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Digital ecosystems: extending the boundaries of value creation in insurance

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**Executive summary**

Digitisation has created networks of interconnected but autonomous firms that are part of digital ecosystems. Digitisation has revolutionised value creation within and across firms and sectors, including in the re/insurance industry. In more recent years, an extension of the revolution has been the rise of digital ecosystems. These are networks of businesses and consumers (online and offline) that support each other with their respective capabilities to deliver greater economic value than would be possible through autonomous operation. The trends and associated challenges that come with digital ecosystems are irrevocably changing risk markets, impacting both the insurance value chain itself and the business world in which re/insurers operate.

This is being driven by technology advances that have lowered costs of coordination between parties. Many successful present-day business models are ecosystem players: Alibaba, Alphabet, Amazon, Apple, Facebook, Microsoft, Rakuten, Ping An and Tencent. These ecosystems have grown rapidly because the technology that underpins them has matured and coalesced to lower costs of co-ordination. Semiconductors have enabled cheap and abundant computation, the internet rapid connectivity and the IoT is building ubiquitous sensors. At the same time, Big Data is generating huge volumes of information, and machine intelligence allows the processing and analysis of both structured and unstructured data to curate valuable commercial insights.

Access to new data and regulatory openness are some factors shaping the future scope of ecosystems. Many ecosystems begin as simple digital marketplaces. Latterly some have migrated across sector boundaries to create larger ecosystems incorporating many families of services. For example, B2C mobility players have expanded beyond transportation of people into complex B2B services. Key factors that can shape the scope and influence of such ecosystems include maturity of upcoming network infrastructure, access to new sources of data, customer willingness to continue to switch to these structures, and regulatory openness to new models of business.

Re/insurers are a natural fit for some ecosystems such as mobility, health, housing, and both B2C and B2B. Insurance is a service offering that fits very naturally into certain ecosystems like mobility, healthcare, housing, and many B2C and B2B marketplaces. Insurers can feature as the risk mitigation component of these ecosystems, or constitute their own sub-ecosystems that cater to specific individuals and institutions. Emerging digital risks also create new protection gaps and new business opportunities around cyber security, IoT risk, counterparty risks, business interruption and systems failure.

The value that re/insurers can bring depends on the strengths of their partners within ecosystems. However, insurers will have to redefine the role they can play in structures that comprise a heterogeneous assortment of businesses from different sectors. This environment requires distinctive capabilities and relies heavily on access to data and the capability to model risks. True leverage will only be created in combination with other assets such as partnerships with key suppliers and others in an ecosystem. Value creation will also depend on know-how to generate data driven customer insights through perspectives provided by behavioural economics.

Re/insurers need to pick strategic options that define “how and where to play” in the world of ecosystems. Insurers can adapt to these developments by developing three different set-ups: (1) Modular producer: providing plug-and-play products or services that can adapt to a variety of platforms or ecosystems; (2) Ecosystem bundler: creating relationships with other providers that offer complementary or sometimes competing services, and (3) Ecosystem owner: more aggressive insurers could act as active ecosystem owners or orchestrators.

Innovation will be crucial in responding to the future risk environment. Incumbent insurers have time to adjust to the changing risk environment, shifts in customer attitudes and accelerating advances in technology. They are currently sheltered by regulation but nevertheless, must continue to embrace both incremental and more radical innovations. Utilised more fully and intelligently, digital ecosystems present an opportunity for the insurance industry to reinforce its relevance to its clients whose tastes and protection needs are changing.
What is a digital ecosystem?

The building blocks

Digital ecosystems are “an interdependent group of enterprises, people and/or things that share standardized digital platforms for a mutually beneficial purpose, such as commercial gain, innovation or common interest.” As Figure 1 shows, in addition to being a platform that connects specific stakeholders with a common interest (e.g., buyers and sellers of a product/service), an ecosystem has a great variety of autonomous participants (end-users, producers, installers, governments, partners, distributors, and competitors). The participants are connected through shared use of resources and expertise to collectively deliver products/services of greater economic value than would otherwise be possible.

Digital ecosystems enable value creation between an interdependent group of businesses, consumers and devices.

Figure 1
Schematic showing how ecosystems extend beyond existing structures

Multi-sided platforms (MSP)
Innovation: here, the platform serves as the technological foundation on which other firms develop complementary innovations

Ecosystems platforms
Here, the platform includes the technological foundation and intermediary functionality for direct exchanges

Industry platforms
Transactional: here, the platform serves as intermediary for direct exchanges or transactions, subject to network effects

Digital ecosystems enable cross-sector collaboration and sales, to bring the end consumer a one-stop shop service offering.

Digital ecosystems enable cross-sector collaboration for the creation of customer-centric commercial offerings. Solutions that are normally independent and distinct are synchronized to offer customers a holistic experience. For example, an ecosystem can offer a one-stop-shop solution for mobility, rather than a consumer having to make separate purchases of the different elements of a travel experience (such as a car, taxi rides, payment solutions, service plans and insurance). Insurance fits very naturally into the mobility experience, and ecosystems allow insurers to replace multiple independent (vertically-oriented) policies for each service, with a single policy adapted to an individual’s unique behaviour, whatever the individual’s mode of transport choice may be at any time (see Figure 2).

1 See Digital Business Ecosystems & The Platform Economy, Gartner, 2018.
Figure 2
Shift from a vertical to a horizontal consumer-centric market orientation, in mobility

**Vertical market orientation**

<table>
<thead>
<tr>
<th></th>
<th>Buying</th>
<th>Using/maintaining</th>
<th>Selling</th>
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<tbody>
<tr>
<td><strong>Vertical value-chain centric markets</strong></td>
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<td>Bike</td>
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<td>Hailing</td>
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</table>

**Insurance offerings**

Multiple independent (vertically-oriented) insurance policies

**Customer centric market orientation**

<table>
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<tr>
<th></th>
<th>Buying</th>
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<td><strong>Horizontal customer centric markets</strong></td>
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<td>Sharing</td>
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<td>Hailing</td>
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**Insurance offerings**

Customer-centric mobility policy

Source: Swiss Re Institute
What is a digital ecosystem?

These possibilities are also applicable in sectors like housing, health and lifestyle, with insurers able to offer universal coverage that can be configured based on customer behaviour, rather than offering multiple individual policies. Customers can buy a policy that incorporates unique lifestyle risks, and adjusts in real-time to accommodate changing needs. For example, for policies for homeowners may be configured on demand to cover multiple risks such as home contents and others (eg, household pet insurance), personal liability and fire risk, rather than the consumer having to buy a separate cover for each exposure.

Businesses participating in ecosystems go beyond traditional operating modes of strong control over resources within a linear internal value chain, to new ways of orchestrating external resources. Their measurement criteria incorporate interaction-centred metrics, and they transact with a wider set of stakeholders. Online and offline connectivity further builds the utility of a digital ecosystem, and often results in higher spending by customers. It also enables suppliers to sell to consumers digitally, but then deliver services in their physical environment. For example, an ecosystem allows healthcare specialists to interact digitally with consumers and deliver required treatment in person at an actual (offline) clinic.

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2 Alibaba found that consumers who shopped online and offline spent more (average of 575 yuan monthly), compared to under 300 yuan for purely online, or purely offline shoppers. See “Alibaba says New Retail strategy is paying off as Hema shopper data shows bigger average spending”, South China Morning Post, 17 September 2018
Digital ecosystems fail when they do not engage external contributors effectively, offer poor incentives to partners and co-creators, and prioritise profitability over building a critical mass of participants. Other reasons cited include mistaking which stakeholder sets to prioritise. For instance, some argue the reason Google Health failed is because it focused on consumers rather than doctors and insurers, who were loath to share data about their patients/clients that was critical for the success of the scheme. Another reason for platform failure is an imbalance between openness and control. If an ecosystem is too open, too much can be given away without commensurate return. And if too closed, the ecosystem can lose out on scale and network optimization effects.

Starting a simple platform, an ecosystem can mature into a strategic asset, passing through three stages of evolution:

- **Nascent stage**: an ecosystem may begin as basic hub-and-spoke model, in which a sponsor (or initiator) connects entities and collects feedback on member needs (e.g., introducing locally-relevant practices such as cash on delivery). The sponsor creates the technical platform and standards (rules of the game) for members of the ecosystem to connect and interact. At the early stage, the sponsor has a high degree of control, responding to the needs of all members, including subsets of the overall participant population, for the benefit of all other entities on the platform.

**Figure 4**
Three stages of ecosystem evolution


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5 Ibid.
6 The term “sponsor” can entail all of provider, initiator and platform owner, among others.
What is a digital ecosystem?

- **Formative stage**: here ecosystems evolve into more sophisticated configurations where the sponsor continues to play a central role but members collaborate with each other more freely, independent of sponsor involvement, but in a closed environment. Sponsors provide the platform for members to form autonomous connections amongst themselves, enhancing interactivity of the network (eg, Alibaba created chat facilities for buyers and sellers to negotiate directly).

- **Mature stage**: the sponsor further enhances the ability of members to participate and contribute, and promotes collectivism. The sponsor may enrich operational capabilities by providing access to partners, software tools and financing, thereby also strengthening its own relationship with members (eg, Amazon provides outsourced services to members for warehouse and data centres services at attractive rates).7

There has been rapid growth of digital ecosystems in recent times. One reason is that the technology underpinning ecosystems (eg, the cloud, application programming interfaces (API), analytics and modular architectures) has matured, with the effect of lowering the costs of co-ordination and information exchange. As a result, it is easier to create an open environment where suppliers can plug in a number of services, and translate them into “customer jobs”.8 In a digital ecosystem setting, time-to-market (TTM) can be months rather than years.

Another reason for the rapid growth is the explosion in data due to the network effect. Every new participant brings new data, and that increases the network’s value to existing participants. This can apply in insurance as well. For example in China, commentators believe that Ping An could leverage its technology platform to create a network effect that enables it to expand beyond insurance and increase customer loyalty.9 Its diversified platform receives multiple data points about customers from several sources. This allows it to cross-sell a wide variety of also non-insurance services to policyholders.

This explosion of data caused by the network effect allows ecosystems to constantly adapt and evolve, and helps keep their services relevant and innovative. In earlier cycles of innovation, existing services gradually became commoditised (see dark blue curve in Figure 5) and were displaced by new competitors that were cheaper and easier to use (light blue curve). To remain competitive, incumbents had to run hard to stay in the same place often via aggressive imitation, in response to one another and digital entrants. This is called the “Red Queen Effect”.10 But, as data in ecosystems grow continuously, they offer incumbents a strong market advantage and, rather than become commoditised, efficient ecosystems can increase the value gap between themselves and competitors more so than incumbents in earlier cycles.

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8 A “customer job” is what the consumer is trying accomplish in a given circumstance. See “Know Your Customers’ Jobs to Be Done”. Harvard Business Review, September 2016.
9 “Inside Ping An’s Massive Expansion”, institutionalinvestor.com, 28 June 2017
10 Named after the Red Queen, a character in Lewis Carroll’s book Through the Looking Glass, who runs a foot race in which competitors have to work hard just to stay in the same place. See J. Bughin, N. Zeebroe “The Best response to Digital Disruption,” MIT Sloan Management Review, 6 April 2017.
A third reason why early ecosystems have seen rapid growth is because the regulatory environment was less mature. New business models occupied a space in which existing regulations were unclear and difficult, having been designed with a different vision of industry in mind. For example, Uber could operate and scale unchallenged partly because it operated in locally-regulated incumbent taxi sectors, here regulation was fragmented. Digital ecosystems have won customer trust and are looking to expand into other sectors. This is a challenge for regulators seeking to create supervisory and competition frameworks that protect consumer interests, but which are also agile enough to accommodate new innovations.

Finally, early ecosystems had an advantage due to more relaxed regulatory environments.
What is a digital ecosystem?

How open can an ecosystem be?

In a completely open ecosystem, the sponsor allows members the autonomy to freely add services, interact with each other directly, and obtain data about other participants. In a closed ecosystem, sponsors erect entry barriers for new firms, and have strict intellectual property (IP) rules. Most ecosystems are closed, but competition and the need to differentiate is pushing those operating in similar areas to sacrifice control to support the network effect, with due attention afforded to applicable competition laws.

Openness to stakeholders can be characterised through four scenarios. Openness to: 1) suppliers/producers; 2) partners; 3) platform providers; and 4) sponsors. In reality, ecosystems follow different combinations of these scenarios.

1. Openness to suppliers: in some ecosystems producers/suppliers of core goods and services are allowed without much restriction. Suppliers/producers are creators of the offerings and at its most open, an ecosystem may allow producers to freely join, set prices and engage directly with customers (represented by the open green lock on the consumer side in the first panel of Figure 6). Other types of partner which leverage data (e.g., advertisers, testers) are filtered (red lock). In reality, ecosystem sponsors follow a careful vetting process to ensure quality of suppliers, especially in cases where physical and financial security are relevant.

Some ecosystems are open to all suppliers, allowing them freedom to enter and engage with consumers.

Competition and the need to differentiate are pushing ecosystems to become more open to a wider set of participants.

Figure 6

Depiction of ecosystem openness

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12 Producers may encounter some sort of implicit price control (e.g., dynamic pricing to meet the lowest pricing available).
2. Openness to partners: the ecosystem is open to partners which use data for various purposes (e.g., advertisers, testers, survey agencies, insurers, researchers, data aggregators). However, producers/supplier partners face high barriers to entry, and can only offer services under strict terms. For example, most of the software for the iPhone is typically available only to customers through Apple stores.

3. Openness to ecosystem providers: some ecosystems are opening up to multiple providers. Providers are interfaces for the ecosystem and bring it to users. However, the ecosystem sponsor owns the IP, sets the direction, and controls the underlying platform. For example, as an ecosystem owner/sponsor, having made its Android ecosystem available through a few major device manufacturers (e.g., Samsung), Google has now extended Android to smaller device makers. At times providers can also be sponsors, depending on the domain, and country.

4. Openness to other ecosystem sponsors: in this scenario, other ecosystem initiators can contribute improvements to the platform, and co-develop intellectual property (the green lock outside the network shows that the platform is open to modification by other sponsors). It is rare for an ecosystem to be completely open (the red line shows the sponsor retains ownership). However, initiators are beginning to co-develop and modify other ecosystems. For instance, some of Microsoft’s new IoT devices will not run its proprietary Windows operating system, but use the open source Linux (a competitor) so that partners can integrate the Microsoft devices more easily with their own products.

Impact of ecosystem ownership on openness

The degree of ecosystem openness is usually driven by: 1) who/what body the sponsor is; 2) how much regulation the ecosystem faces; and 3) the profit motivation. Ecosystems owned by government and public-sector sponsors are usually subject to greater regulation, and may be more restrictive in filtering providers. A privately-owned ecosystem may be more open. For example, a private-sector insurer sponsor may limit providers of competing risk cover solutions. And in areas where the insurer lacks expertise, it may bring in white-label offerings. In any event, all ecosystems will need to comply with applicable regulations, particularly in relation to data protection and competition.

The degree of openness also depends on the sponsor’s profit motive and how much value the sponsor wants to retain, which can impact how ecosystem participants are able to operate. For example, in a non-profit government health ecosystem motivated by lower costs, the sponsor may impose strict rules on how confidential data like health records can be used, making it harder for private participants to optimise profits. A private venture-capital sponsored ecosystem in a competitive market with aggressive revenue and profit targets will likely be more open.

13 “Google and top Android partners agree to share software patents”, theverge.com, 2 April 2017.
14 “Microsoft built its own custom Linux kernel for its new IoT service”, techcrunch.com, April 2018.
Market examples

Ecosystems start with expanding their reach within their specific domains. Ecosystems operate in broad clusters such as healthcare, public services and lifestyle. The clusters can be subdivided into more granular domains (e.g., mobility and dining are two domains in the lifestyle cluster; see Figure 7).

<table>
<thead>
<tr>
<th>Ecosystem cluster</th>
<th>Health</th>
<th>Public</th>
<th>Learn &amp; job</th>
<th>Home &amp; stay</th>
<th>Market</th>
<th>Lifestyle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health / care &amp; well-being</td>
<td>Public services &amp; government</td>
<td>Education</td>
<td>Job &amp; work</td>
<td>Housing</td>
<td>Energy &amp; utilities</td>
<td>B2C (retail commerce) market places</td>
</tr>
<tr>
<td>Health Public Learn &amp; job Home &amp; stay Market Lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

**Figure 7**
Clusters and domains within ecosystems, and the key role of insurance and financial services

Source: Swiss Re Institute

They often expand their reach beyond the domains in which they first originated, into adjacent areas.

Digital ecosystems evolve from their original core businesses, leveraging strong customer relationships to move into new domains. They do this by reorienting existing capabilities to solve problems in adjoining industries, thus opening up new lines of business. For example, leveraging the perceived reliability and efficiency of its services, Uber was able to launch Uber Health, a ride-hailing platform specifically designed for healthcare services.
designed for healthcare providers which can assign rides for its patients and other clients from a central dashboard, with the passenger not even needing to have an account with Uber, or a smart phone.\textsuperscript{15} Similarly Grab, which started with passenger mobility, then entered into food and goods delivery (horizontal domain orientation), and is now expanding into new clusters and domains such as healthcare.\textsuperscript{16} See Figure 8 for a representation of how ecosystems progress across domains.

\textsuperscript{15} From 2018, Uber Health allows clinics and other medical facilities to book rides on their clients’ behalf. See “Introducing Uber Health, Removing Transportation as a Barrier to Care”, uber.com, 1 March 2018.

\textsuperscript{16} “Ping An Good Doctor and Grab Form Joint Venture to Deliver Transformative O2O Healthcare Solutions in Southeast Asia”, grab.com, 16 August 2018.
Market examples

Ecosystems that started in B2C are expanding into the B2B space. Ecosystems that started in B2C segments have found that growth among B2B users can be a viable expansion route, as consumer-oriented products can often be deployed in the B2B context also. As a result, ecosystems can take bigger steps to make products and services easier to adopt in a new environment. For example, Singapore-based Grab started with GrabTaxi, later expanding its offering within the same domain (vertical orientation in transport B2C) by introducing GrabShare and GrabShuttle to move larger groups of people, and also GrabHitch, a social carpooling service. Grab then transformed the same B2C offerings into a B2B service called Grab-for-Business for corporate customers, for example in Cambodia.

This involves forming close relationships with services firms and resellers which can bring an ecosystem’s offerings into new settings. For example, Apple has announced a partnership with the B2B manufacturer GE to bring GE’s Industrial IoT apps into its ecosystem. Apple and GE will give developers the tools to make their own industrial IoT apps, and make these available to companies through the App Store. Industrial operators can get better insight into their equipment from their iPhone or iPad.

Financial services function as a key transaction enabler across domains. Financial services is a distinct domain naturally embedded into different verticals, and could be the tie that binds customers to ecosystems like Grab. Insurance is likewise a distinct domain naturally embedded into ecosystem offerings, both from a B2C perspective (eg, getting insurance on a ride) and in the B2B setting (a delivery driver being insured for his employment-related driving activities). Figure 9 has an architectural view of how an ecosystem like Grab plugs in a variety of parties, including transport operators, payment companies, insurers and municipalities, to offer integrated products and services in the B2C and B2B spheres concurrently.

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17 "No more late-night bookings with carpooling service GrabHitch from October 2018", Today, 25 September 2018.
18 "Grab introduces news business service", Khmer Times, 18 November 2018.
19 "Apple and GE partner to bring Predix industrial apps to iPhone and iPad", apple.com, 18 October 2017.
20 While enabling these suppliers, a sponsor may also offer specific services in its own right (eg, driver verification in partnership with law enforcement).
We highlight two more ecosystems to better understand this concept. Figure 10 shows a typical B2C (retail) and a B2B set up. Using Ping An to represent the retail experience, the Chinese insurer has identified key B2C sectors relevant for its retail consumers (eg, health and well-being, mobility and housing), and has designed ecosystem synergies around these. For example, in auto it has invested in an online car-buying platform to grow its share of the fragmented used-car market, and has integrated its insurance and financial services offerings into the platform.21

Market examples

Figure 10
Examples of B2C (retail) and B2B (commercial) ecosystems

In Japan meanwhile, e-commerce firm Rakuten’s ecosystem has expanded into a wider range of B2B domains. It now spans more than 70 businesses and in 2018, received approval to operate as Japan’s fourth mobile network operator. With the inclusion of telecommunications, a retail partnership with Walmart, and the acquisition of a property insurance business, Rakuten offers services across a wide range of B2C and B2B domains. Recently it also included pet insurance to its e-commerce market, to complement its range of 3 million pet related products.

22 “Japanese e-commerce giant struggles to retake the lead from Amazon,” economist.com, 14 April 2018.
Ecosystems succeed because they are designed around solving “customer jobs to be done”.

As ecosystems move across domains, and from B2B to B2C and vice versa, they focus on problems that customers need help with. In other words, the fundamental need that causes a customer to “hire” a product or service, also called the “job to be done” (see Figure 11). These jobs vary in complexity. For example, a consumer may sometimes want basic advice on healthy living but in the event of serious illness, may want more complex services such as diagnosis and treatment (see Example of a diagnostic service: consultation and prescription in a digital health ecosystem).

**Figure 11**
Depiction of how ecosystems focus on customer needs, or jobs to be done
Market examples

Ecosystems combine offerings from multiple providers to address different needs along the customer journey.

For a more granular view of how ecosystems fulfil customer jobs across the B2C and B2B universes, in Figure 12 we sub-divide domains into lifecycle phases depicting the customer journey. These phases can vary by domain. For example, in automobile, the broad life cycle phases could be: (1) buying; (2) using; and (3) selling of a car and related services. Within each phase (e.g., using the car), there could be multiple “customer jobs” to be done (e.g., insurance, maintenance, replacement of damaged parts after an accident). Ecosystems combine offerings from different suppliers, financiers and insurers to fulfil all of these customer needs. In healthcare, the similar phases could be: (1) diagnosis; (2) treatment, and; (3) recovery.

Example of a diagnostic service: consultation and prescription in a digital health ecosystem24

As part of its digital health ecosystem, Ping An has introduced a medical consultation and prescription service for customers. This service is valuable because, getting an in-person appointment with a doctor in China can be challenging given lack of quality primary care facilities, overcrowding in hospitals and long waiting times. Ping An’s platform offers consumers a menu of online and offline workarounds. As a first step, patients log into Ping An’s “Good Doctor” app and, after describing their symptoms via a dialog box, are directed to a recommended list of physicians on Ping An’s payroll (with names, qualifications, expertise, etc).

Consultation with the physician online is free for the first 15 minutes, and can be extended for another 15 minutes on payment. Ping An’s artificial intelligence diagnostic technology enables physicians to offer a range of solutions: (1) an electronic prescription; (2) direct patients to get tested and upload results for follow-up consultation; and/or (3) refer the patient to an offline primary care clinic (affiliated with Ping An) or a specialist in a what is typically a state-run hospital.

Source: Swiss Re Institute

24 Based on corporate presentation From Ping An to Platform: Technology Innovation for Growth, Ping An, 20 November 2017.
Additional services and quality assurance

If referred to a hospital, the patient can make an appointment on the “app” (integration of online and offline worlds). The app recommends a set of hospitals based on the user’s location and health issue. Depending on the extent of system integration with hospitals, a user can either simply choose available slots from a doctor’s online profile page, or speak with medical assistants at a hospital to complete the appointment process. The user gets a ticket number from the system as proof of appointment, and pays the registration fees at the hospital. At present, Ping An does not charge users for hospital appointment services.

To offer this comprehensive service, Ping An has integrated a range of participants (hospitals, third-party intermediaries, primary care clinics, insurers, and advertisers, see Figure 13) into its ecosystem. At the end of the user experience, consumers can provide feedback on quality through a user-review system, which in turn can incentivise medical teams to improve the quality of care.

Figure 13

Example of a “consultation” within a digital health ecosystem (B2C and B2B)

<table>
<thead>
<tr>
<th>Life cycle</th>
<th>Diagnostic</th>
<th>Consultation need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third-party intermediaries</td>
<td></td>
<td>In some cases the sponsor pays API connection fees to intermediaries in exchange for connection to affiliated hospitals.</td>
</tr>
<tr>
<td>Online shopping mall</td>
<td></td>
<td>Online pharmacy sales, advertisements and shopping cards.</td>
</tr>
<tr>
<td>Government hospitals</td>
<td></td>
<td>Offline medical services, hospitals can cooperate directly with the sponsor to link appointment systems.</td>
</tr>
<tr>
<td>Primary care clinics</td>
<td></td>
<td>Offline medical services, Ping An has a network of offline clinics.</td>
</tr>
<tr>
<td>Advertisers</td>
<td></td>
<td>Three types of advertisements are offered: display, search &amp; sponsored stories. Advertisers choose to pay primarily based on cost/thousand impressions, cost/click, or cost/day.</td>
</tr>
<tr>
<td>Banking services</td>
<td></td>
<td>Enables payment transactions on the platform.</td>
</tr>
<tr>
<td>Insurance services</td>
<td></td>
<td>Cross selling insurance: if the patient is a policyholder, priority access to in-patient arrangement services is also offered at some hospitals in the network.</td>
</tr>
<tr>
<td>Physician services</td>
<td></td>
<td>Preliminary symptom collection, smart routing, consultation, recommendation via dedicated in-house medical teams, standardised consultation protocols, self-developed, scalable AI-Ass.</td>
</tr>
</tbody>
</table>

Source: Swiss Re Institute

How the service is monetised

1. Patient fees: First-level online diagnosis is free; online physicians have sufficient experience to handle small health issues, but patients can choose to pay more to speak with a more experienced doctor online.
2. Corporate fees: Corporate subscription plans are available, providing employees with online consultations.
3. Online pharmacy sales, advertisements and shopping cards. Two thirds of customers who use family doctor services also use paid wellness services (weight loss, personal care and fitness).
4. Offline medical services: Profit sharing, and commissions with the primary care clinics on the platform.
5. Cross-selling: Policyholders get free access online consultations and three priority inpatient services if diagnosed with a critical illness.

25 In 2017, on average 65.5% of the users who used family doctor services during a month also used wellness services. “Ping An Healthcare and Technology, Initiate at Buy/1H: Game-changing Internet Healthcare Platform”, Citi Research, 6 June 2018.
Ecosystem value drivers

Digital ecosystems enable interactions between multiple stakeholders, each of whom seek distinctive sources of value.

Digital ecosystems facilitate efficient transaction between different stakeholders, each of whom seek distinctive sources of value. For example, consumers value lower prices, reduced friction and carefully vetted service providers. Producers value new customer segments, access to deeper consumer insights, and enabling software and tools. Platforms sponsors can extract value when the volume and quality of interactions within an ecosystem increases.

Demand: consumer perspective

Connected ecosystems create a simpler experience for consumers, through a single window of interaction that eliminates points of friction between the different participants of the ecosystem (see Figure 14). A recent survey suggests that 64% of consumers are willing to pay extra for simple experiences, and 61% are more likely to recommend a brand because of the ease of experience and communication. Simplicity is particularly valuable in areas where speed of supply/demand matching is critical (eg, urban mobility and sales of perishable products). Newer ecosystems streamline the purchase journey, and make the supply chain transparent for consumers. For example in China, by using e-commerce platform Pinduoduo, manufacturers can ship directly to consumers, eliminating layers of distributors.

26 See Simplicityindex Omni Channel Customer Care, Siegel+Gale, 2017.
27 "The incredible rise of Pinduoduo, China’s newest force in e commerce", techcrunch.com, August 2018.
Figure 14
Depiction of frictionless services enabled by digital ecosystems

Disconnected ecosystem platforms

Connected, digital platform ecosystem

Source: Swiss Re Institute
Although consumers see value in increased convenience, they also value transparency into how their data is accessed by supply chains. In a recent survey, 74% of consumers said it was very important for them to be in control of who gets information about them, but only a small fraction (9%) believe they have “a lot of control”.28 Over time, negative privacy experiences can undermine the ecosystem as a whole. Pew Research recently found that 44% of 18 to 29-year old users in the US say they have deleted the Facebook app in 2018.29 Facebook inadvertently allowed parties access to data without user permission, leading to significant media exposure and loss of faith among users.30 Consumers also expect higher physical safety standards from external providers, than they set for their own behaviours. For example, the public expectation is that self-driving cars must have a much lower error rate than human drivers.31 The left panel in Figure 15 visualises the trust and transparency balance facing digital ecosystems.

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29 Americans are changing their relationship with Facebook, Pew Research, 5 September 2018.
31 A recent study showed that the public will not accept self-driving technology unless it is shown to be four to five times as safe as human-driven vehicles, meaning SDVs should be able to reduce 75-80% of current traffic fatalities. See “Self-driving cars must reduce fatalities by at least 75% to stay on the road”, sciencedaily.com, 30 May 2018.
Producers value access to new customers, insights about customers, and enabling tools.

Domain knowledge is key as producers move across different types of customers.

Ecosystem sponsors continually maximise value by creating models and simulations of interactions.

Sponsors also offer incentives to offline partners to digitise and share untapped data.

Sponsors have to balance sharing extensive data in the supply chain, and losing customer control.

Producer perspective

Producers value the ease of access to new customers that digital ecosystems offer. They extract value by being able to obtain granular data about customer preferences, build a loyal customer base, and by having the flexibility to frame customised segmentation strategies (the right panel in Figure 15 visualises the data-driven virtuous loop). They also value user-friendly tools that allow them to manage activities efficiently.

Producers extract value when they are able to seamlessly shift across buyer segments, such as from B2C to B2B. B2B customers may have different needs than B2C, such as dedicated customer service, additional controls and reporting, and corporate buyers tend to be more fact-driven and risk-averse than retail customers. However, there has been merging of boundaries within ecosystems, into B2X, or business to all, as producers start with one segment, and later identify openings for similar services in many B2X contexts (eg, Apple sells to individuals, employers and also to employees of B2B clients (B2B2E)).

Platform sponsor

The platform sponsor adds value as orchestrator and transaction enabler, and manages and incentivises stakeholders to joint service provisions. The sponsor continually creates simulations of the ecosystem to fully understand the relationships between different participants. For example, Uber does millions of forecasts in real time to balance supply and demand for its ride hailing service. A sponsor plays a dominant role in governance by maximizing value not only for itself but also for others (eg, guiding producers by providing insights from consumers).

In this co-ordination role, the sponsor needs to constantly refine incentives to encourage participants to part with data, while still allowing participants to receive an appropriate share of sales to operate profitably. For example, in helping brick-and-mortar shops digitise their operations, in exchange for data from such businesses, Alibaba strives to balance the exchange of value for both sides. Ecosystem sponsors may offer technology tools to producers in exchange for data, but building trust can still be a challenge. The reason Amazon discontinued its credit card reader for small- and medium-sized businesses is that merchants were hesitant to divulge detailed information on their operations.

Sponsors looking to optimise value for all across the ecosystem have to determine how much and what kind of data to share within supply chains, so that producers can improve their offerings. On one hand, sharing enriched data with the value chain, like the type of promotions customer groups respond to, can help providers differentiate from competition. For instance, Walmart’s e-commerce platform (Jet) shares data with brands to create a better ecosystem outcome. On the other hand, sharing too much information can result in anger or loss of customer. Firms like Facebook, for instance, have faced backlash for sharing consumer data within its supply chain. Compliance with data protections regulations is key.

32 Like Grab-for-Business, which offers solutions to common problems with work-related travel in Myanmar, such as not being able to keep track of employees’ rides, missing or faded receipts, price haggling, price certainty and safety.

33 “Alibaba says New Retail strategy is paying off as Hema shopper data shows bigger average spending”, South China Morning Post, 17 September 2018.

34 Amazon allowed small businesses to use a small credit card reader to accept plastic for purchases using a phone or tablet. See “Everything You Need To Know About What Amazon Is Doing In Financial Services”, cbinsights.com, 2018.

35 “Nike Partners Up for Online Sales While Protecting Its Brand”, Barrons, 5 October 2018.

The building blocks for value creation

The outlook for digital ecosystems will depend on a number of key factors. These include the maturity of existing infrastructure, access to new sources of data and technology, ability to develop domain expertise as ecosystems expand across industry domains, maintaining and increasing consumer engagement with ecosystems by continually offering new products and services, and regulatory openness to new models of business (see Figure 16).

A number of key factors will determine how ecosystems find new opportunities and ramp up growth.

Figure 16
Defining factors that shape the scope and potential success of ecosystems

<table>
<thead>
<tr>
<th>Defining factors</th>
<th>Relevant areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Key infrastructure</td>
<td>Access to (digital) assets, eg, satellite, cables, devices, network services</td>
</tr>
<tr>
<td>2 Data: sensors, intelligence</td>
<td>Access to digital data, maturity of sensor technology</td>
</tr>
<tr>
<td>3 Domain expertise</td>
<td>Access to deep knowledge of the skills and processes in new sectors</td>
</tr>
<tr>
<td>4 Switching costs</td>
<td>Real or perceived cost of transferring for consumers and producers</td>
</tr>
<tr>
<td>5 Regulation</td>
<td>New barriers, tightening government regulation</td>
</tr>
</tbody>
</table>

Source: Swiss Re Institute

The maturity of existing infrastructure can be either an enabling or a limiting factor for services in ecosystems.

Some of the larger ecosystems are choosing to build their own end-to-end infrastructure.

Ecosystems often leverage existing infrastructure to find new opportunities (eg, Uber and Airbnb were able to make use of existing infrastructure (ie, cars and apartments that people own, and existing online connectivity) to grow. Less mature or restricted infrastructure on the other hand, can cap the range of services and data collection. For example, slow online connectivity can limit how participants in an agriculture ecosystem interact with farmers; a 3G network may be slower than a 4G equivalent.

In some domains, ecosystems may be able build out their own end-to-end infrastructure. Such as in healthcare, where Amazon is building specialised distribution capabilities to handle products that are difficult to transport. With additional licenses and a temperature-controlled supply chain, it may soon be able to expand beyond distribution of products that are easy to transport and take on more profitable and specialised roles, thus increasing the economic value transacted within the ecosystem. For example, with its acquisition of an online pharmacy in 2018, Amazon could be moving in the direction of shipping pharmaceuticals directly from manufacturers to consumers.37

Source: Swiss Re Institute

37 With its acquisition of mail-order pharmacy PillPack, Amazon has gained a built-out pharmacy supply, and pharmacy licenses in all US states. See “Amazon In Healthcare: The E-Commerce Giant’s Strategy For A $3 Trillion Market”, cbinsights.com, 2018.
The advent of 5G could make wireless networks cheaper to install, maintain and update, enabling new business cases beyond consumer-focused end markets. For instance in B2B, factories could be connected in real time allowing manufacturers to better monitor materials and processes globally. The speed at which new spectrum is made available will be a key determinant of an ecosystem’s ability to leverage new types of networks. In addition, the advent of edge and fog computing could move data processing to or near the source of data generation to increase transaction speed and to create new intelligence (Figure 17 shows the evolution of network infrastructure over time).38

**Figure 17**

Evolution of network infrastructure

<table>
<thead>
<tr>
<th>Description</th>
<th>Early 1980s</th>
<th>Early 1990s</th>
<th>Early 2000s</th>
<th>Late 2000s</th>
<th>Now-Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Early networks were funded by a few governments such as the US</td>
<td>Migration to dial-up internet and proliferation of client-server networks</td>
<td>Internet penetration in developed world exceeds 50%</td>
<td>Change economics of networked computing in terms of fixed investment</td>
<td>Further change of networked computing to further reduce investment, add IoT</td>
</tr>
<tr>
<td>Examples</td>
<td>Arpanet</td>
<td>Top-level domains eg. .com take hold</td>
<td>Appliances shipped with IP addresses</td>
<td>AWS, GCP, and Azure</td>
<td>Make appliances “smart”</td>
</tr>
<tr>
<td>Objectives</td>
<td>Connect researchers and military</td>
<td>Connect universities and companies</td>
<td>Connect companies, governments, universities &amp; consumers</td>
<td>Create more elastic networks that extends networked computing</td>
<td>Move intelligence out to network edges to increase speed and create new “intelligence”</td>
</tr>
</tbody>
</table>

Source: Swiss Re Institute

38 Edge and fog computing allow decentralised data processing at or near the source of data generation, which is essential for many IoT applications. This is superior to technologies that only allow centralised data processing. See "Edge and fog computing: Cutting through the haze", cisco.com, 11 June 2018.
Sensor data, and “intelligence”

Larger time series of structured data remain in focus. However, unstructured domain specific data (e.g., text, audio and video) is also an opportunity, as of yet not fully exploited. Advances in technologies such as miniaturised sensor networks enable continuous monitoring and collection of new types of unstructured data, both internal and external.\textsuperscript{39} Although accessing new data sets is important, the key differentiator is assembling, standardising and calibrating such data to create unique insights that are hard to copy. Figure 18 depicts data exchange within ecosystems.

Data needs to be appropriately structured before it can be exchanged and analysed. In newer sectors like telematics, data components are not yet standardised across providers and are difficult to exchange. We expect more consortia will seek to integrate ecosystem stakeholders to manage date standardisation, data exchange policies, governance (e.g., the Mobility Open Blockchain Initiative, and B3i for Blockchain Insurance).

Figure 18
How the nature of data exchange in ecosystems can impact risk modelling

Despite access to more and more-granular data, poor infrastructure might limit new ways in which providers can use the information. For example, new products based on real time data may not work if network connectivity is poor. Also, as consumers grow more concerned about data security, they may increase their use of privacy filters which could counteract the use of new types of unstructured data by insurers.

Providers need additional expertise as they go beyond their existing domains.

Ecosystems may have to borrow technology applications from other sectors.

Expansion plans can face obstacles.

Domain expertise

Shifting across domains and even adding new services within a domain can require additional and specific expertise that takes time to develop. As an example, a challenge for mobility provider ecosystems is how to integrate public transportation facilities like buses and trains into their existing private sector offerings. In some markets, firms like Whim in the Finnish capital Helsinki have integrated all the city’s mobility options into one app.\(^{40}\) In others, particularly in emerging markets, this integration poses challenges as customers do not have a unified payments method, such as one mobile wallet.\(^ {41}\)

As ecosystems seek to transform into one-stop-shop destinations for various digital consumer and business services, they need to translate the application of new technologies across different domains, which can have unpredictable effects. Behavioural economics can play a role in mitigating some of the risks. For example, ecosystems moving into online retail may assume that giving customers access to new 3D scanning tools will help the consumers find better-fitting clothing and improve the experience. But a recent study has showed the direct opposite: people’s self-body image takes a hit after seeing themselves in a 3-D body scan.\(^ {42}\)

Managing areas of friction

As it expands, a digital ecosystem may encounter and need to manage areas of friction that can constrain growth potential. These include switching costs, location-specific factors and regulation.

Switching costs

Customer loyalty to incumbent institutions will also determine how rapidly a new ecosystem can spread. Emerging ecosystems increasingly offer multiple touchpoints to capture user attention. Tencent’s WeChat app in China, for instance, combines features typically offered by standalone incumbent firms into a one-stop-shop service. It increases customer retention by solving offering many services (eg, banking, insurance renewal, taxi hire, video conferencing, doctor appointments, filing police reports, gaming, etc). Insurers can benefit from customer loyalty to such ecosystems. For example, Aviva recently partnered with Tencent to test online distribution of critical illness policies.\(^ {43}\) Aviva brings underwriting expertise that lies outside Tencent’s core competency, while Tencent offers Aviva increased reach through its ability to target specific segments, and can mine WeChat user behaviour.

Insurers are considering upfront investments in areas where it is not easy for customers to switch, such as smart-home investments.\(^ {44}\) These investments allow insurers to develop stronger customer loyalty, and help consumers better manage their daily lives. Switching costs are higher when customers have to invest upfront in physical products (eg, moving from one smart home platform to another) or face administrative hassles (eg, restaurants prefer not to switch ordering and payment operators many times). Switching costs are lower in sectors where users can engage with more than one ecosystem at the same time (eg, in transportation, or social media where multiple competitors co-exist).

40 See https://whimapp.com/
41 “More than a ride-sharing company: how Grab became a market leader in Southeast Asia”, The Drum, 2 March 2018.
42 “Dissatisfaction in three dimensions: Researcher finds link between 3-D body scans, feelings of dejection”, sciencedaily.com, 5 February 2018.
43 “Hong Kong’s first pure digital insurance venture, Tencent-backed Blue, to start selling policies”, South China Morning Post, 12 September 2018
44 “Which Smart Home Startups Have Insurers Invested In?”, cbinsights.com, 4 March 2018.
The building blocks for value creation

To prevent switching, sponsors may sometimes have to cannibalize existing offerings to invest in new ones.

In some sectors and markets, local customisation is as important as building rapid network effects...

Offerings combining online and offline services differentiate by quality of service, and rarely fit a global template.

Regulatory complexity varies by domain, and regulators may fail to appreciate new applications of technology.

In the process of building a broader footprint to pre-empt switching, ecosystems may sometimes need to cannibalise core offerings. For example, Uber undercut its original ride-hailing business with a cheaper carpooling service, and Tencent cannibalised its instant messaging product (QQ) to create WeChat. This trend could accelerate in the future. For example, Apple’s desire for its iWatch to be at the centre of consumer wellness and preventive health could render its iPhone obsolete. People can already make calls from the iWatch and AirPods.45

Local particularities and global boundaries
Local particularities can impact how consumers value ecosystem solutions in different markets. A 15-minute online medical consultation bundled with an insurance policy can be a huge step-up in markets with poor primary healthcare facilities, but could be considered less than ideal in developed markets where practice and expectation has for many years been in-person consultation with a doctor. A reason many ecosystems struggle to expand internationally is slowness to customise offerings to local practices. For example, Uber exited Southeast Asia because local competitors were quicker off the mark to offer a host of innovative features relevant for local market conditions, such as acceptance of cash payments, driver verification and additional safety controls.46

Scaling rapidly at the cost of localization is problematic when combining digital and physical experiences, because service delivery in the physical world (which is a key driver of customer differentiation) is sensitive to local factors and harder to scale using a global template. In sectors that require strong physical customer service such as transportation and healthcare, ecosystems that allow freedom to incorporate localised digitisation strategies often fare better.47

Regulation
The regulatory architecture will play an important role in shaping the integration of re/insurance into new ecosystems. Errors or bias in algorithms that prompt dubious insurance decisions could become an area of regulatory scrutiny. Regulators may struggle to understand a complex and proprietary algorithm that insurers have based a decision to deny coverage or reject a claim on. This could undermine the ability of regulators to fulfil their core supervisory and consumer protection responsibilities (see Figure 19 for some regulatory challenges vis-a-vis digital ecosystems). Regulators may also play a role in deciding whether local or foreign led ecosystems are allowed to dominate in new areas. For instance, they may require foreign entrants to accept greater supervision than local ecosystems.

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46 “Uber’s defeat in Southeast Asia calls into question its “barge in” expansion strategy worldwide”, Quartz, 26 March 2018.
Regulators may be concerned about the market power that dominant ecosystems wield over suppliers.

By bringing new definitions to traditional roles, ecosystems are constantly pushing boundaries. For example, they are now calling for equity ownership rules to include a new category of shareholders, the “gig economy workers”. In some regions, regulators may take issue under competition laws and regulations with sponsors of large, almost monopoly ecosystems that have the power to exclude producers from their market place without right of appeal. Historically, only state actors have had the power to cancel licenses or otherwise exclude. Regulators may view such “governance by exclusion” as abuse of power.

Collecting and curating suitable, sufficient data
Making algorithms interpretable and diagnosable
Defining what constitutes algorithmic malpractice in the machine intelligence arena
Architecting and complying with data privacy regulations
Addressing conflicts arising from human notions of law, fairness, and justice and machine-intelligence capabilities that can circumvent protections
Addressing system fragility as interconnected and complex networks are infused with machine intelligence
Addressing growing cyber-risk in digital ecosystems infused with machine intelligence

Source: Swiss Re Institute

Figure 19
A selection of regulatory challenges relevant for digital ecosystems

Regulators in some markets could limit the extent to which ecosystems can mine customer insights. The European Commission recently said that ecosystem sponsors assume much greater authority over user uploaded content than consumers realise. With regulatory regimes likely to follow different approaches, ecosystems and their insurance partners operating in markets with less restrictive regulation on data access, especially in large population-markets, may be able to generate greater volumes of critical data to inform, improve and build more complex algorithms. Over time, models developed in such markets could become more accurate than in markets with more limited data access, but also make the situation more challenging for regulators, who may be behind the curve.

48 Airbnb has asked the SEC to allow it to issue equity in its company to hosts. See “Airbnb Petitions SEC to Allow Hosts to Get Equity”, fortune.com, 21 September 2018.
49 However, it is difficult to determine whether governance is operating for the health of the ecosystem as a whole, or primarily to advance the interests of the sponsor or owner. See Evert Verhulp speak on “Regulatory challenges in the platform economy”, youtube.com, 24 January 2018.
50 “Facebook warned to amend TsS to fix EU consumer rights issues by year’s end”, techcrunch.com, September 2018.
The implications of the advance of digital ecosystems for re/insurance will depend on how the sector’s risk-absorbing capabilities and regulatory frameworks evolve. It could be that digital ecosystems foster further incremental changes similar to past technological developments, yet broaden the scope and affordability of insurance to more households and businesses. Alternatively, ecosystems could prove more disruptive if some of the typical hurdles to innovation can be overcome, especially in relation to the capture and analysis of information to assess risk more accurately.

**Economic opportunities for insurers**

Insurers have generally been slow to embrace new technologies, but there are signs that many incumbents are looking to upgrade their digital capabilities. Current trends have increased awareness of insurance ecosystems among insurers. In a survey, 76% of insurers agreed that competitive advantage will not be determined by their organisation alone, but by the strength of the partners and ecosystems they choose. And 94% said adopting a platform-based business model and engaging in ecosystems with digital partners would be critical to their success. Ecosystems offer opportunities to insurers across business model (eg, B2B, B2C) and lines of business (L&H, P&C, see Figure 20).

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Insurers have already tapped into obvious opportunities such as liability risk for vehicles and car owners in mobility ecosystems (B2B insurance). New opportunities are emerging across business models. These include accident insurance for passengers (B2C) and drivers (B2E), and health insurance for drivers and their families (B2B2C). For example, AXA recently partnered with BlaBlaCar to offer three tiers of coverage from third-party liability protection to comprehensive insurance for risks including collision damage.

Insurance can also be embedded into offerings to ecosystem partners. This can involve financing solutions for drivers, agents and merchants in the form of working capital loans, and consumer goods financing. Insurers could even participate in consumer-to-consumer (C2C) networks where risks with limited exposure are co-insured (e.g., collision damage on a motor policy). Insurance could be offered across business line siloes within an ecosystem. For example life, health, property and casualty insurance can be integrated into all-in-one flexible policies, providing cover for motor, travel, home and health exposures as and when needed.

### Insuring emerging digital risks

**New protection gaps:** New risk categories emerge as the overall complexity of ecosystems increase, giving rise to new exposures and associated insurance opportunities. For instance, as the ride sharing and autonomous vehicles sectors evolve, a consequence could be less individual vehicle ownership and a big market for commercially-owned vehicles. At the same time, automated driving shifts the associated risks from human error-related to those linked to mechanical or computer malfunction. This means liability for any resulting losses (and therefore those parties who might seek insurance) will increasingly shift to the manufacturer/designer of the equipment within an ecosystem rather than the user.

Another emerging area of digital risk is the increasing trend of private individuals engaging in commercial activities using personal assets. This in addition to a growing prevalence of “bring your own device” (BYOD) culture as participants (firms and organisations) in ecosystems allow employees, business partners and other users to utilise personal devices to run enterprise applications and access data. Gartner predicts that 90% of organisations will support some form of BYOD, making maintaining IT security with an ecosystem more challenging.

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52 Chubb partners with Grab to offer accident, hospitalization coverage to both passengers and drivers. Airbnb already embeds B2C insurance coverage in the platform.

53 “AXA and BlaBlaCar launch BlaBlaSure, the first insurance offer for rideshers”, axa.com, 29 May 2018.

54 Gartner Predicts, Gartner, January 2018.
The IoT increases the range of vulnerabilities...

The growing numbers of participants has security implications for all parties in an ecosystem’s supply chain.

Risks go beyond corrupted data and include loss from damage to property, reputation and business interruption.

Cyber and IoT risk: As analog systems and processes convert to digital, businesses and households face a new scope of potential data and security breaches (see Figure 21). IoT devices in healthcare, mobility and logistics generate huge volumes of data, often sensitive and personal information, and interact with critical infrastructure. Both the data and infrastructure are exposed to risk. Gartner predicts, regulatory compliance for critical infrastructure will drive IoT security spend to USD 1 billion globally by 2021, up from less than USD 100 million today.55

Counterparty risks: As digital integration grows, anonymous entities interacting with each other could expose an ecosystem to weak-link risk. Regulatory pressures will impact how all parties in an ecosystem’s supply chain think about cyber risk, as compliance requirements and liability for damages from a breach could increase for all. Not all companies or institutions are fully aware of the risks embedded in their supply chain. For example in Europe, 80% of companies do not assess the cyber risk profile of their suppliers.56

Business interruption: Worries about the costs of a cyber attack/security breach are no longer confined to coping with lost, stolen or corrupted data. There is also growing corporate concern about potential damage to property and reputation, and the costs associated with business interruption (BI) or severe disruption to critical infrastructure due to, for example, operational issues at a key supplier.

55 Make Privacy a Top Priority for Your IoT Project, Gartner, 2018.
System failures: The rapid pace of technology change renders systems obsolete. An obsolete IT system at hospitals could put health ecosystems at risk. Along similar lines, devices no longer used but still online (e.g., legacy CCTV cameras) present hackers with an opening to enter a network. Some ecosystem partners may access the internet using outdated tools like older versions of web browsers, which may be vulnerable to new spyware, malware, and viruses.

Despite the rapid growth of ecosystem risks, the role of re/insurers is still small.

In this context of growing hazards, widening sources of vulnerability, and heightened regulatory pressure, we expect that demand for risk protection solutions within digital ecosystems will increase. To broaden and deepen the market, close cooperation between ecosystems sponsors and insurers will be necessary.

Adapting the insurance business model

The future role that insurers play in digital ecosystems will depend on two factors:

- Knowledge of the consumer: the extent to which insurers know their end customer’s goals, needs, and aspirations; and
- Business design: the extent to which insurers want to control the value chain, or drive an ecosystem that delivers on the end customer’s needs.

Figure 22
Strategic options for insurers in a digital ecosystem

<table>
<thead>
<tr>
<th>Knowledge of end consumer</th>
<th>Value Chain</th>
<th>Ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complete</strong></td>
<td><strong>Omni-channel business</strong></td>
<td><strong>Ecosystem driver</strong></td>
</tr>
<tr>
<td></td>
<td>“Owns” customer relationship</td>
<td>Provides a branded platform</td>
</tr>
<tr>
<td></td>
<td>Multiproduct, multichannel customer experience to meet life events</td>
<td>Ensures great customer experience</td>
</tr>
<tr>
<td></td>
<td>Integrated value chain</td>
<td>Plug-and-play third-party products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer knowledge from all data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matches customer needs with providers</td>
</tr>
<tr>
<td><strong>Partial</strong></td>
<td><strong>Supplier</strong></td>
<td><strong>Modular producer</strong></td>
</tr>
<tr>
<td></td>
<td>Sells through another company</td>
<td>Plug-and-play product/service</td>
</tr>
<tr>
<td></td>
<td>Potential for loss of power</td>
<td>Able to adapt to any ecosystem</td>
</tr>
<tr>
<td></td>
<td>Skills: low-cost producer, incremental innovation</td>
<td>Constant innovation of product/service</td>
</tr>
</tbody>
</table>

Business design: the extent to which they want to control the value chain, or drive or be part of an ecosystem that delivers on the end customer’s total needs

End-consumer knowledge: the extent to which they know about their end customer’s goals

Modular Producer: Provides plug-and-play products or services that can adapt to a variety of ecosystems. Needs to continue rolling out new products and services to demonstrate being among the best options available and also well-priced.

Ecosystem Bundler (insurance as non-core): Creating relationships with other providers that offer complementary (or sometimes competing) services. Ecosystem bundler provide a platform for the participants to conduct business; the platform can be more or less open. Insurer acts here as a kind of modular producer.

Ecosystem Owner (Driver): Creating relationships with other i.e. financial services providers that offer complementary (or sometimes competing) services. These ecosystems can be functionally driven (i.e., mobility) or purely financial services driven.

Implications for insurers

Those with low consumer access may act as white label modular producers, while others could play larger roles.

Some could aggregate or bundle services around insurance and plug this into a variety of ecosystems.

Insurers which possess only partial knowledge of the end consumer and typically sell a standard set of offerings through another company, may have to transform into “modular producers”. This means being able to offer plug-and-play white label solutions, constantly innovate their products, and rapidly adapt to newer ecosystems at they emerge (see Figure 23).

Insurers with more complete knowledge of end consumers can play a more active role within an ecosystem. Such insurers typically “own” the customer relationship and currently operate as omni-channel businesses with an integrated value chain which allows them to offer a multi-product, multi-channel customer experience. Such insurers could design their business to play the role of an “Ecosystem Bundler” with modular and flexible product/service aggregation. Here they create relationships with other providers that offer complementary (sometimes competing) services. A bundler can plug an aggregate set of all products and services around insurance into an ecosystem.

Those with low consumer access may act as white label modular producers, while others could play larger roles.

Some could aggregate or bundle services around insurance and plug this into a variety of ecosystems.

Figure 23
Detailed view of insurance business model options

More aggressive insurers could aspire to be “Ecosystem Owners”. In other words, be the sponsor that provides a branded platform and leverages its customer knowledge and data to match customer needs with third-party providers. Their focus is on customer experience and engagement by delivering continuous and valuable interactions. They act as active ecosystem orchestrators, monetising new technologies & services, and accessing new revenue pools, through proactive interaction based on continuous flow of data (personal, behavioural, etc.)

Source: Swiss Re Institute

More aggressive insurers could act as active ecosystem owners.
To contribute to the effectiveness of a digital ecosystem, insurers will need to develop or acquire new competencies.

**New competencies**
Irrespective of the choice of business design, successful insurance providers will need to develop three competencies:

- **Core capabilities**: These will depend on business design. Fundamental for modular producers is access to data and insights, the ability to design modular flexible products, and behavioural economics know-how to understand consumers buying patterns. Ecosystem bundlers will in addition need to acquire bundling, product/service supplier expertise, platform and business operations proficiency. Finally, an ecosystem owner will need all of the above, and sophisticated capabilities in design interface and relationship and engagement.

- **Partnerships and collaborations**: Modular producers will need access to branded and trusted platforms, and third-party support in areas of non-core expertise (e.g., technology, data management, analytics, methods/models). Ecosystem bundlers, meanwhile, will need to go a step further to access a greater variety of platform stakeholders and partners. They will need to demonstrate high flexibility and agility to respond to emerging stakeholder needs, and be able to accommodate the platform capabilities of all stakeholders. Ecosystem owners will again need to cover all of the above, and also have high branding and community building expertise, and best-in-class experience management design.

- **Culture**: Modular producers will operate with a lean, straight-through processing mind set (i.e., automate the transfer of data between systems with minimal or no manual intervention), while at the same time remain open to co-creation. Bundlers will shape a high stakeholder oriented and development culture (front-end openness), with high change tolerance levels and agility, and an open innovation culture. In addition, ecosystem owners will need a highly responsive consumer-driven culture.

**Impact on the existing insurance value chain**

- **Product development**: Insurers that plug in early may be better able to adapt to an ecosystem’s evolution as it expands into new product and service areas. Currently, insurer participation in ecosystems is via classical products such as e-commerce covers, per-ride schemes, and personal accident policies. With more data on customers via the platform, insurers will be able to design more personalised products based on more precise pricing models. For example, Uber or Grab may be able to go beyond a flat fee for each driver, to a real-time price that incorporates insurance cover for the driver and passenger(s).

- **Distribution**: For some products, the fastest way to access a market may be through partnering within an ecosystem structure rather than by direct sales. Insurers will have to identify the capabilities needed to deliver their service, and determine whether ecosystem interactions are the best way to gain these new capabilities. For example, Google’s recent investment in insurance software firm Applied should allow insurers to apply Google technology in areas like artificial intelligence and digital marketing, thereby freeing up agents’ time for other value creation activity.57

- **Underwriting**: New risk pools are being created and insurers are collecting data to underwrite specialised or under-served niches. However, tighter scrutiny by regulators over the use of customer data could impact insurers in digital ecosystems. Worries that the use of Big Data will result in high-risk individuals facing prohibitively expensive premiums or being unfairly denied insurance are at the forefront of regulators’ minds, as already discussed earlier.

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Implications for insurers

Claims: Policy and claims management should become more efficient as machine learning and pattern recognition are used to expedite and accept, but also deny and detect false claims. Insurers participating in digital ecosystems will need to continue to invest in sustaining their reputation for customer-centricity especially as they begin to offer more complex insurance products through ecosystems. In the case of claims denial, the lack of transparency inherent in the growing complexity of algorithms on which claims decisions are based, may weaken consumer trust.

“Where” and “how” to play: a strategic decisions for insurers

Financial services ecosystem play

An insurer ecosystem platform allows participants such as banks, utilities and original equipment manufacturers to access bespoke white-labelled insurance solutions. The participants manage the sales, marketing and distribution of insurance covers while insurers, as modular producers, take care of policy administration, underwriting and claims services. In some cases, the partner may jointly design products and pricing together with the insurer. The more open a insurer’s platform in terms of APIs, the better it can plug into partner apps or websites. In addition to white-labelled insurance solutions, insurers may also aggregate a variety of financial services offerings from other players into the platform, thus acting as a modular bundler within the financial services ecosystem.

Functional ecosystem play

Insurers can move from pure financial service to functional ecosystems that focus on specific areas such as mobility and auto services, home and real estate, healthcare and well-being. The insurance offerings in these ecosystems are enabled by data-driven analytics for that specific domain. For example, as insurers get more customer insights into smart homes, they may develop and integrate new insurance products into security systems of device companies. Due to its digital nature, processes in these ecosystems are provided in a lean and cost efficient manner, and insurance serves as only one of a variety of interconnected services.

Figure 24

“Where” and “how” to play: a strategic decisions for re/insurers

How to play

Consumer interaction & insights intensity

Source: Swiss Re Institute
Holistic ecosystem play

Insurers able to aggregate information from multiple functions and develop deep and well-rounded understanding about how consumers and corporations behave will be in a position to consider a holistic industry ecosystem function. In this role, holistic (risk) insight is a key prerequisite, whereby customer behaviour is deeply understood and products/services tailored accordingly. This is the hardest space to play in because insurers have to operate in ecosystems that are almost purely digital, driven by high frequency interactions and transactions that require application of sophisticated artificial intelligence methods. Customer characteristics and needs are dynamically derived from the insights and applied directly within the value chain, increasing the dependencies of all parties involved.

To summarise, insurers can play a bigger role in boosting resilience within digital ecosystems if they can gain access to richer data, and make advances in risk quantification and in collaboration with ecosystem owners. An important factor influencing the pace of market development will be the capture and analysis of relevant data and information needed to underwrite new risks accurately. Knowledge of the range of risks, their impacts and the reliability of the data are crucial to actuarial efforts to estimate risk occurrences and their impact.
Conclusion

As digitisation continues to permeate society, re/insurers will identify areas that leverage their know-how.

Partnerships and collaborations among re/insurers and tech firms appear to show the way forward.

Unstructured data, such as text and voice, constitute a potential treasure trove of insight-generating resources.

Digitally-informed customer strategies and generation of behavioural insights are another important investment.

Effective implementation of technology will be a key differentiator for forward-thinking reinsurers.

Building scalable risk modelling expertise will be a key differentiator to adapt to changes in the ecosystem.

In recent years, digitisation has transformed the consumer retail, transportation, healthcare and manufacturing sectors, but less so insurance. However, as premium growth has slowed in recent years, insurers are looking to a variety of approaches to differentiate products and services within the rapidly expanding new economy sectors. Participating in digital ecosystems is one such option, but will require that insurers to invest in the following areas:

Building a superior partner network: identifying innovative and appropriate ecosystem partners and suppliers, including in the technology space, to offer unique value propositions to customers. Competition for suitable partners is high, and relationships need to be fostered, the focus being on creating mutual value.

Accessing unique and large data sets: efforts are underway to collect data beyond what is already a data-intensive process to feed pricing models and improve risk selection. Insurers have volumes of useful - but currently unstructured, unexplored and unexploited - data across their organisations and networks.

Developing deeper customer insights: putting the customer at the centre of the ecosystem and aligning all actions to customer needs. Using behavioural insights to personalise offerings is essential. This holds true even if a insurer does not own a customer relationship directly. Digitally-informed brand strategies are an important investment, encompassing how data are managed, how customer needs are met, and the extent to which regulators are satisfied.

Data analytics and autonomous robotics: the more insurers understand data and its contextual relationships, the more sophisticated risk modelling can become. Artificial intelligence stands to reshape the risk landscape in profound ways, resulting in better simulations. At the same time, robotics can generate significant operational efficiencies by automating repetitive back-end processes.

Scalable risk modelling expertise: building superior risk models based on existing and unique data sets combined with analytical methods and tools that can be scaled across ecosystems and value chains. This enables insurers to make appropriate adjustments to value chains to take advantage of insurance opportunities in a more dynamic world of changing ecosystem designs.