance Lines of Business, including both retail and corporate clients. It did not address intermediaries at this stage.

The survey was launched in Q2 2023, with a total number of responses amounting to 209 (re)insurance undertakings from 22 EU Member States.<sup>4</sup>

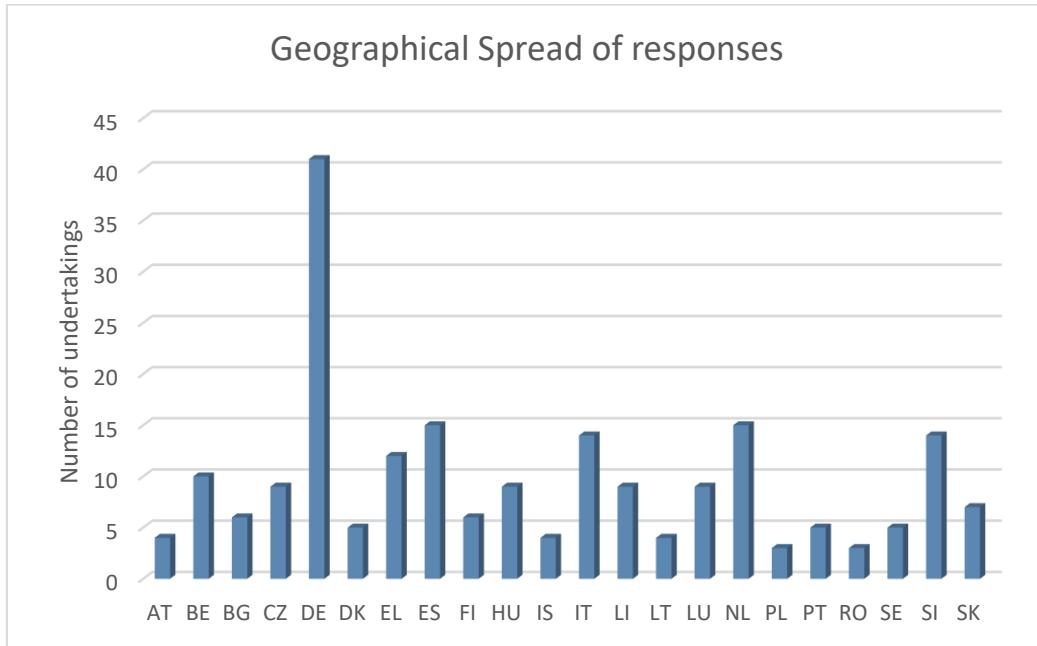
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<sup>1</sup> Regulation (EU) No 1094/2010

<sup>2</sup> [Artificial Intelligence governance principles: towards ethical and trustworthy Artificial Intelligence in the European insurance sector \(europa.eu\)](#)

<sup>3</sup> [Work programme 2024-2026 - European Union \(europa.eu\)](#)

<sup>4</sup> Some National Competent Authorities that did not participate in the exercise explained that they had recently conducted similar surveys in their national markets. This is for instance the case of the Central Bank Ireland, which in 2023 published the results of a Digitalisation survey ([link](#)) and that it carried out as well as a report on Data Ethics within Insurance ([link](#))

**Figure 1 – Participating countries and number of undertakings**

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Almost half of the participating insurance undertakings (49%) were active in both life and health insurance, while 28% were only active in non-life insurance and 23% only in life insurance lines of business. As far as their target market is concerned, 70% of the participating undertakings targeted both private and corporate customers, although some stated that there could be differences between lines of business. Moreover, 21% stated that they only targeted retail customers, while the remaining 9% stated that they commercialised products only to corporate clients.

It should be noted that undertakings were asked to complete the survey based on the status of their organisation in 2022 and, for some questions, foreseeable developments over a 3 years' time horizon; for this reason, the most recent digital developments, such as Foundational Models and Generative AI, might have not been fully captured by the responses provided.

Overall, the input received can be considered representative of the current state of play of the digitalisation of the European insurance sector. Some respondents provided very comprehensive responses on all areas, while others focused on those areas on which they were more specialised or where more input on concrete plans and cases could be provided. When analysing the input provided by stakeholders, to display the results EIOPA focused on the replies for which a reply to the question was provided; any resulting differences in terms of total count of inputs per question from the overall number of contributions mentioned above relates to the non-availability of data and responses for the specific question at stake i.e. the graphs pertain exclusively to the subset of

entities among the total which provided a response for the specific question/area and disregard empty and N/A responses, unless it is otherwise mentioned explicitly in the report.

The data gathered from insurance undertakings via the above-mentioned survey has been complemented with input from customers gathered via an EU-wide Eurobarometer survey conducted in July 2023. The Eurobarometer survey was carried out in the 27 EU Member States, via a representative sample in each country of 1000 EU citizens<sup>5</sup>, aged 18 and over. In total 26168 interviews were conducted via computer-assisted web interviewing. Among other topics, the survey captured customers' point of view in relation to certain aspects of online insurance distribution and their interaction with insurance companies via digital means.

The report provides a general assessment of the status of digitalisation across the EU, and it has been structured around the following focus areas:

- ▶ Strategy, Channels and Partnerships: assesses digital transformation strategies in place, as well as the relevance of digital distribution and communication channels and the role of BigTech and InsurTech start-ups as ecosystem facilitators.
- ▶ New technologies and business models: covers AI governance, machine learning leverage, crypto assets, Blockchain, cyber insurance and usage of other technologies such Internet of Things, Application Programming Interfaces (APIs) and RegTech.
- ▶ Opportunities, Risks and Barriers: describes opportunities and challenges arising from digitalisation.

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<sup>5</sup> For LU, CY, and MT the sample size was 500 customers.

## 2. STRATEGY, CHANNELS AND PARTNERSHIPS

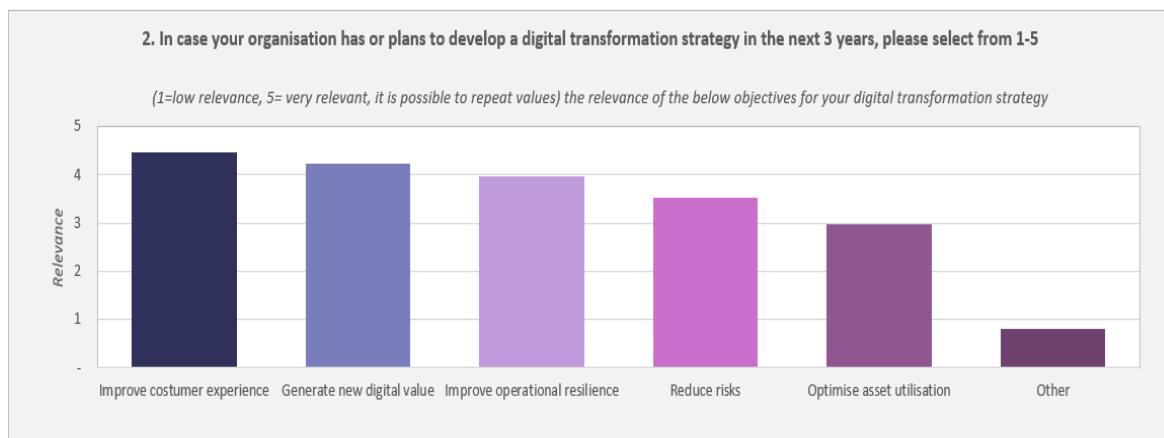
### 2.1 DIGITAL TRANSFORMATION STRATEGY

The majority of the 209 insurance undertakings (52%) that participated in the survey already have a dedicated digital transformation strategy in place, often developed at group level. Meanwhile, 23% of the undertakings stated that they do not have a standalone digital transformation strategy, but instead this strategy is integrated in their IT/corporate/business strategy. The remaining 25% did not count with a digital transformation strategy yet, or they were in the process of developing it.

The strategy will typically outline the digitalisation objectives and it is updated periodically to reflect the changes taking place in the digital space. It covers areas such as customer service / user experience, digital infrastructure, data interfaces, digital platforms and ecosystems, Application Program Interfaces (APIs), digital distribution channels, interaction with sales agents or IT security issues.

Insurance undertakings ranked the improvement of customer experience and to be close to their customers more generally as the main objective pursued with the digital transformation of their business; the generation of new value for the undertaking (e.g., increase revenues and reduce costs through the automation of processes) and the improvement of operational resilience are also considered to be highly relevant, while risk reduction and optimisation of asset utilization are ranked with average relevance across the EU.

**Figure 2 – Ranking of objectives sought through the implementation of a digital transformation strategy**

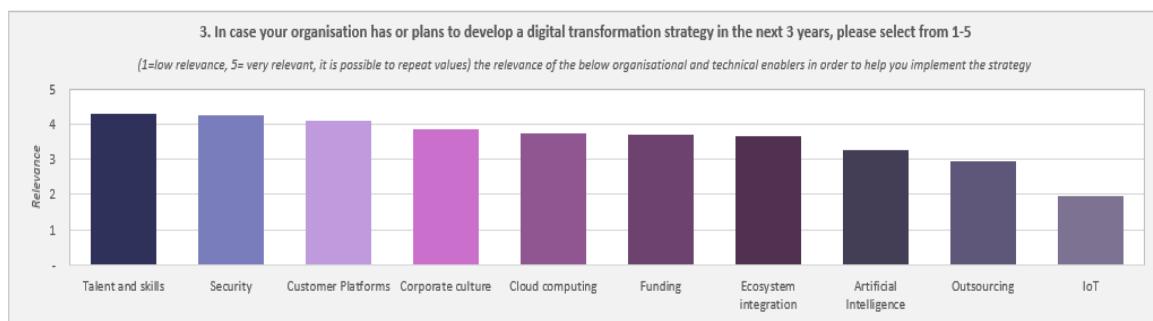


Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

In order to be able to implement these objectives, the digital transformation strategies reportedly typically include a road map with milestones and guidance on how to meet these objectives. The use of Key Performance Indicators (KPIs) is common to monitor the implementation of these objectives.

Certain business processes and technologies are considered particularly important to unlock the full potential of digitalisation within the organisation. When questioned about enablers of the digital transformation, acquiring relevant talent and skills, relying on adequate levels of security and developing customer / digital platforms were reported to be the three main enablers.

**Figure 3 – Organisational and technical enablers of digitalisation**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

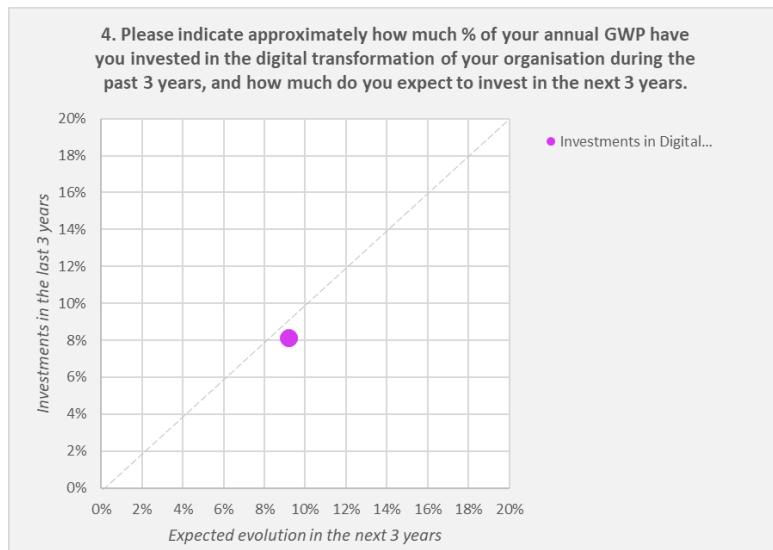
Continuous training of staff and acquiring staff with relevant knowledge of new technologies and business models certainly plays a key role in the digital transformation journey of insurance undertakings. The scarcity of staff with certain profiles (e.g., data scientists) can represent a significant barrier to digitalisation (see section 4.3 below), although traditional staff present in insurance undertakings such as actuaries already count with extensive knowledge and experience on mathematical models and they may further enhance their knowledge on new technologies via adequate trainings.<sup>6</sup>

Undertakings often need to make significant investments to replace outdated legacy systems by more modern digital infrastructures and technologies; when questioned about the amount of their Gross Written Premiums (GWPs) that they allocate to support the implementation of their digital transformation strategy, the results show an average investment proportion of GWP which is currently around 8% and is foreseen to be kept stable over a 3-year horizon.

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<sup>6</sup> [What-should-an-actuary-know-about-Artificial-Intelligence.pdf](#)

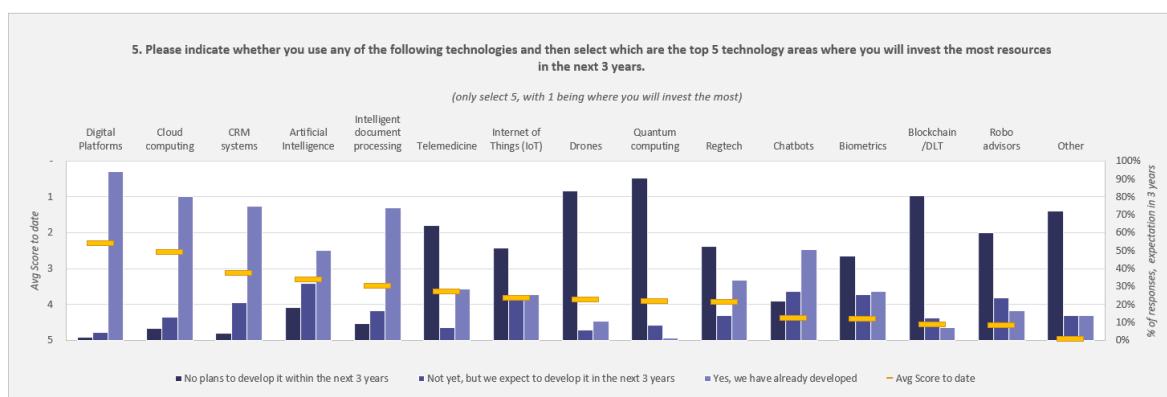
**Figure 4 – Level of investments of insurance undertakings in digitalisation**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

In line with the objective to improve their customer's experience (see Figure 2), most undertakings tend to concentrate their resources on the set-up and maintenance of digital platforms where they can interact with their customers. Moreover, enhancing their data analytics capabilities is also the common objective pursued by the investments in AI, cloud computing and on Customer Relationship Management (CRM) systems i.e., a database / platform where all the information about their customers is available (contact details, number of policies, emails, complaints, other customer interactions etc.).

**Figure 5 –Top technology areas on which undertakings are more likely to concentrate their investments**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

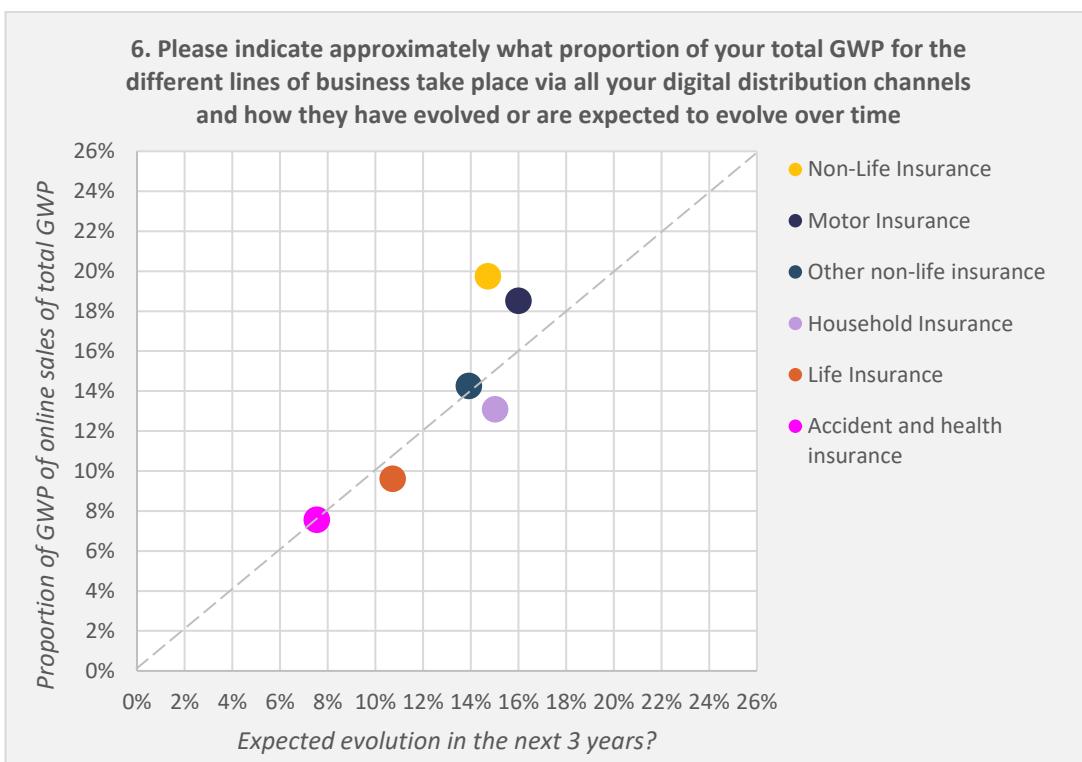
Some undertakings mentioned that they have started to invest specifically in Generative AI technology. It was also highlighted that significant investments are made on upgrading cyber security capabilities, including data security. Another undertaking mentioned that while they do not directly invest in technologies such as drones or telemedicine, this would typically be done by their partners.

## 2.2 DIGITAL DISTRIBUTION CHANNELS

An important indicator when assessing the level of digitalisation of the insurance sector is the revenue generated by digital distribution channels. In insurance, digital sales are mainly distributed through the undertakings' own website, comparison websites, social media, mobile apps, or websites from other third parties (e.g., airplane companies selling travel insurance on its website).

As it can be observed in the graph below, the proportion of sales via digital channels as a percentage of the total gross written premiums (GWP) represent, on average, 9% in life insurance sales and 19% in non-life insurance lines of business in the European insurance sector. The expectation is that sales through digital channels will increase in life and non-life lines of business in the next 3 years. Future growth fits the same pattern as existing penetration.

**Figure 6 – Investment as a % of GWP– breakdown across the main business lines**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

While some insurance undertakings explained that they exclusively distribute insurance products through non-digital channels, it was also highlighted that some customers may use digital tools to search and compare information online, but then conclude the contract in a physical branch. Furthermore, customers often stay with the same insurer for many years and do not shop around on a yearly basis (one undertaking mentioned that only around 20% of their customer base changes from one year to another).

Some respondents also referred to differences between retail and commercial sales, or between personal profiles (i.e., age and digital skills), or products (for instance life insurance products representing high investments often require professional advice and therefore are less commonly sold via digital channels). Some respondents also justified the low level of digital sales by reference to the fact that they distribute insurance products only indirectly to the final customer, for instance via group insurance contracts distributed through other intermediaries or collective agreements with employers.

These results are somewhat in line with the ones of the Eurobarometer survey, which shows that European customers still prefer to purchase insurance products through physical channels: in person or on the phone, directly from an insurance company (34%), via an intermediary (15%) or via a bank (11%). However, several European customers have also purchased insurance products via digital channels in the last 2 years: from the insurer's website (25%), a comparison website (11%) or the website from a third party different than comparison websites (4%).

**Figure 7 - Thinking about the insurance policies you purchased in the past two years; how did you purchase these?**<sup>7</sup>

	Online, from the insurance provider's website	Online, via a price comparison website	Online, but neither on the insurance provider's website nor on a price comparison website	In person or on the phone, directly from an insurance company	In person or on the phone, via an intermediary (other than a bank)	In person or on the phone, via a bank	The insurance came together with a non-insurance product I purchased	Other distribution channels not mentioned above	Not-applicable (I did not purchase any insurance in the past two years)	Don't know/Prefer not to answer
<b>EU27</b>	<b>25%</b>	<b>11%</b>	<b>4%</b>	<b>34%</b>	<b>15%</b>	<b>11%</b>	<b>5%</b>	<b>3%</b>	<b>19%</b>	<b>3%</b>
<b>BE</b>	20%	4%	3%	27%	15%	19%	3%	3%	22%	4%
<b>BG</b>	10%	4%	3%	31%	25%	15%	7%	7%	18%	5%
<b>CZ</b>	23%	11%	3%	32%	22%	13%	5%	2%	19%	4%
<b>DK</b>	29%	5%	2%	33%	4%	7%	3%	2%	29%	4%
<b>DE</b>	22%	18%	4%	23%	15%	6%	2%	3%	29%	4%
<b>EE</b>	47%	20%	6%	15%	8%	10%	8%	3%	16%	2%
<b>IE</b>	55%	13%	5%	36%	13%	5%	3%	2%	9%	2%
<b>EL</b>	22%	14%	5%	27%	23%	11%	7%	3%	15%	3%
<b>ES</b>	25%	7%	3%	44%	15%	15%	4%	3%	12%	2%
<b>FR</b>	23%	7%	4%	46%	7%	18%	6%	2%	15%	4%
<b>HR</b>	15%	8%	2%	47%	18%	11%	5%	4%	14%	4%
<b>IT</b>	27%	12%	4%	40%	11%	9%	6%	3%	13%	3%
<b>CY</b>	16%	2%	1%	43%	20%	15%	7%	2%	16%	4%
<b>LV</b>	36%	17%	5%	17%	11%	8%	6%	7%	19%	3%
<b>LT</b>	34%	15%	5%	33%	14%	9%	6%	3%	12%	3%
<b>LU</b>	9%	2%	1%	57%	16%	12%	5%	3%	15%	5%
<b>HU</b>	21%	15%	3%	25%	15%	11%	4%	2%	24%	2%
<b>MT</b>	22%	2%	1%	50%	16%	13%	6%	3%	14%	3%
<b>NL</b>	44%	15%	4%	11%	14%	4%	3%	1%	25%	3%
<b>AT</b>	12%	8%	4%	27%	33%	11%	4%	3%	25%	3%
<b>PL</b>	30%	15%	5%	35%	25%	10%	7%	3%	13%	3%
<b>PT</b>	24%	4%	4%	32%	20%	15%	8%	3%	16%	3%
<b>RO</b>	21%	9%	4%	37%	20%	13%	11%	4%	15%	2%
<b>SI</b>	24%	4%	5%	39%	35%	8%	5%	3%	9%	3%
<b>SK</b>	17%	8%	4%	28%	24%	13%	3%	3%	24%	3%
<b>FI</b>	41%	6%	3%	30%	4%	5%	4%	1%	24%	2%
<b>SE</b>	35%	6%	3%	27%	7%	6%	6%	3%	27%	7%

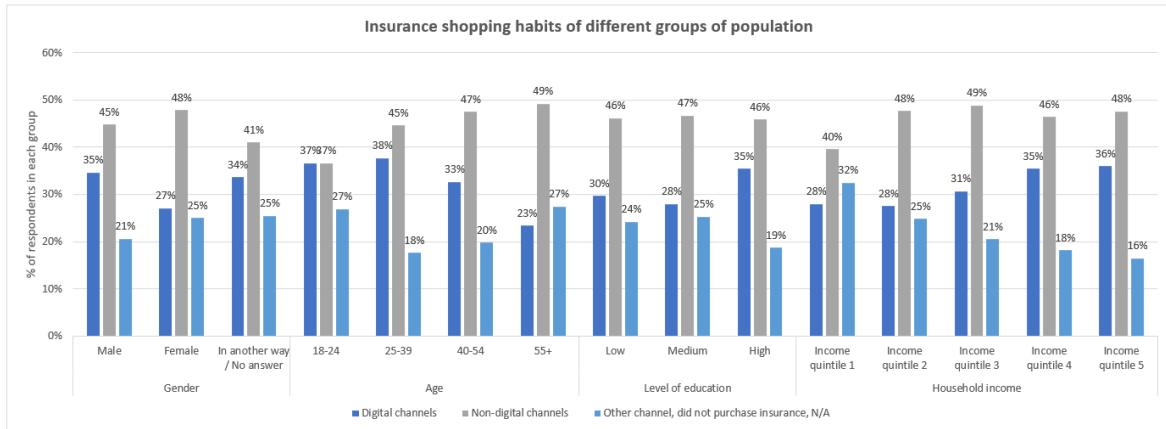
Source: EIOPA's Eurobarometer Survey, July 2023

While on average at EU level most customers still purchase insurance products from physical channels, this is not the case in all the EU 27 Member States; Figure 7 shows that there are relevant differences between Member States, which could be explained by different factors such as overhead costs, cultural differences, the overall level of digitalisation of the country or the existing network of distribution channels.

There are also relevant differences when analysing the shopping habits of insurance products by different groups of population. As it can be observed in the graph below, digital distribution channels are more frequently used to purchase insurance products by young male customers with a high level of education and high income.

<sup>7</sup> The %s represent the proportion of consumers in each country that participated in the Eurobarometer survey; consumers were offered the possibility to answer more than one option for this question, and therefore the sum of %s of the different options in each country does not equal to 100%.

**Figure 8 - Insurance shopping habits by different groups of population in the EU<sup>8</sup>**



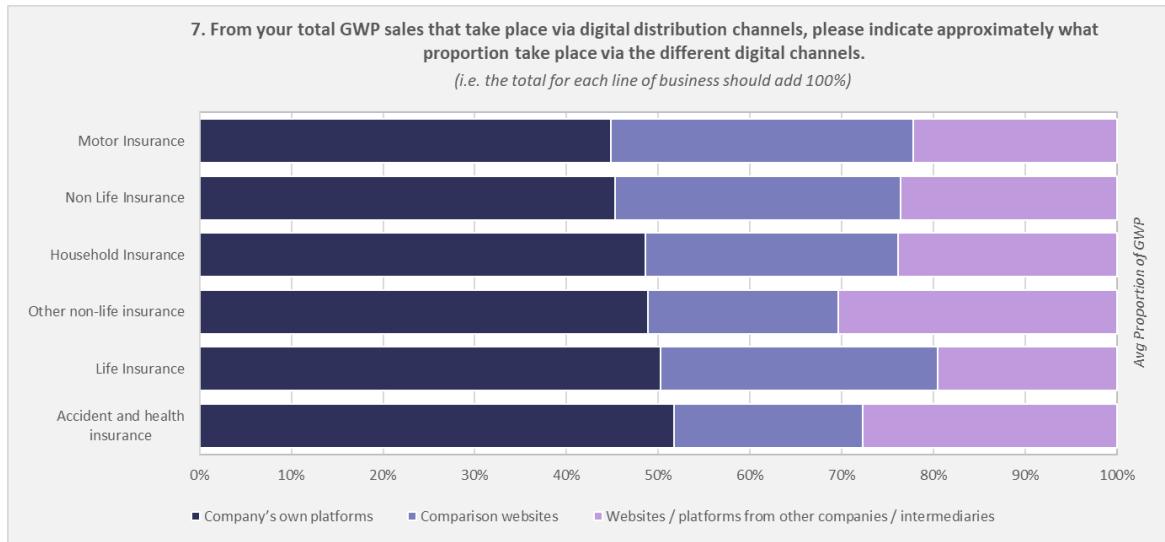
Source: EIOPA's Eurobarometer Survey, July 2023

From a financial inclusion perspective, it is noteworthy the high percentage of low income customers who did not purchase insurance products in the last two years, which could reveal a lack of coverage (protection gap) for this group of customers. In this context it is also relevant that elderly populations use digital channels less frequently compared to younger customers, and therefore they could be more impacted by the digitalisation of the insurance sector.

Moreover, when looking exclusively at the digital sales channels, the responses provided to the market survey highlight the important role played by sales done through undertakings' own platforms, evenly distributed through all the main business lines, immediately followed by comparison websites (the cumulative average percentage of sales delivered through these two channels amounts for more than 70% of total sales). Comparison websites play a greater role in non-life insurance lines of business, in particular in motor insurance.

<sup>8</sup> The non-digital channels category includes the following responses: "In person or on the phone, directly from an insurance company", "In person or on the phone, via an intermediary (other than a bank)" and "In person or on the phone, via a bank". The digital channels category includes the following responses: "Online, from the insurance provider's website", "Online, via a price comparison website", and "Online, but neither on the insurance provider's website nor on a price comparison website". The other channels category includes the following responses: "The insurance came together with a non-insurance product I purchased", "Other distribution channels not mentioned above", "Not-applicable (I did not purchase any insurance in the past two years)" and "Don't know/Prefer not to answer".

**Figure 9 – GWP sales via digital distribution channels – breakdown across the main business lines**



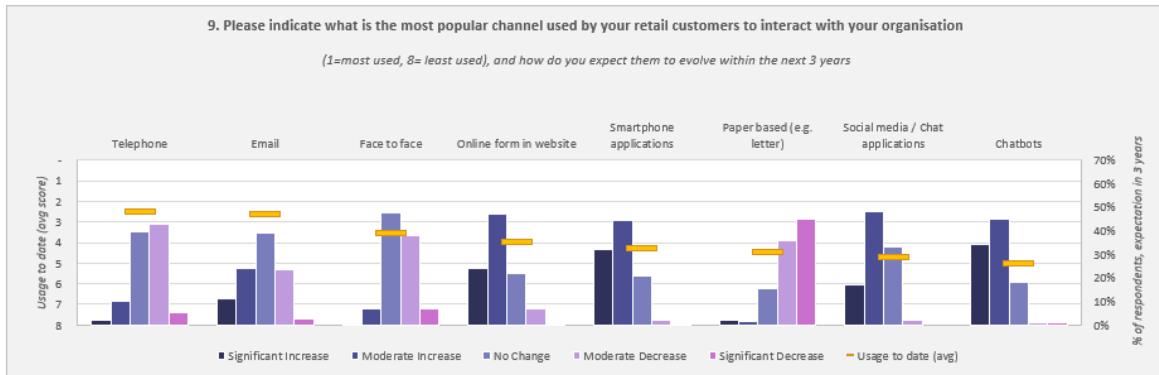
Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Digitalisation may also enable the cross-selling of insurance products with other products to retail customers (sometimes referred to as “embedded insurance”), for instance when travel insurance products are offered with plane tickets purchased online. The survey results highlight that this phenomenon mostly relates to non-life insurance products, and most undertakings consider bancassurance, customer products / e-commerce and the mobility sector as the most relevant areas for cross-selling activities. When it comes to analysing the outlook on a 3-years’ time horizon, the outlook remains stable.

## 2.3 COMMUNICATION TOOLS AND CHANNELS

Customers use different tools and channels to communicate with insurance undertakings. Currently, telephone calls, email interactions and face-to-face communications are the most used channels by customers to interact with insurance undertakings.

**Figure 10 – Most popular channels used by retail customers to interact with undertakings**



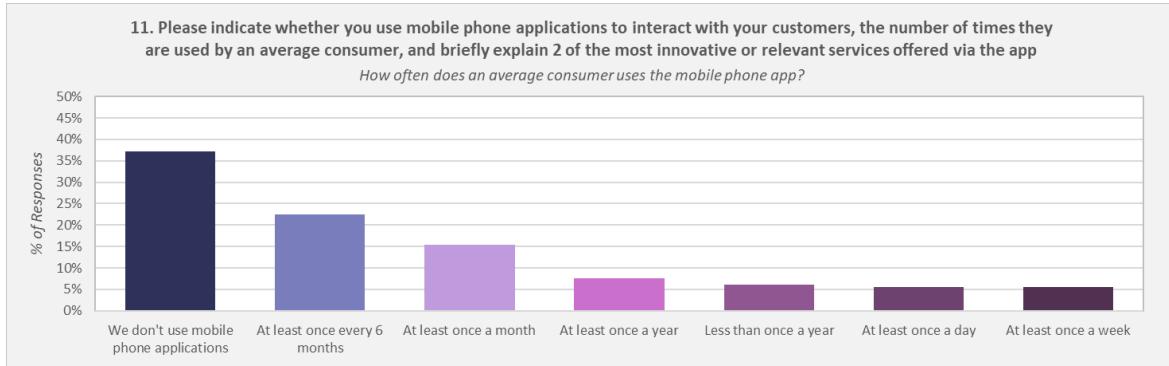
Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

In addition to the communication channels shown in the graphic above, some undertakings explained that their customers predominantly interact via their network of intermediaries and not directly with them. Others referred to the importance of customer platforms / portals in their website, which may include self-servicing capabilities. Other insurers made explicit reference to communications via SMS texts and other messaging applications or indicated their intention to establish video meetings.

When questioned about the expected evolution of the different channels within the next 3 years, European (re)insurance undertakings consider that the use of chatbots, mobile phone applications and online forms through websites will increase the most. The high growth expected for chatbots could potentially be anticipating an increasing use of Generative AI tools for customer service purposes.

Specifically concerning mobile phone applications, the results of the survey show that a significant proportion (37%) of the respondents do not have a mobile phone application. Amongst those with one, customers appear to use them only occasionally.

**Figure 11 – Mobile phone applications in insurance**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Compared to the banking sector, where the use of online banking by customers is widely extended,<sup>9</sup> the use of mobile phone applications in insurance appears to be relatively low. This could be explained by the nature of the business model; customers do not need to regularly interact with insurance undertakings, but rather on specific occasions such as to renew an insurance contract (typically once a year in non-life insurance) or to make a claim in the event of a loss or an accident. Some undertakings also explained that instead of developing mobile phone applications they have prioritised the development of a customer portal in their websites.

Those that offer a mobile phone app reported a wide array of services offered via the app; the most common ones included the possibility to make premium payments and claims or dashboards providing an overview of the insurance products portfolio and other relevant documents such as the contract and the terms and conditions. The use of apps in the context of digital identities and customer identification services was also reported several times. More specifically, some health insurance providers offer the possibility to search for medical specialists, submit medical bills or telemedicine services (e.g., video consultation with a doctor). Life insurers would typically provide an overview of the accumulated savings and offer some pension projections and tax benefits calculators. Pay-per-use services, coaching advice, accident detection, warnings of storms or tow truck geolocation tracking are some examples of the services offered by insurers providing telematics-based insurance products (see also section 3.3).

Most of the participating insurance undertakings are active in social media. They explained that depending on the specific social media platform they may target different customers and post different content. Common social media uses include for corporate branding purposes, to interact with existing and prospective customers (e.g. answer questions and complaints), or to launch marketing or financial education campaigns (e.g., raise awareness about taking travel insurance during the holidays). Nonetheless, some undertakings stated that they are reluctant to have direct communication with customers on social media and instead redirect them to other communication channels.

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<sup>9</sup> [Statistics | Eurostat \(europa.eu\)](#)

Figure 12 – Social media and influencers uses word cloud



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

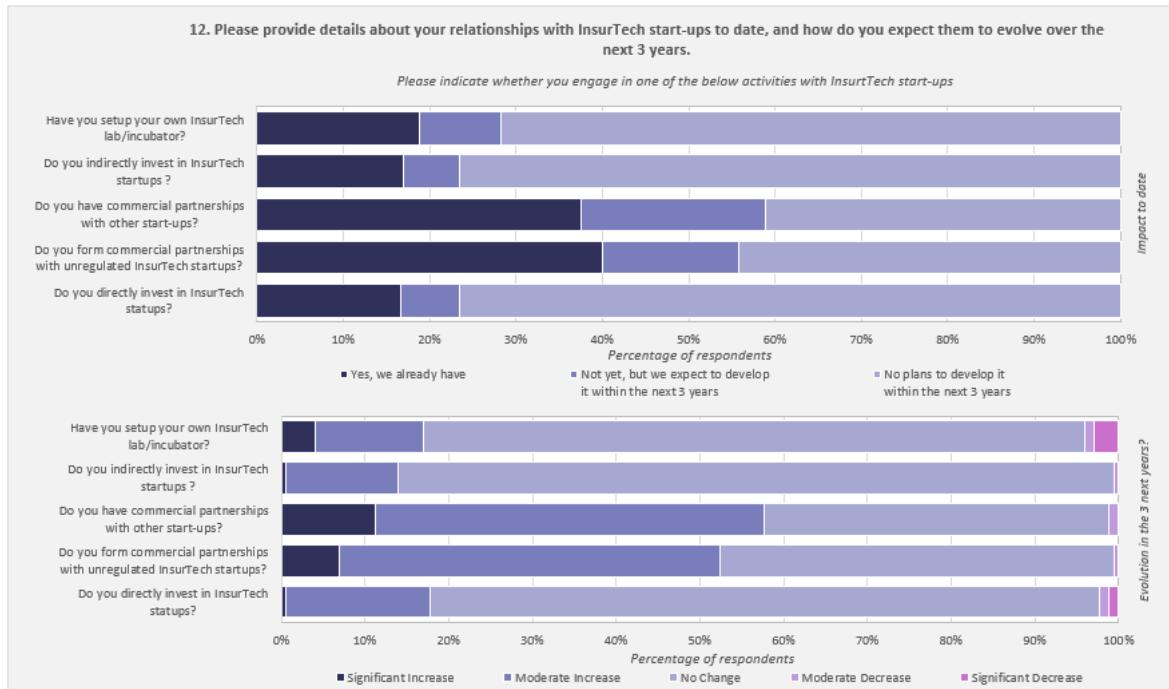
More particularly, 25% of the 209 participating insurance undertakings reported having already established a commercial relationship with the so-called social media “influencers”, and another 8% were planning to do it soon. Insurance undertakings mainly collaborate with social media “influencers” for branding purposes, including promoting social responsibility campaigns. Some undertakings also mentioned that they also use “influencers” for product placement purposes and to reach to targeted audiences.

## 2.4 PARTNERSHIPS WITH INSURTECH START-UPS AND BIGTECHS

Outsourcing of products and services from specialised third-party providers is commonly seen as a way to obtain quick access to new technologies and business models by insurance undertakings. The recent developments around Generative AI and Foundation Models can be seen as a practical example. Indeed, insurance undertakings enter into collaborative agreements with specialised entities such as InsurTech start-ups or BigTechs, as well as other service providers, to leverage on their technological know-how and experience.

The survey questioned undertakings specifically about their partnerships with Insurtech-startups and BigTechs. Around 40% of the respondents highlighted that they currently have in place commercial relationships with start-ups and foresee to increase their interactions with them in the near future. Moreover, most undertakings have not invested either directly (e.g., acquiring shareholding) or indirectly (e.g., through venture capital) in InsurTech start-ups to date, and most of them expect to keep this approach unchanged over a 3-year horizon.

**Figure 13 – Relationship with InsurTech start-ups and foreseen 3-year horizon evolution**

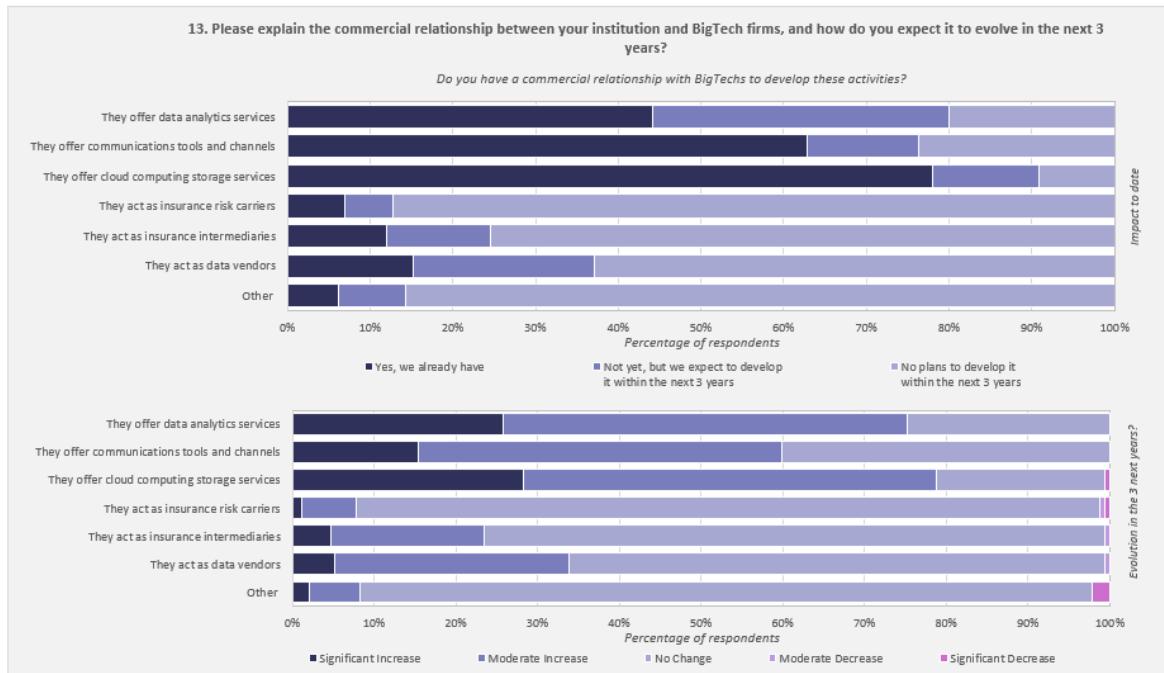


Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Some respondents explained that the relationships with InsurTech start-ups are typically managed at group level and not by the subsidiaries. Overall, the relationships between incumbent undertakings and InsurTech start-ups differ from one undertaking to another, with some having developed their own innovation labs or start-up incubators, while others appear to prefer to prioritise their relationship with a reduced number of InsurTech start-ups, and others do not report any commercial relationships.

As far as the relationship between insurance undertakings and BigTechs is concerned, a large majority of respondents, with a percentage close to 80%, reports that the outsourcing of cloud computing storage services is the main commercial relationship held with BigTechs, immediately followed by communication tools and channels and data analytics services (e.g., AI tools).

**Figure 14 – Relationship with BigTechs and foreseen 3-year horizon evolution**



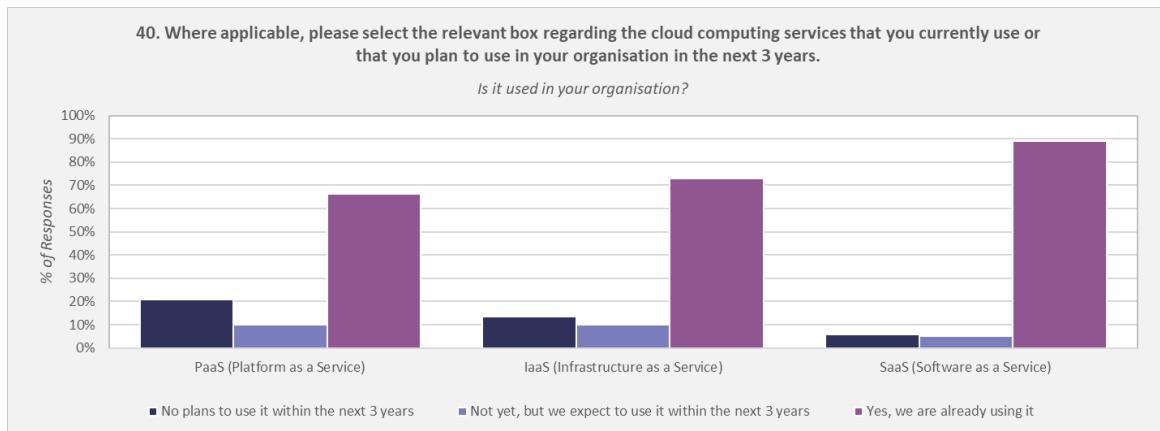
Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

The high concentration of services outsourced by insurance undertakings from BigTechs is one of the main takeaways from the above graphs. Some respondents explained that they predominantly work with one BigTech provider, while others collaborate with several of them for different processes. It is also worth highlighting that most insurance undertakings expect to significantly or moderately increase the outsourcing of services from BigTechs in the next 3 years.

It is also noticeable that some BigTech platforms are operating as licensed insurance intermediaries in some EU markets. Some of the respondents also reported that BigTech firms act as risk carriers, but EIOPA subsequently followed-up bilaterally with some of these undertakings and they clarified that they had misunderstood this part of the question and that BigTech firms do not underwrite risks themselves, but rather offer the technical infrastructure in the cloud for the insurer to perform these activities.

Specifically concerning cloud computing, the survey gathered information about the types of services that were being outsourced from cloud computing service providers (not exclusively from BigTechs). As it can be observed in the graph below, software as a service (SaaS) was the most popular.

**Figure 15 – Cloud computing**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Software as a service (SaaS) is the most comprehensive package of services (compared to PaaS and IaaS) offered by cloud service providers to their clients (e.g., insurance undertakings). In addition to data storage services, SaaS typically includes other services such as IT security, marketing tools, Anti-money laundering (AML) screening solutions, digital signatures, data analytics (including AI tools), language translation tools, chatbots or CRM solutions. Indeed, cloud service providers typically cross-sell different types of services to their clients in addition to data storage services.

## 3. NEW TECHNOLOGIES AND BUSINESS MODELS

### 3.1 ARTIFICIAL INTELLIGENCE

#### 3.1.1 MARKET DEVELOPMENTS

Artificial intelligence (AI) is expected to play a pivotal role in the digital transformation of the insurance sector; 50% of the respondents, irrespective of their size or market share, are already using AI in non-life insurance lines of business, and 24% in life insurance lines of business.<sup>10</sup> And additional 30% and 39% of respondents expect to use AI in the next 3 years in non-life and life insurance, respectively.

These percentages are somewhat in line with the findings of EIOPA's 2019 thematic review on the use of Big Data Analytics in motor and health insurance,<sup>11</sup> which showed that 31% of the insurance undertakings and intermediaries that participated in that exercise were already actively using AI, and another 24% were at a proof-of-concept stage.

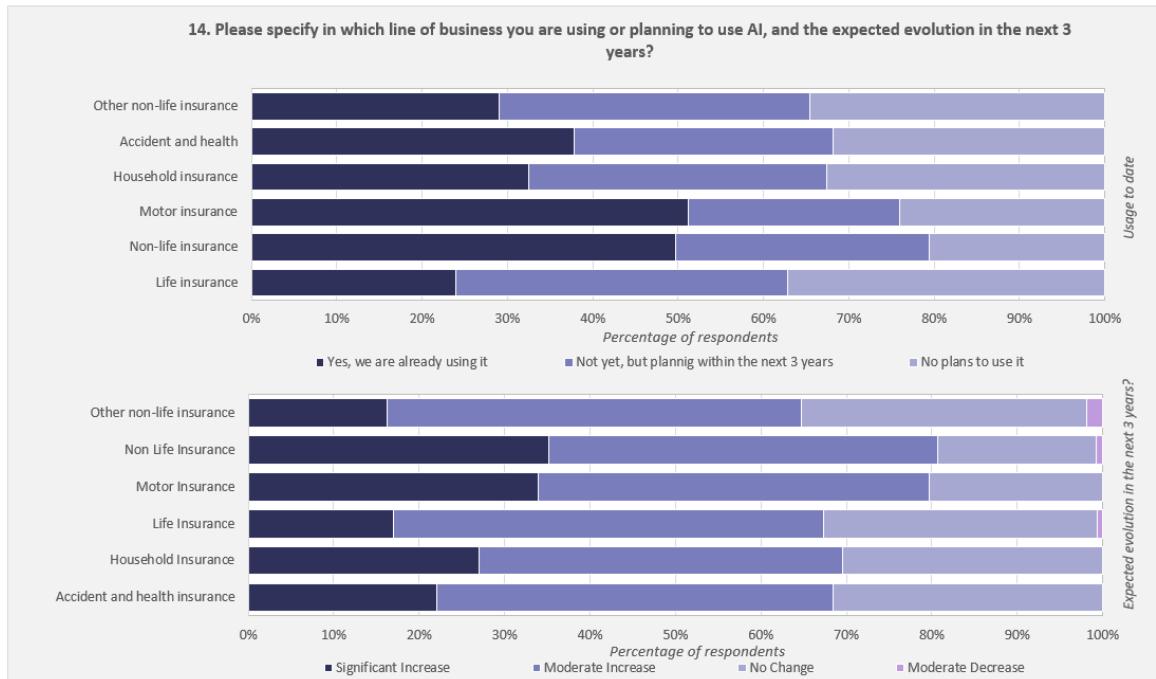
Possibly taking into account developments such as Generative AI, the use of AI is indeed expected to increase in the years to come, being this increase more pronounced in non-life insurance lines of business; and more particularly in motor insurance (see graph below).

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<sup>10</sup> This is based on the replies to Q14 of the survey, which are more or less in line with the results of Q5 (shown in Figure 5). However, based on the replies to Q15 of the survey, 61% of the 209 participating insurance undertakings were already using AI. The results from Q14 are considered more complete and hence they are highlighted in the report.

<sup>11</sup> [https://register.eiopa.europa.eu/Publications/EIOPA\\_BigDataAnalytics\\_ThematicReview\\_April2019.pdf](https://register.eiopa.europa.eu/Publications/EIOPA_BigDataAnalytics_ThematicReview_April2019.pdf)

**Figure 16 – Use of AI in the different lines of business**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

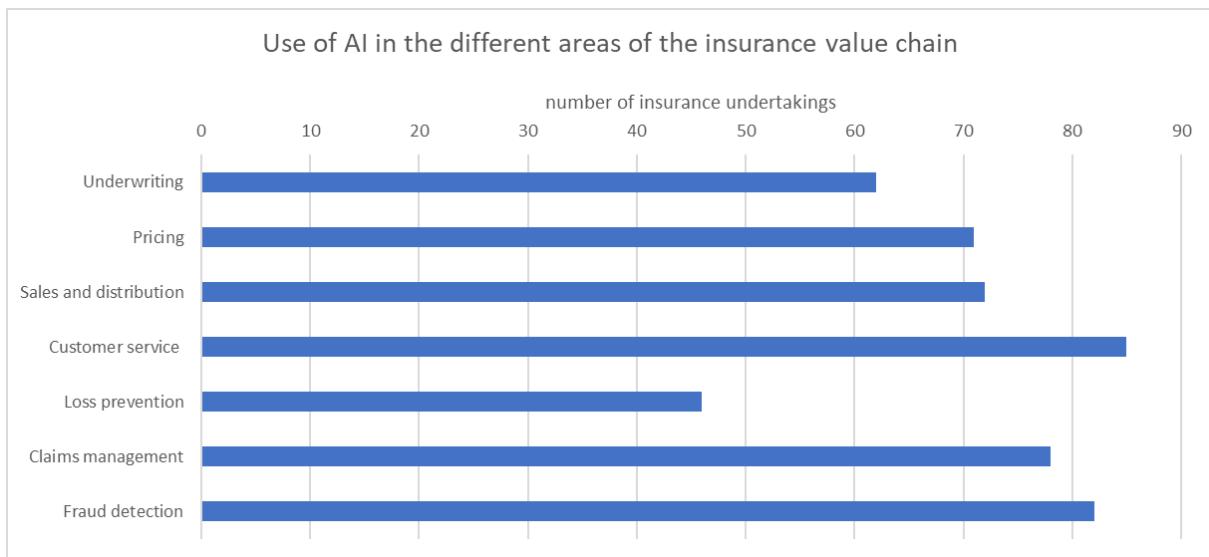
While the use of AI in life insurance reportedly has had a lower impact to date, most insurance undertakings expect this impact to significantly or moderately increase in the next 3 years. Moreover, some AI use cases may be relevant for the overall organisation and not in a particular line of business (e.g., in the area of customer service such as chatbots).<sup>12</sup>

Amongst those respondents that were planning to start using AI in the next 3 years, one of them explained that they had recently developed their CRM system which will allow them to run AI solutions based on the data stored therein. Another insurer also explained that they do not use AI solutions themselves, but it is used by their partners. Another insurer reported an ongoing proof of concept aiming to use AI systems in underwriting processes.

Irrespective of the line of business, customer service is the area of the insurance value chain where a larger number of insurance undertakings (85) are already using AI,<sup>13</sup> followed by fraud detection (82 insurers) and claims management (78 insurers).

<sup>12</sup> This could explain why some respondents replied to the question asking them whether they were using AI in non-life insurance lines of business in general, but then they did not respond to the part of the question asking them in which specific line of business they were using AI.

<sup>13</sup> As explained in footnote 10, this question of the survey asked about the current use of AI, but it is possible that some respondents have also reported expected uses.

**Figure 17 – Use of AI in the different areas of the insurance value chain**

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

It is noteworthy that a significant number of insurers are using AI in pricing (71 insurers), sales and distribution (73 insurers) and underwriting (62 insurers), while the use of AI for loss prevention services lags behind (46 insurers). Moreover, only 27 insurance undertakings were using AI throughout the complete value chain, i.e., currently the majority of insurers use AI only on selected areas and use cases.

In each area of the insurance value chain there are several types of AI use cases designed to perform different tasks; as it can be observed in the graph below, chatbots, which are typically used to help customers navigate through the undertakings' website or to answer non-sensitive questions, are the most popular AI use case (64 undertakings reported to be using it). The provision of cross-selling and up-selling recommendations is used by 51 insurance undertakings, and the same number of insurance undertakings are using AI to estimate the probability of churn of individual customers, i.e., to estimate which customers are more likely to cancel their contract or shop around at the renewal stage.

Figure 18 – Different types of AI use cases across the insurance value chain



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

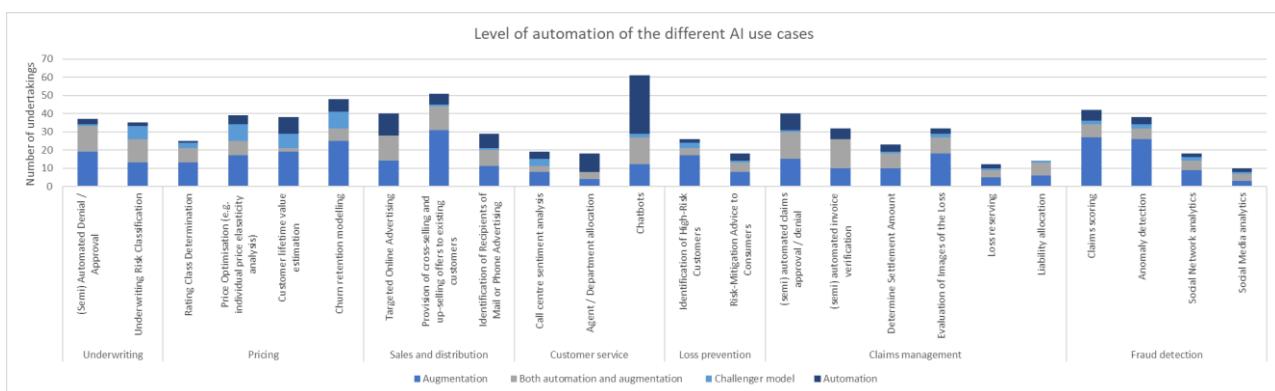
The use cases reflected in the Figure 18 are the ones that insurance undertakings were explicitly asked if they were already using them or not i.e., there are other AI use cases not captured therein. For example, one insurance undertakings explained that they use AI in the area of cyber security to detect possible cyber-attacks. Another insurer also reported the use of AI systems to assign different tasks to employees. The use of Natural Language Processing (NLP) to extract and summarise data from texts was also highlighted.

Based on the use cases mentioned in the survey, pricing and claims management are the areas of the insurance value chain with a greater number of use cases currently used by insurance undertakings, closely followed by sales and distribution and fraud detection. It is also noteworthy that some insurers are already using AI to perform risks assessments and manage underwriting risks, as well as in more niche use cases such as loss reserving or (semi) automated claims liability allocation.

Furthermore, 66% of the reported use cases were developed in-house by insurance undertakings themselves, while the remaining 34% were outsourced from third-party service providers. However, some respondents highlighted that some AI systems have a mix nature, i.e., they are developed in-house in cooperation with 3<sup>rd</sup> parties. Pricing and underwriting are the areas of the insurance value chain that count with a greater proportion of use cases developed in-house. In contrast, use cases such as chatbots or the ones related to marketing and advertising are predominantly outsourced from third parties.

From a different perspective, insurance undertakings largely adopt AI with a certain level of human oversight, i.e., AI is used for augmentation purposes, where an AI system suggests the answer to a human who makes the final decision. For example, an AI system would suggest to an insurance agent to cross-sell or up-sell to customers different products or services, but the final decision lies with the insurance agent. The level of automation may indeed depend on factors such as the distribution channel.

**Figure 19 – Level of automation of different AI use cases**

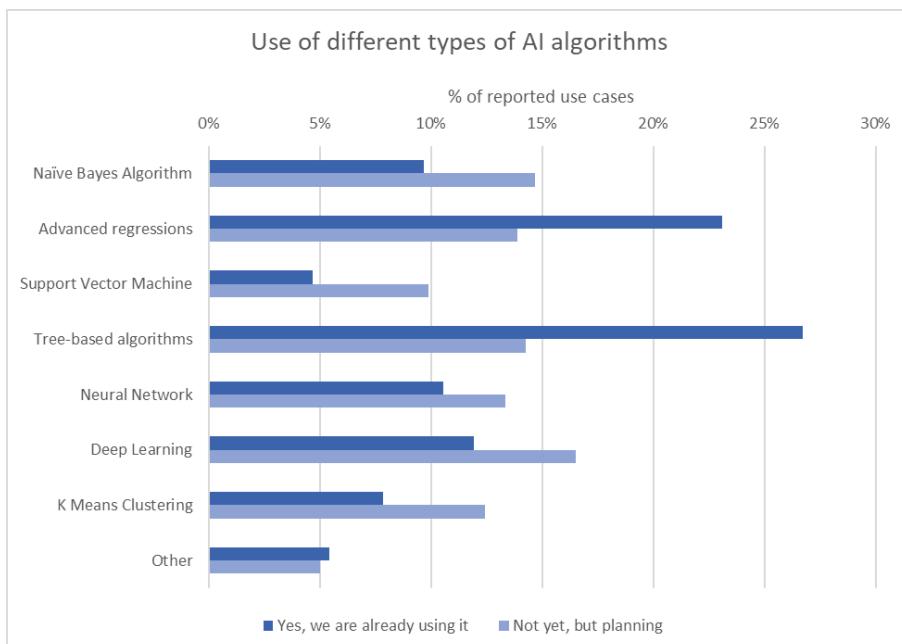


Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Certain use cases such as chatbots, online advertising or the denial and approval of claims show relatively high levels of automation. It is also noticeable that several insurance undertakings use AI systems as “challenger models” (similar to A/B testing) in the pricing and underwriting areas of the insurance value chain, where the AI system is used for the purpose of future selection / engineering or for benchmarking purposes.

The latter would suggest a cautious approach by insurance undertakings when adopting AI systems within their organisations. This is also reflected by the types of AI algorithms that insurance undertakings are currently using; to date insurance undertakings have predominantly opted for more simple and explainable AI algorithms such as advanced regressions or tree-based algorithms, as it can be observed in the graph below.

**Figure 20 – Types of AI algorithms**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

It is often mentioned that there is a trade-off between explainability of the AI system on the one side, and accuracy / complexity of AI systems on the other side. Possibly because of this reason, in the coming years insurance undertakings expect to progressively move from more explainable AI systems such as advanced regressions or tree-based algorithms, to more complex (and less explainable) ones such as neural networks and deep learning, once they have acquired a greater level of expertise with the use of simpler AI systems and built appropriate governance and risk management frameworks around them.

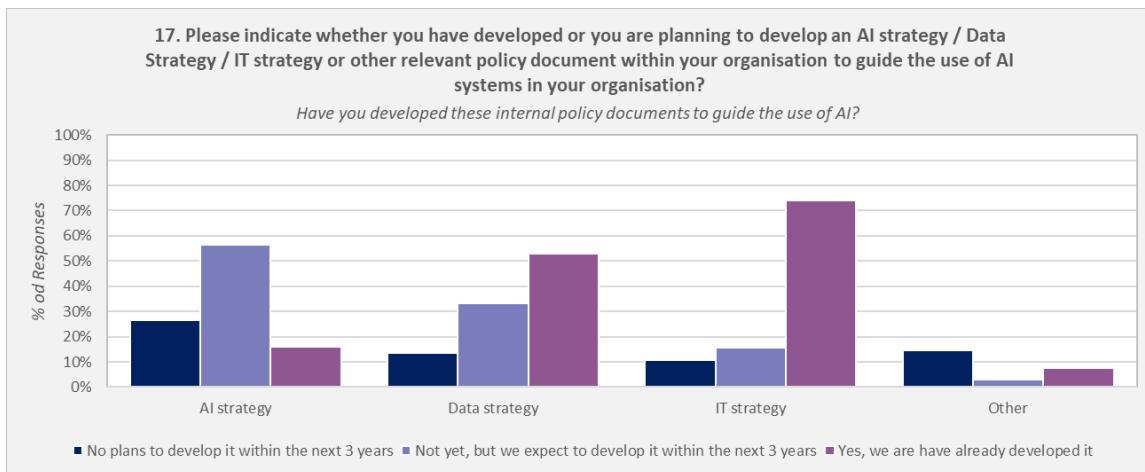
### 3.1.2 AI GOVERNANCE

The insurance industry has extensive experience in the design, calibration, and validation of mathematical models. While the level of automation, opacity, non-linearity and dimensionality of AI systems bring out new challenges, insurance undertakings can leverage their model governance and risk-management experience to ensure the trustworthiness and security of AI system, for

instance by including similar extensions to the model risk management approach already in place for critical models.

Based on the input gathered by EIOPA, and noting that not all of the undertakings are using AI yet, most of them rely on their existing data and IT strategies to guide the use of AI within their organisation. A small proportion of them (16% of respondents) have developed a dedicated AI strategy to address the specific opportunities and challenges of this technology. However, an additional 56% of the respondents expect to develop such AI strategy within the next three years, in line with their expected increase in the adoption of AI.

**Figure 21 – AI Strategy/Data Strategy/IT Strategy development trends.**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

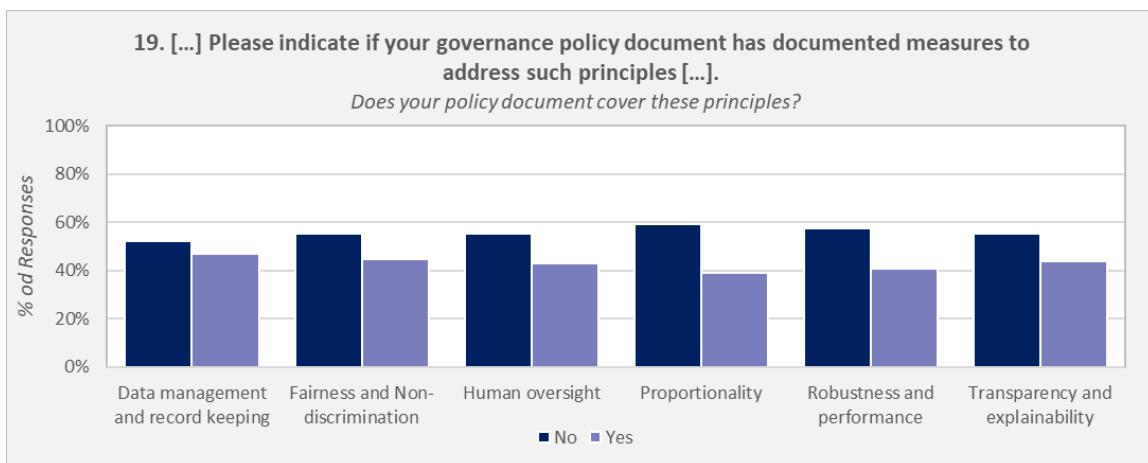
In addition to the Strategies mentioned above, one insurer explained that when they conduct mandatory Data Protection Impact Assessments they also describe and document the use of AI systems. Another insurer mentioned that they are relying on external consultants to develop their AI strategy, while others use the AI strategy developed at group level. Another insurer said that they have in place the three strategies mentioned in the graph above, each of them serving a specific purpose. Some insurers also reported the development of a specific ethics strategy.

Moreover, the Solvency II Directive requires undertakings to consider in their system of governance, risk-management system and own risk and solvency assessment (ORSA) all risks they face in the short and long term and to which they are or could be exposed. Insurance undertakings acknowledge that the increasing adoption of AI and automation of business processes could potentially have an impact on the operational risks of the undertakings. While some insurance undertakings have already included AI-related risks within their assessment, most of them do not have yet a specific section about AI in their ORSA reports, although they were open to include such

section should the materiality of the risks arise. They also explained that AI-related issues are sometimes covered in a broader section about digitalisation in their ORSA reports.

Several AI policy initiatives at international and European level, including the Artificial Intelligence Act, often have in common a number of high-level governance and risk-management principles such as fairness, explainability, human oversight, accountability, record keeping and robustness and performance. When questioned about the adoption of such principles within their organisations, several undertakings reported that they had already implemented similar governance and risk management principles, whilst a majority of them still have not adopted them.

**Figure 22 – AI governance principles**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Some insurance undertakings explained that they are not following these principles because they were still not using AI. Others explained that they were in the process of developing a policy framework in anticipation of the entry into force of the AI Act. Some described specific processes to address each of these principles, such the use of SHAP, LIME or A-B testing methods<sup>14</sup> to be able to better explain the outcomes of AI systems. Others use risks assessment questionnaires / checklists to assess the risks of AI systems and implement proportionate governance and risk management measures, having in place comprehensive documentation and record-keeping

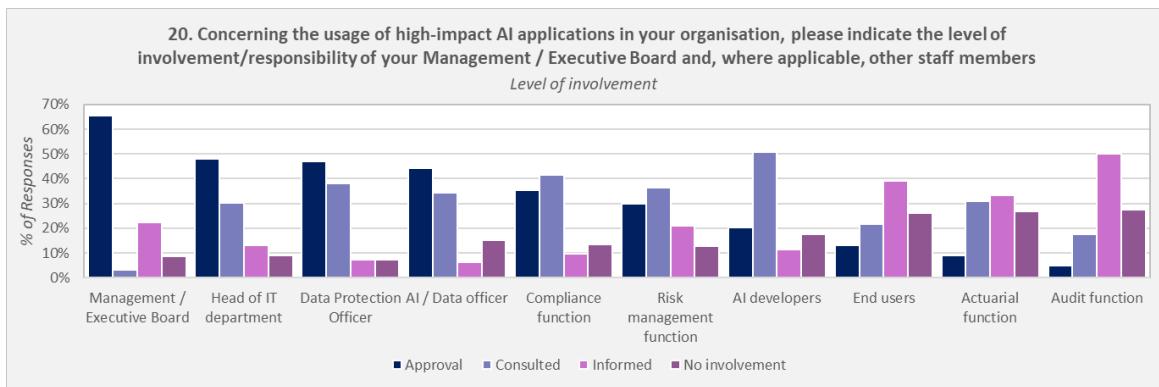
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<sup>14</sup> LIME (Local Interpretable Model-agnostic Explanations) and SHAP (SHapley Additive exPlanations) are two explainability techniques that aim to provide local explanations, i.e., an explanation about the behavior of specific data points or regions in the input data (i.e. how they influence the output of the AI system). While they both have the advantage that they can capture multi-factor interactions in the dataset, they also have certain limitations. For example, SHAP's method of sampling values assumes feature independence, which might not necessarily be the case and therefore affects the reliability of the explanation. Moreover, in LIME users can (subjectively) choose how to define the proximity measure for the "local" region of the model where the explanation applies; minor changes in the scale of the proximity measure can lead to significantly different explanations. A/B testing is a statistical way of comparing and/or choosing from two options, A and B, for instance by splitting the training dataset of comparing the results, or by comparing the outcomes of a ML algorithm with another ML algorithm or other mathematical models traditionally used in insurance.

processes, also in line with the data protection impact assessment required by General Data Protection Regulation (GDPR).

Finally, the staff involved in the development and implementation of high-impact AI use cases varied widely depending on the organisational structure and business model of the undertaking concerned. Most respondents highlighted a heavy involvement of the management and the executive Board in the final approval of high-impact AI use-cases. This seems relevant in terms of accountability, for example in case an AI algorithm produces inaccurate predictions used for decision making.

**Figure 23 – Management involvement on high-impact AI use cases**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

### 3.2 BLOCKCHAIN AND CRYPTO ASSETS

Distributed Ledger Technology (DLT) / Blockchain, with its decentralized and transparent ledger system of transactions, is the cornerstone of innovations such as for crypto assets and is key for the (nascent) development of the Metaverse and the evolution towards Web 3.0. Blockchain can potentially have several applications in the insurance sector. However, based on the input collected by EIOPA, this technology still shows a limited development across the European insurance sector; only 15% of the 209 participating insurance undertakings reported at least one Blockchain use case, and approximately half of the reported use cases were still at a proof-of-concept stage.

Most undertakings reported a high reliance on outsourcing (close to 80% of the reported use cases) to develop the different types of Blockchain-based use cases, with a very limited set of initiatives being developed in-house. Some undertakings referred to their participation in sector-wide initiatives or collaborative consortiums with other entities from the financial sector and elsewhere.

**Figure 24 – Examples of reported existing and envisaged Blockchain use cases in insurance**

Area of application	Type of use case
Insurance products	Household insurance linked to mortgages Blockchain with watch insurance Travel insurance Flight delays Parametric Products Blockchain-based PPU (Pay-per-use) Transport reinsurance Peer-to-peer (P2P) insurance
Insurance processes	International claims settlements Tracking claim-free years Advertising Fraud Control
Metaverse / Web 3.0 / NFT	Branding in the Metaverse Self-Sovereign Identities Digital coin (e-money token)

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Amongst the different types of use cases reported, it can be highlighted the collaboration in one country between banking institutions and insurance undertakings to enable access to a DLT database about home insurance linked to mortgages. Insurance undertakings also reported other insurance offerings linked to Blockchain, often related to transport-related parametric insurance products (see next section). Moreover, 3 insurance undertaking reported to be offering P2P insurance products using Blockchain technology, two of them as insurance carriers and one of them as an insurance intermediary.

Blockchain can also be used to streamline certain insurance processes, for instance regarding international claims settlements a sector-wide initiative launched in one country to track non-claims / bonus malus records of individual customers is notable.

Finally, some insurance undertakings reported experimenting with some initiatives in the Metaverse (mostly for branding purposes), and others were exploring the use of Blockchain for the development of digital / self-sovereign identities. Some insurance undertaking also reported proof of concepts with Non-Fungible Tokens (NFTs), including NFT reward offerings to build customer loyalty.

The survey also questioned insurance undertakings about specific use cases related to crypto assets; as it can be observed in the table below, their current and expected use is very low or virtually non-existent amongst most insurance undertakings.

**Figure 25 – Approach towards crypto assets**

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Notwithstanding potential (silent) coverages that could exist in other insurance contracts such as household insurance, only 6 insurance undertakings reported to be offering or planning to offer insurance products covering the lost or theft of crypto assets. In addition, 2 insurance undertakings were also offering or planning to launch a dedicated liability insurance product targeting crypto assets service providers; according to the recently approved Markets in Crypto Assets Regulation (MICA), crypto assets service providers can take liability insurance coverage as an alternative to meeting the capital requirements established therein.

None of the participating insurance undertakings offer their customers the possibility to pay insurance premiums or receive compensations for claims with crypto assets, although 3 undertakings were considering offering such options in the near future. In the same line, and noting that not all of the participating insurers were active in life insurance, none of the respondents offered their customers the possibility to invest directly or indirectly in crypto assets (e.g. as underlying assets of unit-linked life insurance products, where the risk is born entirely or partially by the retail customer), although 9 insurance undertakings were actively considering to offer such investment option to their customers within the next 3 years.

### 3.3 INTERNET OF THINGS

The Internet of Things (IoT) refers to a network of interconnected physical devices, vehicles, appliances, and other objects embedded with sensors, software, and network connectivity, enabling them to collect and exchange data in real-time. In insurance, this technology has many relevant applications, both with corporate and retail customers. Regarding the former, IoT is used in various industries for real-time monitoring and predictive maintenance of manufacturing

equipment and processes, providing indeed very relevant information for risk assessments and underwriting.

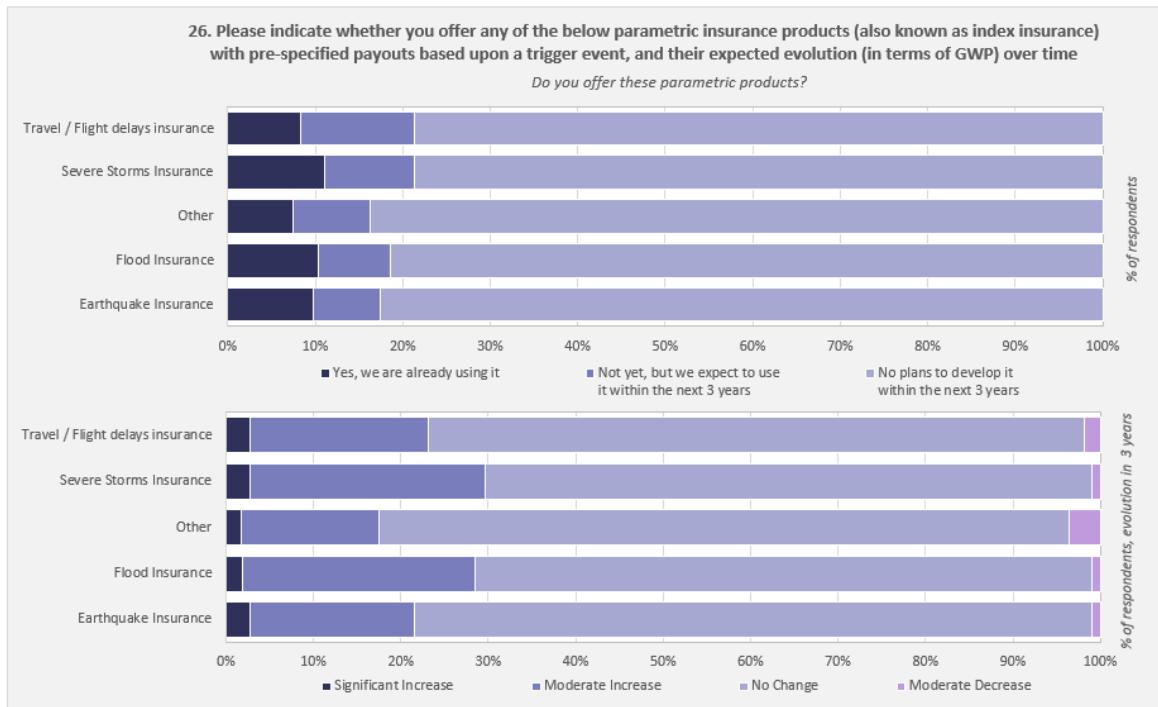
Amongst retail lines of business, the use of IoT in usage-based or telematics-based motor, home, or health insurance products can be highlighted. EIOPA's survey specifically collected input from insurance undertakings on these types of telematics-based insurance products. The result of the survey shows that 17% of the 209 participating insurance undertakings already offer a motor insurance product linked to IoT. These percentages are smaller for the other two lines of business considered, household insurance (10%) and health insurance (7%).

The penetration of insurance products linked to IoT devices is expected to increase; approximately two times more insurance undertakings expect to add such products to their portfolio in 3 years' time. Moreover, the respondents also explained that on average the like-for-like difference in price when using telematics vs not using telematics for the same insurance product is in most cases between 1 and 10%.

Some insurance undertakings explained that the data collected from their customers via sensors / telematics devices is not used for pricing purposes; they focus on the provision of risk-mitigation services, such as giving recommendations to their customers about how to improve their driving skills or how adopt healthier lifestyles, including by designing tailored health programmes for them.

When it comes to parametric insurance products with pre-specified pay-outs based upon a trigger event (also known as index insurance), sometime combining both IoT and DLT technology, the input gathered through the survey showed a low penetration of such products in the European insurance market; circa 10% of the respondents reported to be offering parametric insurance products.

**Figure 26 – Offering of parametric insurance products**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Some of the respondents explained that they have in their portfolio insurance products offering similar coverages, but the pay-outs are not automated and therefore are not purely parametric products. For example, flood, severe storm, and earthquake-related risks are typically covered by natural catastrophe insurance.

Other insurance undertakings explained that they use telematics / sensor data to assess losses, helping speed up the claims management process, but the pay outs were still not fully automated. Another undertaking reported having tried to develop a parametric insurance product for the agricultural sector, but due to the inconclusive model results, they decided not to include parametric features in the product offering.

### 3.4 CYBER INSURANCE

Cyber risks are one the main risks arising from digitalisation, as acknowledged by insurance undertakings (see section 4.2). However, for the insurance sector cyber risks also presents a business opportunity with the commercialisation of cyber insurance products, both as standalone products and bundled / cross-sold with other traditional insurance products.

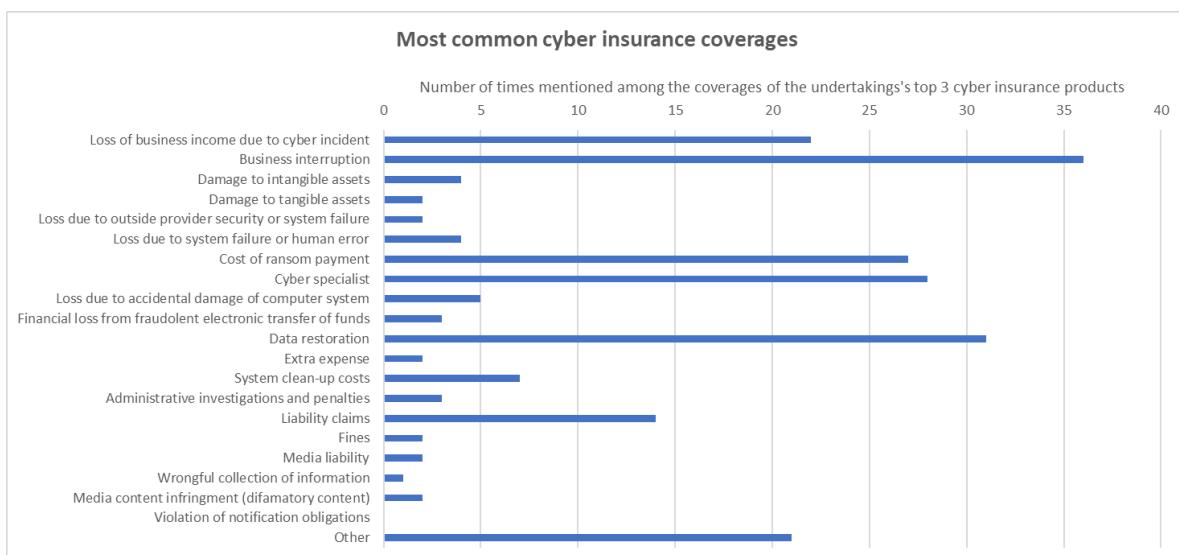
The cyber insurance market has experienced a significant growth in terms of Gross Written Premiums (GWP) over the past two years according to most respondents, although they acknowledge differences between countries and some undertakings only report a moderate increase. The increase in GWP has reportedly been driven both by an increase in the demand of cyber security protection as well as due to increases in rates.

Overall, respondents highlight the importance of relying on longer time series for the purpose of assessing the risk appetite and the possibility to further develop the sales related to cyber insurance coverages. Many respondents report a link between the development and growth of the overall portfolio and of cyber insurance products; 38% of respondents stated that they offer cyber add-ons to other insurance policies or the terms and conditions of such policies implicitly cover cyber incidents.

While some undertakings (29% of respondents) reported an increase in cyber claims in the last two years, in particular resulting from ransomware attacks, most respondents (71%) have not experienced such increase. It was also mentioned that the increase in claims could be linked to its organic growth (in terms of GWP), and therefore it was difficult to draw conclusions and trends. Furthermore, it was also highlighted that the frequency and severity of claims varies across the EU and across entity types (SMEs versus larger clients).

When analysing the risks covered by the undertakings' top 3 cyber insurance policies, business interruption losses, data restoration costs, cyber insurance specialists and of ransom payments are the most common coverages reported, as it can be observed in the graph below.

**Figure 27 – Risks covered in cyber insurance policies**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

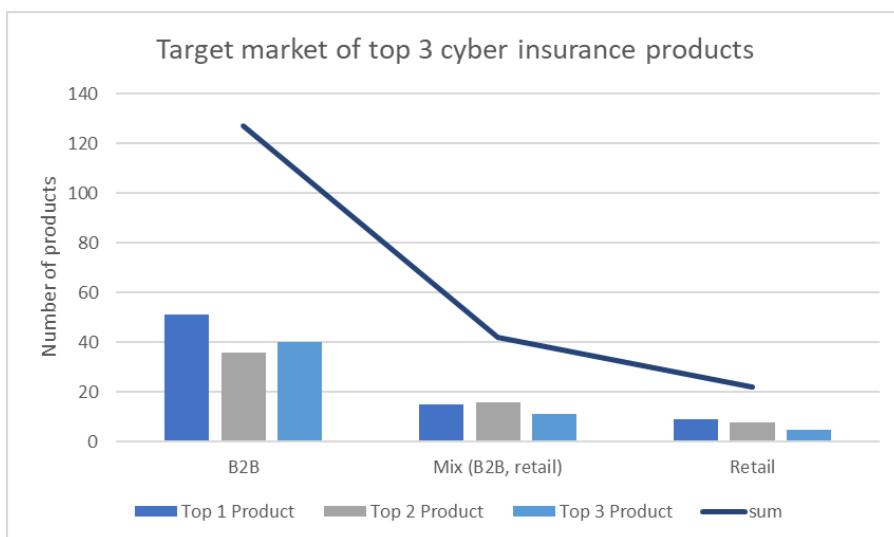
Relevant limitations in the coverage offered can also be identified from the graph above, namely concerning damages to tangible or intangible assets resulting from a cyber-attack, possibly due to the lack of data to underwrite such risks. Other commonly reported exclusions present in cyber insurance contracts include terrorism, war (including cyber war), ransom payments, crypto asset exposures or lack of compliance with minimal security measures (e.g., lack of antivirus protection).

Moreover, some undertakings report having pro-actively removed “silent-cyber insurance coverages” from other general liability/business interruption policies i.e., those ones that do not specifically target cyber-attacks. This is namely done by the addition of exclusion clauses in the insurance contracts, or by therein specifying what types of cyber risks are covered (also referred to as “affirmative cover”).

Insurers explained that the pricing of cyber insurance products is typically done combining qualitative and quantitative analysis. Regarding the qualitative tools, undertakings typically ask their customers to complete a questionnaire that aims to assess their level of cyber resilience. Concerning the quantitative tools, rating tools mentioned included revenue-based calculations and an assessment of the personal data exposures and company turnover. Other factors such as past claims, inflation, coverages, or market conditions were also mentioned. In this context, the role of reinsurers as providers of data and studies, but also in managing providers for quantitative pricing platforms emerges clearly.

Finally, the target market of cyber insurance products are predominantly corporate clients (i.e., business to business (B2B)), including SMEs. Only a minority of them are sold to retail customers, as it can be observed in the graph below.

**Figure 28 – Target market of cyber insurance policies**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Specifically concerning SMEs', in 2022 EIOPA's Eurobarometer survey collected information about their access to insurance products and services; in this regard, most SMEs (over 60%) reported having commercial motor and commercial general liability insurance and over 50% of them having liability and professional indemnity products. On the other hand, only 17% of the participating SMEs reported having cyber and data security insurance coverage.<sup>15</sup>

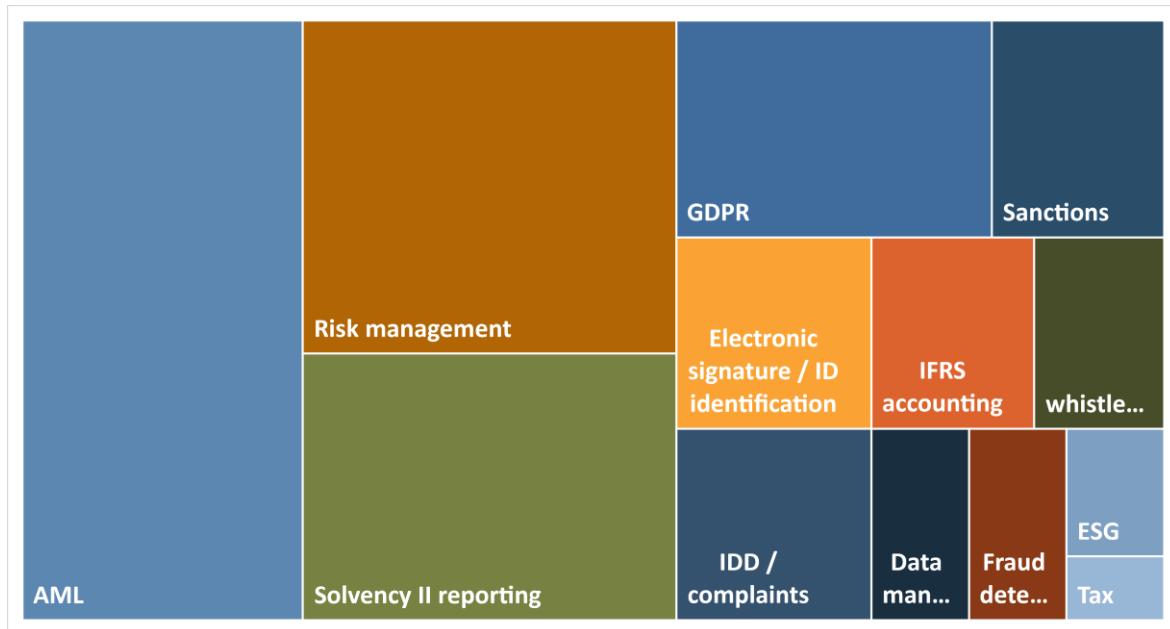
### **3.5 REGTECH, APPLICATION PROGRAMMING INTERFACES AND SUSTAINABLE FINANCE**

Regulatory Technology (RegTech) is defined as technology enabled applications for regulatory, compliance and reporting requirements implemented by a regulated institution. The participating insurance undertakings reported a total of 162 RegTech use cases across different areas, 59% of which were outsourced from a third-party service provider, and the remaining 41% developed in-house.

As it can be observed in the graph below, RegTech is predominantly applied for Anti-Money Laundering / Know your customer purposes, followed by risk management and prudential reporting tools.

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<sup>15</sup> See page 13 of EIOPA's 2022 Consumer Trends report: [Consumer Trends Report 2022 \(europa.eu\)](https://www.eiopa.europa.eu/-/consumer-trends-report-2022_en)

Figure 29 – Areas where RegTech tools are being applied<sup>16</sup>

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Undertakings use different technologies for different RegTech use cases. For example, one insurer explained that for life and non-life lines of business they use different actuary risk management tools. Another respondent reported the use electronic signature and video call systems to identify the contracting customer, in compliance with AML legislation.

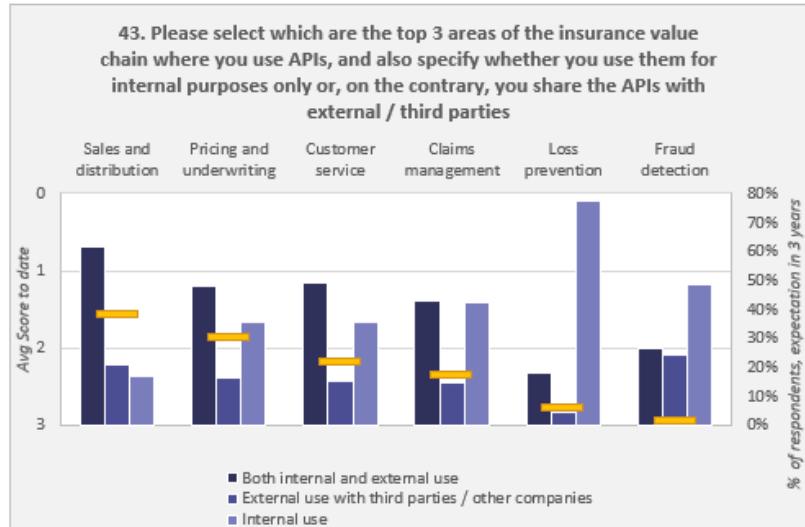
Other reported RegTech use cases include the use of IT systems to compile and validate information which is then submitted to public authorities for regulatory reporting compliance purposes. It was also reported the creation of a fraud database with an online portal where insurers share intelligence about fraudulent practices in the market.

With respect to the use of Application Programming Interfaces (APIs), these tend to be used in sales and distribution (it was most often mentioned as the top 1 area of the value chain where APIs were being used), immediately followed by pricing and underwriting and customer service activities. The use of APIs for loss prevention and fraud detection is less common.

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<sup>16</sup> EIOPA has clustered all the reported use cases into the categories shown in the graph. Those use cases for which a clear categorisation was not possible based on the information provided, they were included in the category "other", which is not shown in the graph above to improve its visibility.

Figure 30 – Use of APIs across the insurance value chain – Top 3 areas

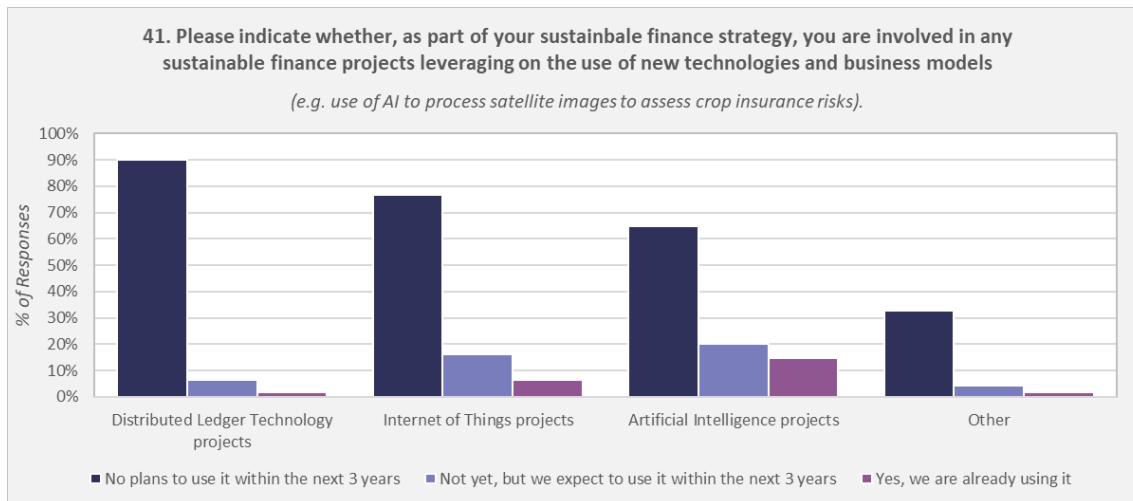


Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

The sales and distribution area of the insurance value chain is where the proportion of APIs exclusively used for internal purposes is the lowest. Indeed, insurance undertakings commonly use APIs to “connect” with third party insurance distributors (e.g., comparison websites). In contrast, the use of APIs in fraud detection is mainly for internal purposes only.

Insurance undertakings can also leverage on new technologies and business models to pursue sustainable finance objectives; in this regard, the integration of AI and IoT projects, although limited in scope according to the responses received (20% of the respondents flagged AI projects and around 15% of respondents mentioned Internet of Things projects), are currently being used within the implementation of the sustainable finance strategy. No change for this outlook emerges on a 3-year horizon.

**Figure 31 – Use of innovative technologies as part of the sustainable finance strategy**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Some insurance undertakings explained that they use AI systems to develop environmental, social and governance (ESG) ratings for companies which do not have an ESG rating from a rating agency. AI is also used by some undertakings to enhance their Natural Catastrophe modelling capabilities. Undertakings also mentioned the use of AI systems to automate and increase the efficiency of underwriting and claims management processes, which have positive social implications from a financial and customer experience perspective. It was also reported the use of AI systems, and more particularly Natural Language Processing (NLP), to extract information from past claims reports to build a climate database which can then be used for home insurance underwriting.

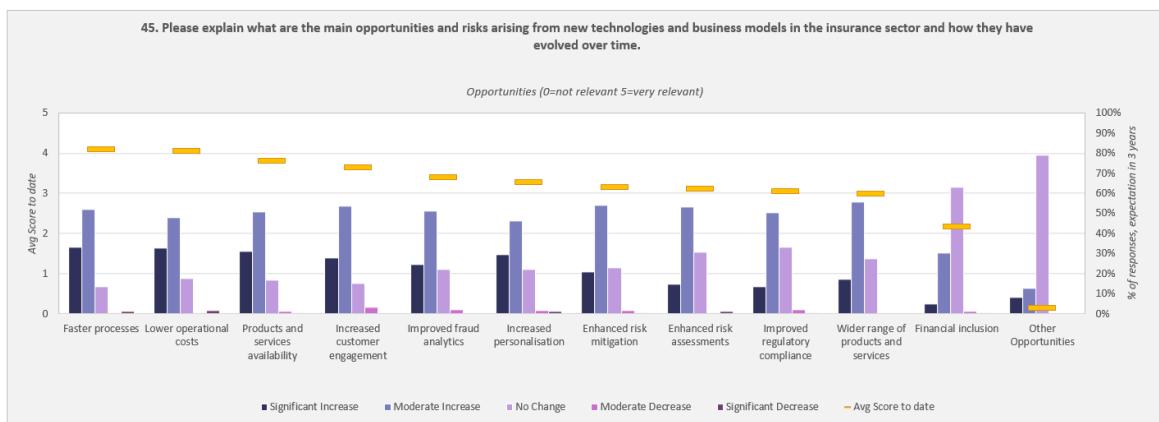
Concerning DLT and IoT, undertakings referred to the use of these technologies in the context of parametric insurance products related to natural catastrophes (see section 3.3 above). Other reported IoT projects focused on the social aspects of sustainable finance, such as telematics-based motor and health insurance products promoting safer and healthier habits. It was also reported the use of sensors to prevent barn fires. The usefulness of IoT data to monitor environmental aspects such as energy consumption, resource utilisations, waste management etc. was also highlighted.

## 4. OPPORTUNITIES, RISKS AND BARRIERS TO DIGITALISATION

### 4.1. OPPORTUNITIES BROUGHT BY DIGITALISATION

Digitalisation brings multiple opportunities both for customers and insurance undertakings. From the perspective of insurance undertakings, faster and more efficient / automated processes, lower operational costs and more convenient products and services for customers (e.g., products available on a 24-hour basis and accessible from any location) are seen as the greatest benefits.

**Figure 32 – Opportunities brought by digitalisation**

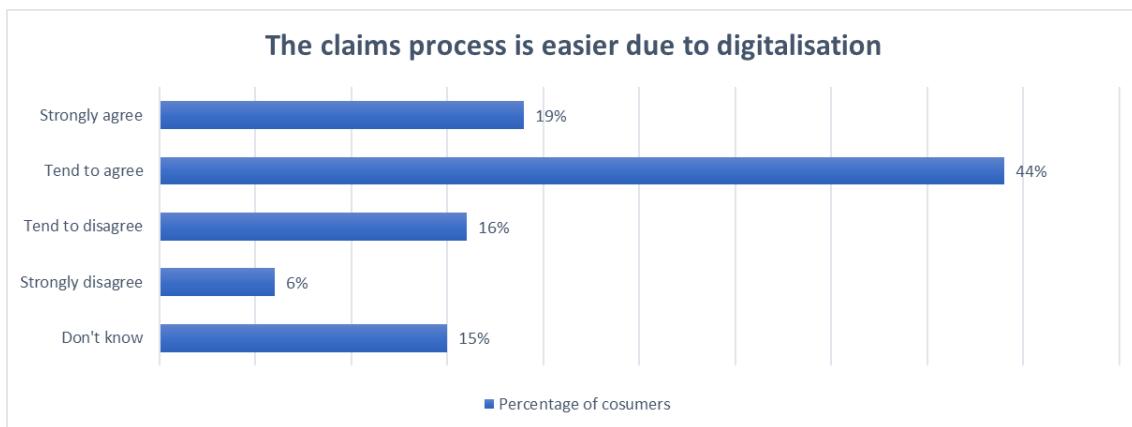


Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

European insurance undertakings do not consider greater financial inclusion as one of the most prominent benefits arising from digitalisation. Moreover, the majority of European insurance undertakings expect all of the opportunities mentioned above to increase in the future i.e., none of them are expected to decrease in the next 3 years, with the exception of financial inclusion, for which the majority of the responding undertakings expect a moderate decrease.

Indeed, digitalisation enables providers to automatize their interaction with clients, including at the claims stage, facilitating the accessibility for customers, and speeding the overall claims management processes. This seems to be also well perceived by customers, as shown in the figure below reflecting the results of the Eurobarometer survey.

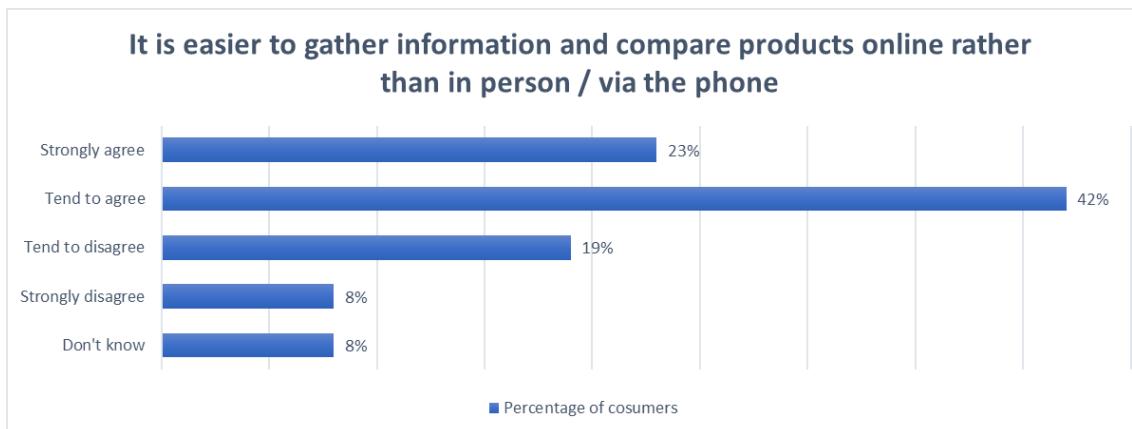
**Figure 33 - Based on your experience with purchasing insurance, to what extent do you agree or disagree with the following statements?**



Source: EIOPA's Eurobarometer Survey, July 2023

Moreover, customers perceive online services as a helpful and convenient way for finding information about insurance products and for comparison purposes. As seen in section 2.2 of the report, comparison websites are particularly relevant in certain non-life insurance lines of business such as motor insurance.

**Figure 34 - Based on your experience with purchasing insurance, to what extent do you agree or disagree with the following statements?**

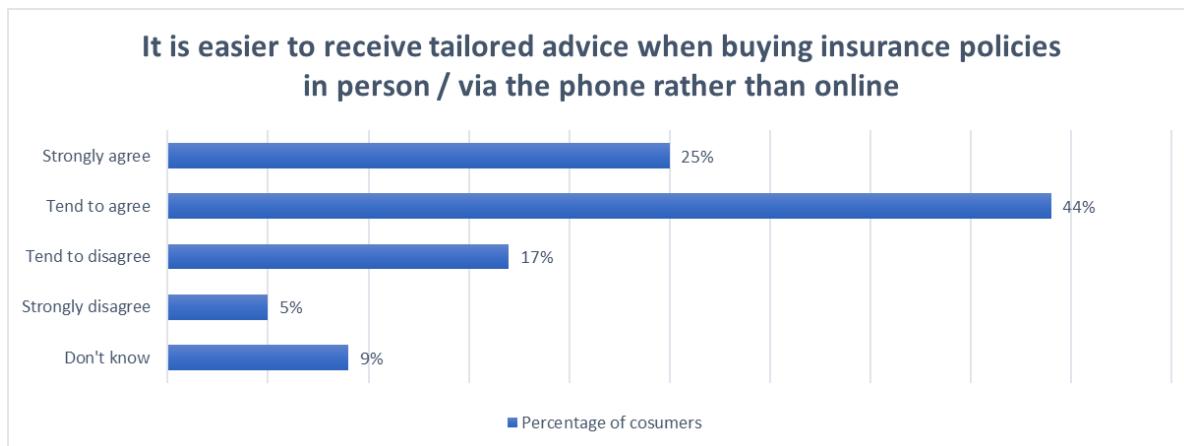


Source: EIOPA's Eurobarometer Survey, July 2023

In contrast, customers find it easier to receive tailored advice in direct interactions (face to face or by phone) with their insurance providers, and this in turn may influence their choice of distribution channel when buying more sophisticated products, such as IBIPs or household insurance with various options. With the advent of new technologies and business models such as chatbots

powered by generative AI, the perception of receiving advice online could potentially change in the future.

**Figure 35 - Based on your experience with purchasing insurance, to what extent do you agree or disagree with the following statements?**



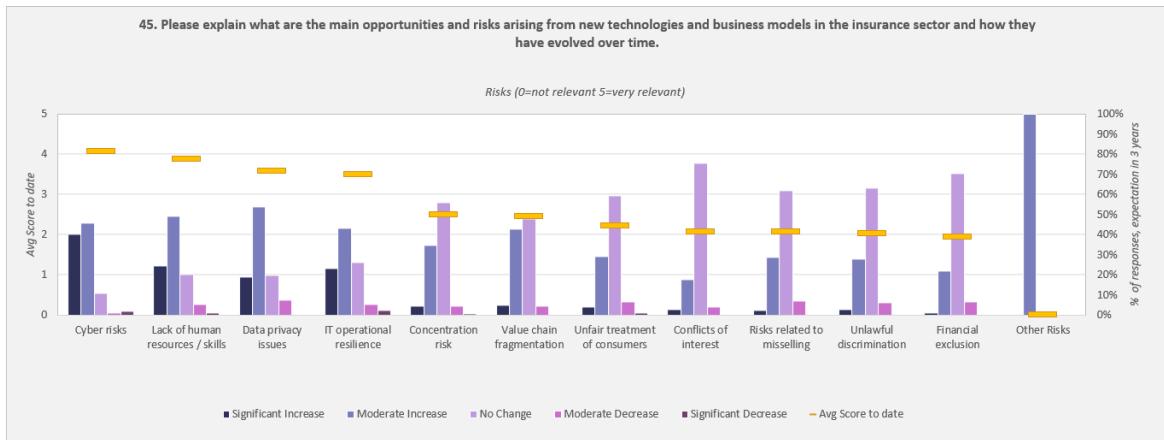
Source: EIOPA's Eurobarometer Survey, July 2023

## 4.2. RISKS AND CHALLENGES BROUGHT BY DIGITALISATION

As shown in the previous section, there are several benefits arising from digitalisation. However, insurance undertakings also need to consider the risks arising from new technologies and business models. Several of these risks are not new, but they can be enhanced by digitalisation.

Cyber risks, lack of adequate skills and issues related to data privacy issues and IT operational resilience are listed by respondents as the top risks brought by digitalisation, as shown in the graph below.

**Figure 36 – Risks brought by digitalisation**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Risks such as financial exclusion, unfair treatment of customers or potential biases are deemed less relevant by the industry, although they could to a certain extent be captured under the category of "data privacy issues". Similarly, the categories of cyber-risks and IT operational resilience are closely related.

Moreover, when questioned about the potential evolution of these risks in the next 3 years, while cyber risks and data privacy issues continue to be the risks that concern insurance undertakings the most, unlawful discrimination or unfair treatment of customers are expected to experience a moderate increase because of digitalisation. Indeed, recent reports in the UK,<sup>17</sup> US,<sup>18 19</sup> or Italy<sup>20</sup> raise the awareness of the risks of financial exclusion of vulnerable customers.

Linked to the topic of unfair treatment of customers are certain selling practices that exploit behavioural insights and customers' cognitive biases, often called "dark patterns", and which are reportedly increasingly present on digital contexts. The exploitation of cognitive biases can also take place in physical settings, but they are more and more used in website interfaces and mobile phone applications.

This is confirmed by the results of the Eurobarometer; European customers have observed dark patterns more often in a digital/online context. Dark patterns can mislead and deceive customers,

<sup>17</sup> [Discriminatory Pricing \(citizensadvice.org.uk\)](https://www.citizensadvice.org.uk)

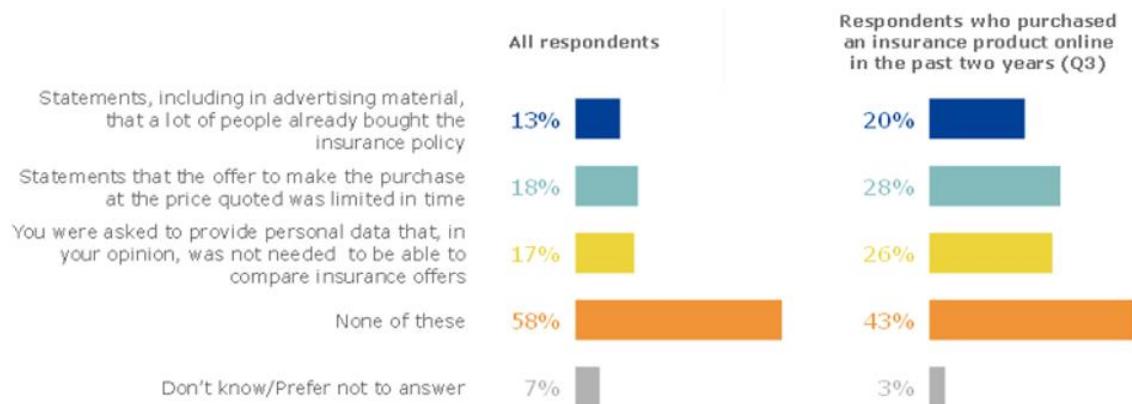
<sup>18</sup> [Insurance-Based Credit Scores: Impact on Minority Populations in Missouri \(mo.gov\)](https://www.mo.gov)

<sup>19</sup> [Report: The Thousand Dollar Insurance Penalty: How Insurance Companies' Credit Scoring and ZIP Code Rating Push Up Premiums for Safe Drivers in New York · Consumer Federation of America](https://www.consumerfed.org)

<sup>20</sup> [Algorithmic Audit of Italian Car Insurance: Evidence of Unfairness in Access and Pricing](https://www.consumerfed.org)

for instance, by persuading them to give up personal data or inducing them to purchase insurance products without carefully verifying important terms and conditions, coverage, exclusions etc, for instance by establishing time limits for premium discount offers.

**Figure 37 – Examples of dark patterns in insurance**

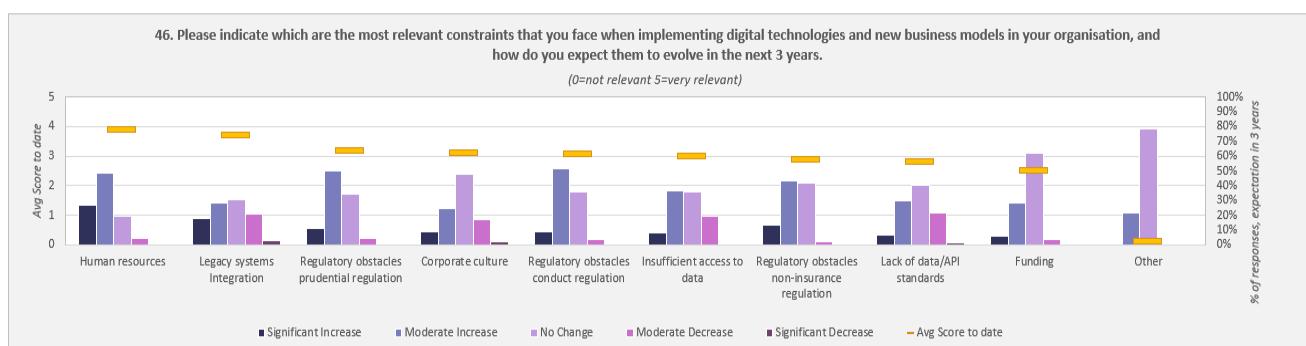


Source: EIOPA's Eurobarometer Survey, July 2023

### 4.3. BARRIERS TO DIGITALISATION

Insurance undertakings were also asked to identify any barriers / constraints faced when implementing digital technologies and new business models in their organisation. The results are shown in the figure below and are broadly in line with the main enablers of digital transformation analysed in section 2.1 above.

**Figure 38 – Barriers to digitalisation**



Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

Issues related to acquiring adequate talents and skills and tackling the structural organisational changes related to the transition from old systems to new platforms represent the most relevant constraints, while funding is rated as the least impacting among respondents.

Insufficient access to relevant datasets or lack of data / API standards are also considered relevant barriers to digitalisation. In this sense, some undertakings welcomed the EU's initiatives such as the Data Act or the Data Governance Act, which are said to facilitate access to relevant datasets for the insurance sector. However, they also expressed their concerns with limitations like the ones included in the proposed Regulation on European Health Data Spaces, which would deny the secondary use of health data by insurers.

Depending on their business model or the line of business where they are active, some insurance undertakings specifically mentioned certain private and public datasets that they would particularly welcome greater access to, ideally via standardised APIs, to be able to develop further data-driven innovations. The reported datasets are summarised in the table below.

**Figure 39 – Examples of datasets which undertakings would welcome greater accessibility**

Line of business	Type of datasets
Motor insurance / transport	Car manufacturers' vehicle IoT / sensor data Vehicle registration databases Sea vessel registries Air vessel registries
Household insurance	Real estate registry Geolocation of fire stations Meteorological data
Health & life insurance	Life expectancy by zip code Public health system databases Health service provider data
Cyber insurance	Cyber incidents data
Other / several lines of business	ESG reports from SMEs Claims history databases Population registers

Source: EIOPA's Digitalisation Market Monitoring survey, June 2023

As far as the regulatory obstacles to digitalisation are concerned, the participating insurance undertakings considered insurance prudential regulation as a significant barrier. However, no concrete examples of provisions in the Solvency II Directive were provided, other than the limitation

to the scope of the activities of insurance undertakings foreseen in Article 18 of the Solvency II Directive. Insurance undertakings also made general references to what they viewed as excessively burdensome reporting and documentation requirements, especially for small insurance undertakings with limited resources.

Insurance undertakings did provide more concrete examples concerning insurance conduct of business legislation, such as the paper-based requirements in Article 23 of the Insurance Distribution Directive (IDD). It was noted that digital platforms would normally fall under the IDD as insurance distributors; according to some undertakings, a clearer differentiation could be made between platforms which take on intermediary tasks and platforms which purely provide tools to facilitate the relationship between insurers and customers / prospective customers. Some insurance undertakings also referred to excessively rigid regulations with regards to the duration of non-life insurance contracts (typically one year), where more flexibility might better reflect new trends in the market.

The greater number of examples of regulatory obstacles were provided in relation to the General Data Protection Regulation (GDPR). Some consider that the GDPR is not sufficiently flexible to address new technologies such as AI or quantum computing, which can infer personal information by combining anonymised datasets. Undertakings also referred to the limitation of data transfers to third countries since the Scherms II ruling. Barriers to information flows between undertakings in the same insurance group were also reported. Furthermore, the requirement to always gather customer consent for the processing of personal data was seen as burdensome by some. Some also mentioned possible inconsistencies between the GDPR and the AML or tax legislation (e.g., in relation to the tax ID).

A few references were made to limitations on the use of cloud computing technology in some jurisdictions, as well as new requirements that will be established under the Digital Operational Resilience Act (DORA). In this sense one insurer advocated for the further development of standard contractual clauses for cloud use (SCCs) to limit the compliance burden. One insurance undertaking also stated that they would welcome further guidance on the prudential treatment of crypto assets.

Specifically concerning AI, on the one hand some insurance undertakings feared that the upcoming AI Act could hinder the adoption of AI by the industry. On the other hand, others considered that the existing governance and risk management requirements are too high level leading to their inconsistent application as well as to level-playing field issues. In this sense, some insurance undertakings considered that there was not sufficient guidance about the use of this technology, and they would welcome additional guidance to clarify the supervisors' expectations with regards to the use of this technology.



## 5. CONCLUSION AND NEXT STEPS

In order to leverage on the opportunities arising from digitalisation, most insurance undertakings have developed a digital transformation strategy, setting medium and long term objectives, allocating resources and investments, and more generally guiding the organisation throughout their digital transformation process. In doing so, insurance undertakings seek to improve their customer's user experience as well as to generate value for the company and improve its operational resilience.

During their digital transformation process, insurance undertakings are allocating extensive resources to develop or adopt digital platforms / customer portals in their websites where they can interact with their customers and may include self-servicing functionalities. Significant resources are also reportedly being allocated to further developing their CRM systems, cloud computing and AI capabilities, which highlights the importance of data analytic processes for the insurance business.

Digital distribution and communication channels also play an important role in the digitalisation journey of insurance undertakings. While insurance customers often use digital channels to search and compare information about insurance products, the level of sales purely via digital channels remains relatively modest, especially concerning life insurance products, although the expectation is that they will increase in the years to come. Similarly, traditional communication channels such as telephone, email or face to face interactions are expected to be progressively replaced by other technology-enabled channels such as chatbots, customer platforms and mobile phone applications.

Outsourcing and partnerships with third-party service providers is frequently used by insurance undertakings to get quick access to innovative technologies and business models. As to the interaction with InsurTech start-ups, the survey showed that undertakings have adopted different strategies; some have developed their own innovation labs, others become shareholders, while others outsource services from them. In relation to BigTechs, the survey revealed strong links between these entities and insurance undertakings, which predominantly outsource to them cloud computing services and access to data analytics services (including AI solutions).

The use of AI systems is quite extended amongst insurance undertakings. AI enables insurance undertakings to benefit from more accurate and efficient processes, among other benefits. However, it also raises a number of concerns, in particular for risks linked to the limited explainability of complex AI systems and to bias and discrimination. Leveraging on their experience with the use of mathematical models, insurance undertakings are seeking to develop adequate governance and risks management measures to mitigate such risks.

Other technologies such as IoT have a relatively low level of adoption by the industry in most countries, although they could potentially have a high impact in the future. Indeed, several insurance undertakings have already developed telematics-based insurance products in motor, health, and home insurance, allowing their customers to share their data to benefit from premiums discounts and receive tailored recommendations on risk prevention.

With regards to Blockchain and crypto assets, most of the projects still remain in an experimental phase to assess technological soundness before public issuance. Similarly, the use of DLT to support parametric policies is not fully developed and the market is still favouring hybrid products (traditional policies with parametric features) where the payout is not entirely automatic, but still quicker and more efficient compared to fully traditional products.

To meet regulatory compliance obligations, insurance undertakings often leverage on new technologies (RegTech) to automate and speed-up processes in areas such as anti-money laundering, risk management or regulatory reporting. Moreover, Application Programming Interfaces (APIs) are used throughout the insurance value chain, although in some areas they are mainly used for internal purposes (e.g., fraud detection) and in others they are predominantly shared with external stakeholders (e.g., for sales and distribution).

In the area of sustainable finance, the use of AI stands out amongst the other technologies, both to address social aspects (e.g., greater insurability of some customers not easily evaluated with traditional models) and environmental issues (e.g., natural catastrophe risk modelling). The positive impact, from a sustainable finance perspective, of telematics-based insurance products in motor and health insurance was also highlighted, in so far as these can promote safer driving and healthier habits.

As to insurance policies covering cyber risks, the frequency and severity of events (e.g. an increase in ransomware attacks was reported) is the main driver for the development and offer of such products, for which reportedly there is a growing demand especially from corporate clients including SMEs. Respondents also highlighted that, generally, cyber insurance policies are bundled with traditional multi-risk coverages and not only offered as standalone products. Due to the limited availability of data to evaluate certain risks, cyber insurance typically combines both quantitative and qualitative underwriting methodologies and include relevant coverage exclusions in the terms and conditions of the insurance contract.

Insurance undertakings across the EU acknowledge that digitalisation requires an effort to overcome barriers and challenges, but also recognise the opportunities arising from it. In particular, more efficient and automated process and the possibility to create innovative, tailored and convenient products and services for customers through traditional channels or to use digital platforms and distribution channels are perceived as valuable and positive outcomes of digitalisation.

However, there are also relevant risks arising from digitalisation. In addition to the AI-related risks mentioned above, insurers highlight the importance of cyber and IT operational resilience risks. They also face a number of challenges, including obtaining access to adequate talent and skills or integrating new technologies and business models with their legacy systems. From a customer protection perspective, issues such as financial inclusion or customer access to adequate products and services including adequate advice and information to make informed decisions are also to be highlighted.

Taking into account the above mentioned market developments and the benefits and risks arising from them, EIOPA's next steps will follow its Digital Strategy,<sup>21</sup> which sets out the key objective of EIOPA's digitalisation work, based on the core principles of technological neutrality and a flexible yet firmly rooted strategy.

In particular, EIOPA will assess the impact of the AI Act<sup>22</sup> in the insurance sector, including assessing interactions with existing sectorial regulations. EIOPA will continue discussing with its members how to supervise the use of AI systems by insurance undertakings and distributors, highlighting best practices and clarifying supervisory expectations, also concerning lines of business and AI use cases not considered as high-risk under the AI Act.

At international level, EIOPA is also actively contributing to the upcoming AI Application Paper of the International Association of Insurance Supervisor (IAIS), which aims to promote international convergence on the application of the Insurance Core Principles in the context of AI. EIOPA will also continue bilateral exchanges on digitalisation topics with non-EU supervisory authorities, such as in the US-EU insurance project.<sup>23</sup>

EIOPA is also developing other relevant activities to promote a digital culture among supervisors, namely by supporting the training of supervisors within the Supervisory Digital Finance Academy (SDFA)<sup>24</sup> and by enhancing the role of the European Forum of Innovation Facilitators (EFIG) as a platform for supervisors to share experiences from engagement with firms through innovation facilitators.

EIOPA will also continue to work on issues related to data accessibility, data standards (APIs), and innovative products and services for customers more broadly, for instance by following up on its exploratory work regarding an insurance dashboard.<sup>25</sup> EIOPA will also actively contribute to the

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<sup>21</sup> [EIOPA's Digital Strategy \(europa.eu\)](#)

<sup>22</sup> <https://data.consilium.europa.eu/doc/document/ST-5662-2024-INIT/en/pdf>

<sup>23</sup> [EU-U.S. Insurance Project | U.S. Department of the Treasury](#)

<sup>24</sup> [Homepage - EU-SDFA \(eui.eu\)](#)

<sup>25</sup> [EIOPA Open Insurance use case - Insurance Dashboard.pdf \(europa.eu\)](#)

discussion of the European Commission proposal for a Regulation on a Framework for Financial Data Access (FIDA)<sup>26</sup> from an insurance and pensions perspective.

Jointly with the other European Supervisory Authorities (ESAs), EIOPA is working on the implementation of the Digital Operational Resilience Act (DORA),<sup>27</sup> which aims to make financial institutions more resilient to cyber-attacks and other IT incidents. In this regard, the ESAs are currently also preparing for the upcoming implementation of the Oversight Framework on critical ICT third-party service providers (CTPPs) and the implementation of a pan-European systemic cyber incident coordination framework (EU-SCICF). The ESAs will also review its existing guidelines and opinion on operational resilience to ensure consistency with the new legal framework.<sup>28</sup>

Also in cooperation with the other ESAs, EIOPA will also develop guidelines on the classification of crypto assets foreseen in article 97 of Markets in Crypto Assets Regulation (MICA).<sup>29</sup> Also in this area, following the recent review of the Solvency II Directive,<sup>30</sup> EIOPA is expected to provide technical advice to the European Commission regarding the prudential treatment of crypto assets.

As far as cyber insurance is concerned, EIOPA acknowledges protection gaps in cyber underwriting and the need to support retail customers including SMEs<sup>31</sup> in the process of digital transformation to increase their resilience vis-à-vis cyber threats. EIOPA continues to conduct analyses to achieve a better understanding of the market on both sides of demand for and offer of cyber coverage.

EIOPA will continue to promote the financial inclusion of vulnerable customers, customer protection and the ethical use of data, including in relation to AI and digitalisation. This will be done taking into the Retail Investment Package proposal,<sup>32</sup> which addresses the use of social media and influencers in financial services, and the revised Distant Marketing Directive<sup>33</sup> that introduced measures against the use of dark patterns in financial services.

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<sup>26</sup> [EUR-Lex - 52023PC0360 - EN - EUR-Lex \(europa.eu\)](#)

<sup>27</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R2554&from=FR>

<sup>28</sup> Further information can be found on: [Digital Operational Resilience Act \(DORA\) - European Union \(europa.eu\)](#)

<sup>29</sup> [Regulation - 2023/1114 - EN - EUR-Lex \(europa.eu\)](#)

<sup>30</sup> <https://data.consilium.europa.eu/doc/document/ST-5481-2024-INIT/en/pdf>

<sup>31</sup> [EIOPA launches survey on access to cyber insurance by SMEs - European Union \(europa.eu\)](#)

<sup>32</sup> [Retail investment strategy - European Commission \(europa.eu\)](#)

<sup>33</sup> [Directive \(EU\) 2023/2673 of the European Parliament and of the Council of 22 November 2023 amending Directive 2011/83/EU as regards financial services contracts concluded at a distance and repealing Directive 2002/65/EC \(europa.eu\)](#)

Finally, regarding the use of digital technologies for supervisory purposes, EIOPA approved a SupTech Strategy in 2020<sup>34</sup> and its currently supporting the development of SupTech projects internally, in collaboration with other European institutions and in collaboration with NCAs.

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<sup>34</sup> [Supervisory Technology - European Union \(europa.eu\)](#)

## ANNEX I – DEFINITIONS

Artificial intelligence	'artificial intelligence system' (AI system) means a system that is designed to operate with elements of autonomy and that, based on machine and/or human-provided data and inputs, infers how to achieve a given set of objectives using machine learning and/or logic- and knowledge based approaches, and produces system-generated outputs such as content (generative AI systems), predictions, recommendations or decisions, influencing the environments with which the AI system interacts; <sup>35</sup>
Application Programming Interface (API)	APIs are mechanisms that enable two software components to communicate with each other using a set of definitions and protocols, i.e., a set of coded routines that receives requests from and sends responses to other programs. API designers implement that code through standardized programming statements that expose functions that make sense for accessing the platform in question.
BigTech firms	Large technology companies with extensive customer networks; they include firms with core businesses in social media, internet search, software, online retail and telecoms. <sup>36</sup>
Cloud computing	Services provided using cloud computing, that is, a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction
Cyber risk and cyber insurance	Cyber risks are “the combination of the probability of cyber incidents occurring and their impact”, according to the Cyber Lexicon of the Financial Stability Board (FSB).  According to IAIS, the definition of cyber risks is “Any risks that emanate from the use of electronic data and its transmission, including technology

<sup>35</sup> This is the definition included in the survey distributed amongst insurance undertakings, which was based on the Council's General Approach on the AI Act from December 2022. Subsequently the European Parliament and the Council reached a political agreement in December 2023, which included a different definition of AI systems: '*AI system* is a machine-based system designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments

<sup>36</sup> The survey did not include a definition of BigTech firms. The present definition has been obtained from the recent Joint ESAs Report - Stocktaking of BigTech direct financial services provision in 2023 ([link](#))

	tools such as the internet and telecommunications networks. It also encompasses physical damage that can be caused by cybersecurity incidents, fraud committed by misuse of data, any liability arising from data storage, and the availability, integrity, and confidentiality of electronic information – be it related to individuals, groups, or governments.”
Digital distribution channels	Distribution of insurance products that take place online via digital means such as insurance undertaking's websites, comparison websites, other websites / platforms, or mobile phone applications
Digital platforms and Ecosystems	Digital platforms and ecosystems are interconnected set of services that allows users to fulfil a variety of needs in one integrated experience. Customer ecosystems currently emerging around the world tend to concentrate on needs such as travel, healthcare, or housing
Digital transformation	Digital transformation is the process of using digital technologies to create new or to modify existing business processes, culture, and customer experiences to realise cost efficiencies, offer additional products, increase the quality of customer service and products etc.
Distributed Ledger Technology	Distributed ledgers - sometimes known as ‘Blockchains’ - are essentially records, or ledgers, of electronic transactions, very similar to accounting ledgers. Their uniqueness lies in the fact that they are maintained by a shared or ‘distributed’ network of participants (so-called ‘nodes’) and not by a centralized entity, meaning that there is no central validation system. Another important feature of distributed ledgers is the extensive use of cryptography, i.e., computer-based encryption techniques such as public/private keys and hash functions, to store assets and validate transactions
Infrastructure as a Service (IaaS)	The capability provided to the customer of cloud computing services is to provision processing, storage, networks, and other fundamental computing resources where the customer can deploy and run arbitrary software. It can include operating systems and applications. The customer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls)
Insurtech start-up	Recently created SMEs with innovative business models, often involving the use of digital and new technologies to offer and/or support the development and distribution of insurance products and services

Internet of Things (IoT)	Is the networking of telematics devices, vehicles, buildings, and other items embedded with electronics, software, sensors, wearables actuators, and network connectivity that enable these objects to (a) collect and exchange data and (b) send, receive, and execute commands
Metaverse	An immersive and constant virtual 3D world where people interact through an avatar to enjoy entertainment, make purchases and carry out transactions with crypto-assets, or work without leaving their seat <sup>37</sup>
Non-Fungible Tokens (NFTs)	NFTs are cryptograph tokens on a blockchain, which are associated with a particular digital or physical asset. They differ from classical cryptocurrencies such as Bitcoin in their intrinsic features: while Bitcoin is a standard coin in which all the coins are equivalent and indistinguishable, NFTs are unique and cannot be exchanged like-for-like (equivalently, non-fungible), making them suitable for identifying something or someone in a unique way. More specifically, by using NFTs, a creator can prove the existence and ownership of digital assets in the form of e.g., arts, real estate, images etc.
Open Insurance	EIOPA considers open insurance as accessing and sharing insurance-related personal and non-personal data usually via APIs. This could include: <ul style="list-style-type: none"> <li>- "Insurance Policy Information Services" where insurers and intermediaries could be required or could provide voluntarily other insurers/intermediaries or third-party providers access (via APIs) to their users' underwritten insurance policies e.g. information such as insured object, coverages, claims history, data on suitability assessment, know your customer (KYC) data, Internet of Things Data (e.g. car black-box data);</li> <li>- Switching services, where customers could automatically transfer their personal and non-personal data from one insurer/intermediary to another;</li> <li>- Increased data exchange through APIs between insurers/intermediaries, e.g. better interaction with insurance platforms and ecosystems (Business-to-Business data sharing);</li> <li>- (Public) comparison websites, where insurers and intermediaries are required by legislation to make standardised insurance product information available to the public (e.g., to customers, supervisors and third parties) to facilitate like-for-like comparison of products (e.g., cost, fees, product features).</li> </ul>

<sup>37</sup> Source: European Parliament Research Services: [https://www.europarl.europa.eu/cmsdata/268589/eprs-briefing-metaverse\\_EN.pdf](https://www.europarl.europa.eu/cmsdata/268589/eprs-briefing-metaverse_EN.pdf)

Parametric insurance	Parametric insurance (sometimes referred as index insurance) is a type of insurance that does not indemnify the pure loss, but ex ante agrees to make a lump sum payment upon the occurrence of a triggering, objective, and predefined event. A triggering event can be in relation to temperature (e.g., 30 days of drought in each region), rainfall, wind speed, earthquake (e.g., up from certain magnitudes) or flight delay time (e.g., 45 minutes).
Platform as a Service (PaaS)	The capability provided to the customer of cloud computing services is to deploy onto the cloud infrastructure customer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The customer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.
Peer-to-Peer insurance	For this exercise, P2P insurance should be considered as risk sharing digital network where a group of individuals with mutual interests or similar risk profiles pool their “premiums” together to insure against a risk/to share the risk among them, and where profits are commonly redistributed at the end of the year in case of good claims experience. Traditional mutual insurers should not be considered as P2P insurance for the purpose of this exercise. Examples of P2P insurance companies can be found in the following link: <a href="https://tracxn.com/d/trending-themes/Startups-in-P2P-Insurance">https://tracxn.com/d/trending-themes/Startups-in-P2P-Insurance</a>
RegTech	Regulatory Technology (RegTech) means any range of applications of technology-enabled innovation for regulatory, compliance and reporting requirements implemented by a regulated institution.
Sustainable finance	Sustainable finance refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects. Environmental considerations might include climate change mitigation and adaptation, as well as the environment more broadly, for instance the preservation of biodiversity, pollution prevention and the circular economy. Social considerations could refer to issues of inequality, inclusiveness, labour relations, investment in human capital and communities, as well as human rights issues. The governance of public and private institutions – including management structures, employee relations and executive remuneration – plays a fundamental role in ensuring the inclusion of social and environmental considerations in the decision-making process

Software as a Service (SaaS)	The capability provided to the customer of cloud computing is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The customer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user specific application configuration settings.
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