

# Facilitating Data Sharing and Ownership in a Future Insurance Market

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## Abstract

Data is a key enabler of digital transformation where organisations adopt new technologies to innovate their organisational strategies. Although the insurance sector has always made use of some form of data to help provide risk models, the data that is now available, and the technology that can manage and analyse that data, has opened up new opportunities for innovation. Discussions with insurance sector experts, and the results of recent industry surveys, have shown that the sector must embrace these innovations if they are to thrive in the Digital Economy. Research has shown that the future of insurance must be: data-driven, customer-centric (with services delivering personalised outcomes for customers), built upon a model of risk prevention (instead of the traditional protection against loss), and adopt an ecosystem approach. We have identified four particular areas relating to these requirements where there exists major policy and regulatory challenges: data sharing, data ownership, data privacy and data usage. This paper explores these four areas, how new technologies (such as personal data stores and sharing platforms) might actually assist with regulation and compliance, and the further research that is needed to address the identified challenges.

**Keywords**— personal data; personal data stores; platforms; data sharing; insurance

## 1 Introduction

The insurance sector is crucial to the UK economy. In 2017, the UK insurance sector was the fourth largest insurance industry in the world employing over 300,000 people and contributing £29.1 billion to the UK economy [1]. Like in many sectors, insurance companies are undergoing digital transformation where they adopt new technologies to innovate

their organisational strategies. Data is a key enabler of digital transformation. Although the insurance sector has made use of data for many years to help understand and provide risk models, the data that is now available, and the technology that can manage and analyse that data, has opened up new opportunities for innovation. Big data has led to more varied sources of data including the provision of unstructured data and increasing amounts of personal data (i.e., ‘information that relates to an identified or identifiable living individual’ [2]).

Discussions with insurance sector experts, and the results of recent industry surveys [3, 11, 15], have shown that the sector must embrace the innovations afforded by emerging technologies if they are to thrive in the Digital Economy. Research has shown that the future of insurance must be: data-driven, customer-centric (with services delivering personalised outcomes for customers), built upon a model of risk prevention (instead of the traditional protection against loss), and adopt an ecosystem approach [6]. Based on ongoing research in servitisation, the Circular Economy and the insurance sector, a new finance insurance ecosystem was proposed to fulfill these requirements, referred to as *Circular Insurance* (CI) [6]. CI uses “innovative digital technologies to encourage and reward behaviours that embrace and enhance Circular Economy principles” [6]. A possible solution design for the ecosystem, depicted in figure 1, postulated that organisations would embrace digital transformation. Innovative digital technologies continuously collect, interpret and leverage data. The solution relied on the use of Personal Data Stores (PDSs), a data sharing platform and the use of AI technologies.

The implications for policy and regulation of this future insurance ecosystem were not addressed. Typically, policy and governance models struggle to keep up with the opportunities afforded by new technologies and new data sources,

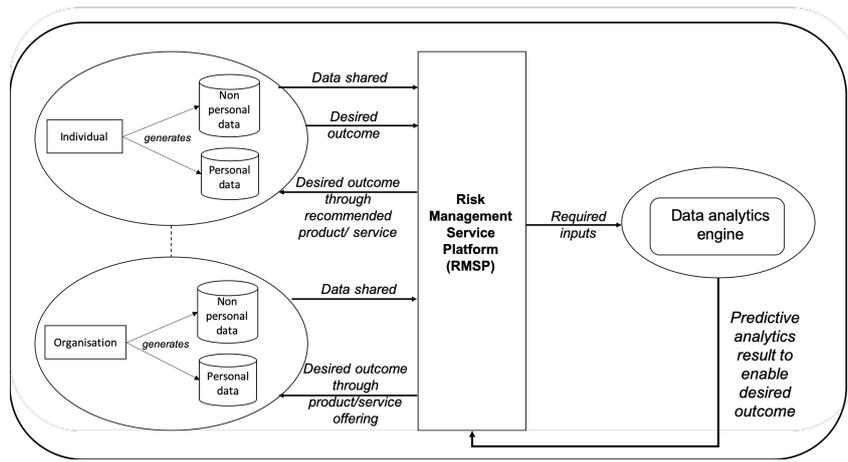


Figure 1: The Circular Insurance Approach [6]

which can make it difficult for insurance companies to innovate and move forward. It was clear that a future ecosystem approach in insurance would require further regulation and policy to that which is currently applicable but, what this was, was not explored.

Four particular areas have since been identified that would bring major policy and regulatory challenges if the requirements (i.e., an ecosystem approach that focuses on risk prevention, is data-driven and customer-centric), are fulfilled. These four areas are data sharing, data ownership, data privacy and data usage. This paper explores these four areas, how new technologies originally presented in the solution design for Circular Insurance (CI), such as personal data stores and sharing platform, might actually assist with regulation and compliance and the further research that is needed to address the identified challenges.

A brief overview of the recent sector surveys are given (section 2). Section 3 considers the relevant policy and regulatory challenges for each of the four requirements of a future insurance ecosystem and the further research that would be needed to address these challenges.

## 2 The future of insurance: an industry perspective

Recent surveys within the insurance sector (e.g., [3, 11, 15]) have supported the discussions that we have had with practitioners in showing that organisations within insurance must innovate if they are to remain competitive in the Digital Economy. Many organisations within insurance, especially given how highly regulated the sector is, find it challenging to embrace the necessary innovations.

The reports emphasise the need for incumbents to move early if they want to thrive in the digital world [11] and the need for a wider, more inclusive ecosystem [3]. Digital technology is driving changing customer expectations and a desire for timely, tailored services. Such personalised services require a much better understanding of the customer. This is possible through the use of personal data and data analytics tools.

Four key trends are identified by Deloitte [3] as being necessary for successful insurance companies. Two of these trends are the need for partnerships (including with InsurTechs and startups) to ensure growth, and making advantageous use of the emerging digital technologies. 95% of respondents in a Deloitte survey of 200 insurance sector executives [3] believed that the use of advanced analytics would increase over the next three years. The survey also indicated that an insurance company's growth would come from 'new service-based models, innovative products and a greater focus on prevention'. 51% of those surveyed believed that cyber and data regulation would be the top challenge when dealing with digital disruption.

A PwC megatrends report [16] outlines five shifts, happening globally, that will shape our future lives and businesses. The data and technology future trends listed include agility in responding to new regulation (especially as there is more of a focus on data protection) and regulatory challenges in dealing with new business-to-business interactions. The report notes that being able to access real-time and diverse datasets will be critical to the insurance sector to facilitate better risk models.

### 3 Policy and regulation implications

Typically, policy and governance models struggle to keep up with the opportunities afforded by new technologies and new data sources, which can make it difficult for insurance companies to innovate and move forward. However, our research has started to explore how new technologies might actually assist in some of these areas. This section will consider each of the requirements of a new ecosystem, explore the relevant policy and regulatory challenges, and identify what further research is needed to address these challenges.

#### 3.1 Data-driven

Data driven systems require: access to good quality and accurate datasets, new data sources, and, data sharing between organisations and individuals. These requirements highlight important policy and regulation questions particularly around data ownership, trust, data access rights and data sharing.

The insurance sector has been managing large amounts of customer data for years. However big data has led to more varied sources of data including the provision of unstructured data [8], and increasing amounts of personal data (‘information that relates to an identified or identifiable living individual’ [2]).

To address questions over data ownership, accuracy and access rights in a future insurance ecosystem we propose the use of Personal Data Stores (PDS’s). Traditionally a PDS can be considered a vault which is owned by an individual and contains their own personal data [9, 19], and in CI, their insurance related data too. Example PDS’s for individuals include Digi.me [4], the Hub of all Things (HAT) [7] and Mydex [12]. The individual can choose who and what data they wish to share or restrict access. Putting individuals in control of their own data could help to improve the accuracy of datasets [14], especially when the value of the data (and the benefit from that value) is affected by its accuracy. In a future insurance ecosystem, we suggest organisations also have their own form of data store to help facilitate data-sharing on a wider scale allowing the emergence of new digital (i.e., data-driven) business models.

Data in the future ecosystem would be managed and shared by a data platform, which PDS’s feed into. In existing research (e.g., [10, 17]), we have seen researchers suggest platforms to be ‘trusted intermediaries’, a way to provide transparent and fair data sharing markets that are self-regulating. Within CI, the data sharing platform is referred to as the Risk Management Service Platform (RMSP). All

data sharing is done through the RMSP and PDSs to preserve privacy. Technical solutions, such as Edge Computing, can help reduce the amount of data that is required for sharing and improve data privacy [18].

In existing approaches within the insurance sector, data is typically stored centrally by the insurance company. There is some regulation as to how it can be analysed, and by whom, but it is not always as transparent to the individual who the data is about. The use of PDS’s, and a suitable data sharing platform, can be considered to improve on these existing approaches because the value is co-created and mutual with both public and private benefits.

Within PDS and data sharing platform research, work has begun in developing the legal and technical infrastructure needed for personal data exchange mechanisms (e.g., [13, 14]). However, key policy and regulatory work is still needed. Ensuring widespread access to PDSs and the removal of any barriers to owning one will need to be controlled by policy and regulation to ensure no individuals are excluded from the market. Digital literacy and digital equality will be also important considerations. The principles of data sharing will also need to be identified in a common framework. This is currently left for future work.

#### 3.2 Customer-centric

The second requirement of a future ecosystem is that it is customer-centric. Digital technology is driving changing customer expectations and a desire for tailored services. Such personalised services require a much better understanding of the customer and knowledge of any changes in circumstances. A customer-centric approach would therefore require: a good (and ongoing) relationship with the customer, real-time data collection and analytics, and trust between parties.

Additional relevant policy and regulation questions, over the ones considered for data-driven systems, would include: ‘what is the role of the customer?’ and ‘who owns the technology used for data collection and analysis?’. Both these questions could be addressed in a suitable data sharing framework.

#### 3.3 A model of risk prevention

There is a push to more sustainable consumer behaviour, and to make the most of our natural resources [6]. Both of these factors support the need for a model of risk prevention instead of the standard approach of understanding risk and protecting against loss. A data-driven business model can

facilitate better risk reduction. A model focusing on risk prevention would be more personalised, focussed on individual and corporate behaviour change, and preventing and reducing exhibited inappropriate behaviour.

A model that focuses on risk prevention would require: data collection and analysis in real-time, continued monitoring of what is being insured, and, a different model of risk and value. Additional policy and regulation questions that must be considered relate to transparency and explainability of algorithms, understanding roles and responsibilities (e.g., who is responsible if a recommendation negatively impacts an individual), ensuring that the vulnerable and disenfranchised are not disadvantaged, and understanding the consequences of changing behaviour.

Risk prevention models would need to make recommendations. These recommendations could result in a behaviour change (e.g., the usage of different fuel sources). Transparency and explainability of how these recommendations have been produced will be very important; both are active areas of research within Computer Science. Each recommendation could have an attached probability and/or decision metric to improve transparency and aid actors in deciding whether they act upon the recommendation.

The digital tracking and predictive analytics used to form the recommendations could lead to potential (but unintended) negative consequences that would need to be considered by the insurance ecosystem to avoid disadvantaging the vulnerable and disenfranchised. For instance, it may not be possible for some users to alter their behaviour in response to prompts or requests, (e.g., as a result of genetic conditions). Not everyone may be keen to share their data due to a belief that knowing more about them would cause a rise in their insurance premiums and reduction in coverage [5]. Greater insight into an individual's behaviour may result in an insurance company considering them too high risk to insure. It is likely that there may have to be mandatory minimum cover (e.g., motor 3rd party fire and theft), and/or government underwriting (e.g., flood insurance). We suggest insurers within the ecosystem develop and implement a digital fairness framework that would help them consider the social implications of their decisions (similar to that suggested by Gemmo and Gründl [5]). This framework is left as future research.

### 3.4 Ecosystem Approach

The fourth requirement of a future insurance market would be the adoption of an ecosystem approach. This would require a significantly enlarged regulatory environment and a

multiplicity of regulators.

Many examples exist of different regulators working together. A good example is the recent announcement of a new approach and policy on operational resilience in financial services issued jointly by the Bank of England, the Treasury and the Financial Conduct Authority. In addressing cyber resilience this group of regulators is joined by the National Cyber Security Centre and the National Crime Agency. A future insurance ecosystem will need to include a similar group of regulators but also include those from insurance and data science. Given the wide reach of the insurance sector and the inclusion of international companies, regulation will need to include international standards.

Identifying the roles and regulators of the different regulators will be very important. The ecosystem has been designed with representatives from the insurance sector but a detailed stakeholder analysis would help identify the different regulators, their scope and the roles that they would play in the ecosystem.

## 4 Conclusion

Organisations within the insurance sector will need to embrace innovations that new technologies bring if they are to thrive in the Digital Economy. Our research has shown us that a future insurance ecosystem must fulfill four key requirements: be data-driven, be customer-centric (with personalised customer services), be built upon a model of risk prevention (instead of the traditional protection against loss), and adopt an ecosystem approach. Four particular areas where these requirements would bring major policy and regulatory challenges are data sharing, data ownership, data privacy and data usage. Our research has started to explore how new technologies might actually assist in some of these areas. Future work would include: the identification of the different regulators required for the ecosystem and the roles that they would play; the development of a fair data usage framework specifically for the insurance sector; and, the development of a set of policy recommendations that would allow the ecosystem approach to be adopted.

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