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Application of AI, Insurtech and Real Estate Technology

Introduction to Insurtech

Professor Christopher Geczy, PhD

Introduction to Insurtech

- The insurance industry is global and diversified across applications and subsegments
- Gross Written Premium (GWP) was \$4.8 trillion in 2017*
 - The amount of insurance written, not including commissions and costs
- Net income worldwide grew 23% last year, vs. actual growth of 14% in 2017*

* Ernst & Young, "Global Insurance Trends Analysis 2018," June 2018.

Introduction to Insurtech

- The insurance industry needs to respond to technological change & disruption
 - Wearables
 - Driverless vehicles
 - Internet of Things
 - “Big Data”
 - Natural language processing
 - Blockchain
 - Distributed ledger technologies
 - Climate change
 - Etc.
- New technologies offer opportunities to increase efficiency in the industry and serve new markets

* Ernst & Young, “Global Insurance Trends Analysis 2018,” June 2018.

Introduction to Insurtech

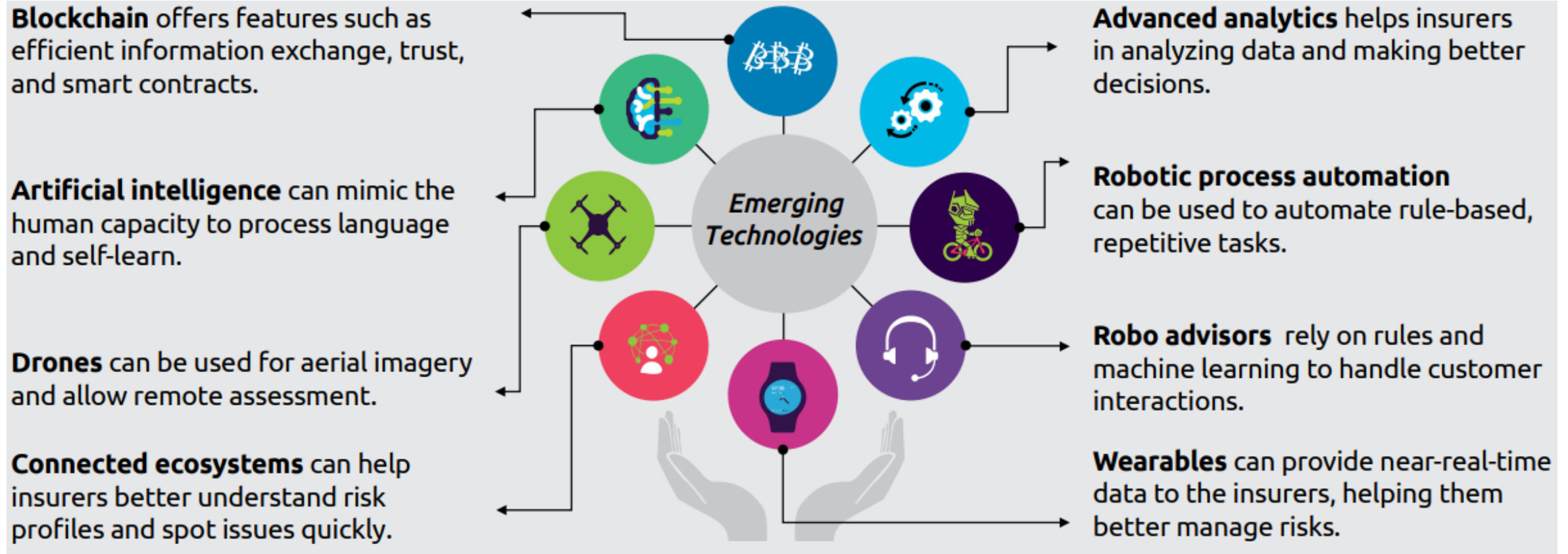
- There is no standardized definition of insurtech
- It is said to be revolutionizing the insurance industry and changing the way insurers do business

* Milken Institute, "InsurTech Rising: A Profile of the InsurTech Landscape," December 2018.

“ InsurTech can be described as “an insurance company, intermediary, or insurance value chain segment specialist that utilizes technology to either compete or provide valued-added benefits to the insurance industry.”

– SIA PARTNERS, 2016

Key Emerging Technologies Leveraged by Insurtech Companies



Source: Capgemini World InsurTech Report 2018



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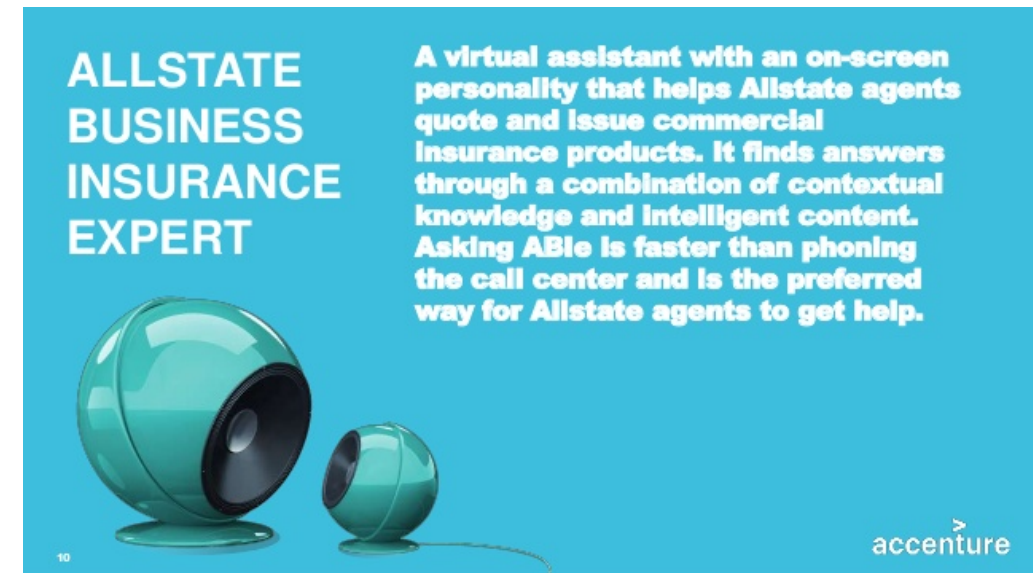
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Emerging Technologies: AI & Machine Learning

Professor Christopher Geczy, PhD

Key Emerging Technologies Leveraged by Insurtech Companies

- Artificial Intelligence
 - A descriptor for software which can perform functions ordinarily associated with human reasoning
 - Iterative learning
 - Self-awareness & emotions
 - Insurers hope to exploit AI for chatbots
 - Allstate's Allstate Business Insurance Expert (ABIE)
 - Provides answers in real time to customer owners' questions
 - Other insurers have followed



Source: "What Is Insurtech and How Are Insurers Using It?"
<https://www.thebalancesmb.com/what-is-insurtech-4584490>.

Graphic: Accenture presentation: "Accenture's 2017 Technology Vision for Insurance."

Key Emerging Technologies Leveraged by Insurtech Companies

Machine Learning

- Enables computers to "learn" over time
- Using algorithms & mathematical models to simulate neural networks in the human brain
- Allows computers to extract patterns from raw data rather than following specific instructions
- Gives the appearance of being closer to the activities of the human brain
- Some insurance companies amass large amounts of data
 - Yet, according to the National Association of Insurance Commissioners, most insurers use only 10 to 15% of the data they collect

Source: "What Is Insurtech and How Are Insurers Using It?"
<https://www.thebalancesmb.com/what-is-insurtech-4584490>.

Key Emerging Technologies Leveraged by Insurtech Companies

- Machine learning could allow insurers to mine their data more effectively and extract valuable information
 - Risk modeling: Analyze claims data to predict the risk of future losses
 - Demand modeling: Predict demand for their products in the future and to estimate premiums
 - Detecting fraud: Identify patterns of behavior that aren't obvious to human adjusters
 - Processing claims: Automate claim reporting and processing
 - Underwriting: Help underwriters analyze data collected from applicants.
 - Computers can aid in the decision making process, flag risks or inconsistencies in data that underwriters might not be able to see
 - Can also check external sources such as social media to verify the accuracy of the data

Source: "What Is Insurtech and How Are Insurers Using It?"
<https://www.thebalancesmb.com/what-is-insurtech-4584490>.



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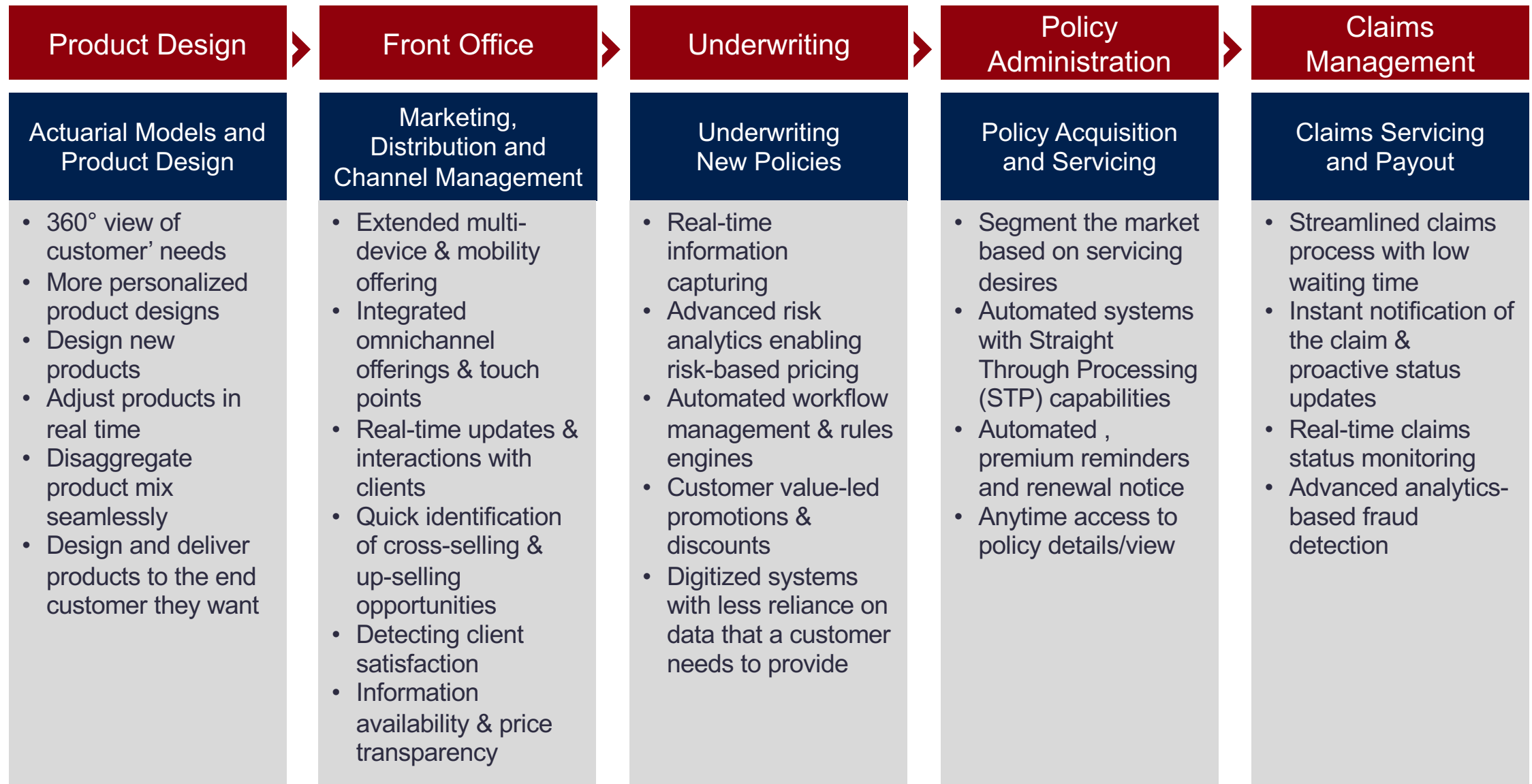
Redefining the Insurance Industry

Professor Christopher Geczy, PhD

Redefining the Insurance Industry

1. Product Design
2. Selling & Marketing / Front Office
3. Underwriting
4. Policy Administration
5. Claims Management

Insurtech Are Redefining the Insurance Industry



Source: Capgemini World InsurTech Report 2018



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Classification of Insurtech Companies

Professor Christopher Geczy, PhD

Segmentation of Insurtech Firms

- There are different classification methods for InsurTech firms and initiatives, but they rotate to similar concepts:
 - A “traditional” view: Full-stack / Agents / Brokers
 - A nuanced view of sub-segments: Carriers / Enablers / Distributors

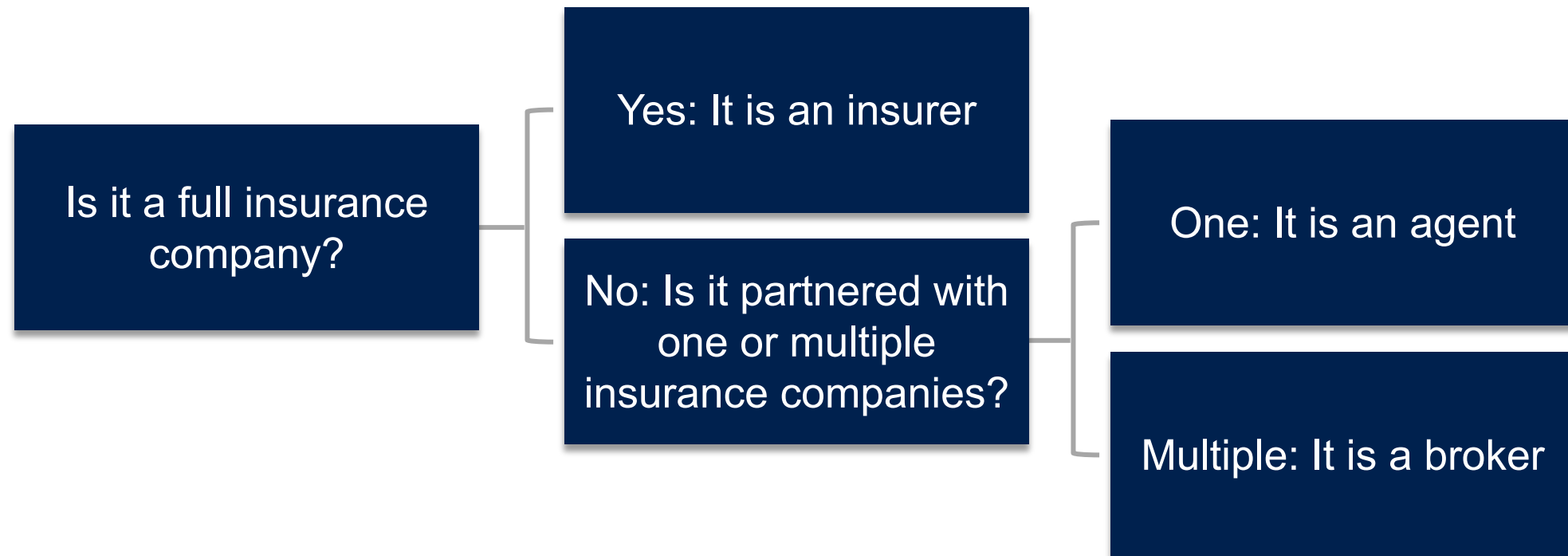
Segmentation of Insurtech Firms

- Milken Institute has three main classifications:
 - Full-stack Insurers: Platforms that underwrite policies, assume the risk, and, in most cases, manage the process from beginning to end
 - Agents: Platforms that act on behalf of a carrier, essentially acting as an extension of an incumbent carrier
 - Brokers: Platforms that provide customers with a variety of policies offered by both incumbent carriers and insurgent InsurTech platforms
 - May or may not be paid commission based on the policies sold through their platform
 - May require customers to scroll through policies offered or automatically connect customers to a preferred policy through algorithms employed & based on a user's response to a set of questions

Milken Institute, "InsurTech Rising: A Profile of the InsurTech Landscape," December 2018.

Segmentation of Insurtech Firms

- To make the classification:



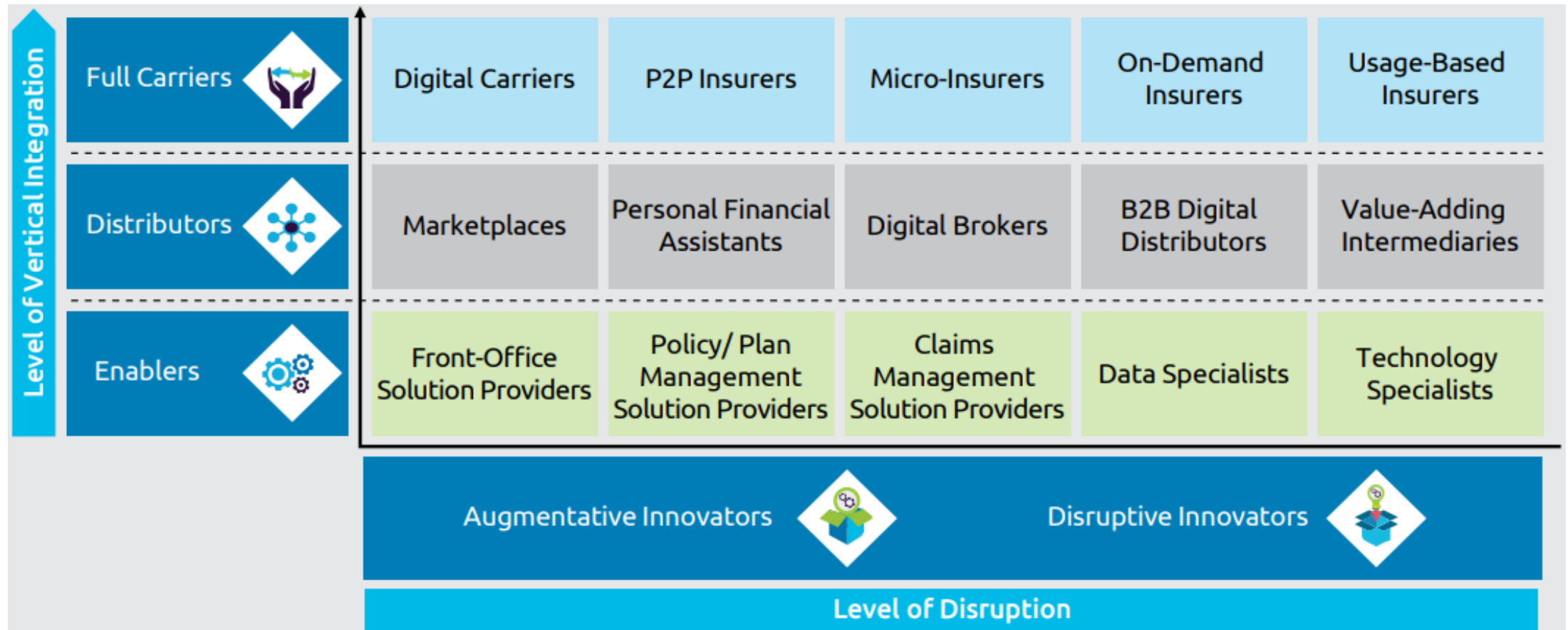
Milken Institute, "InsurTech Rising: A Profile of the InsurTech Landscape," December 2018.

Classification of Insurtech Firms: Capgemini

- Second classification system, used by Capgemini
 - It categorizes InsurTech providers by their role in the distribution chain:
 - Enablers
 - Distributors
 - Full Carriers

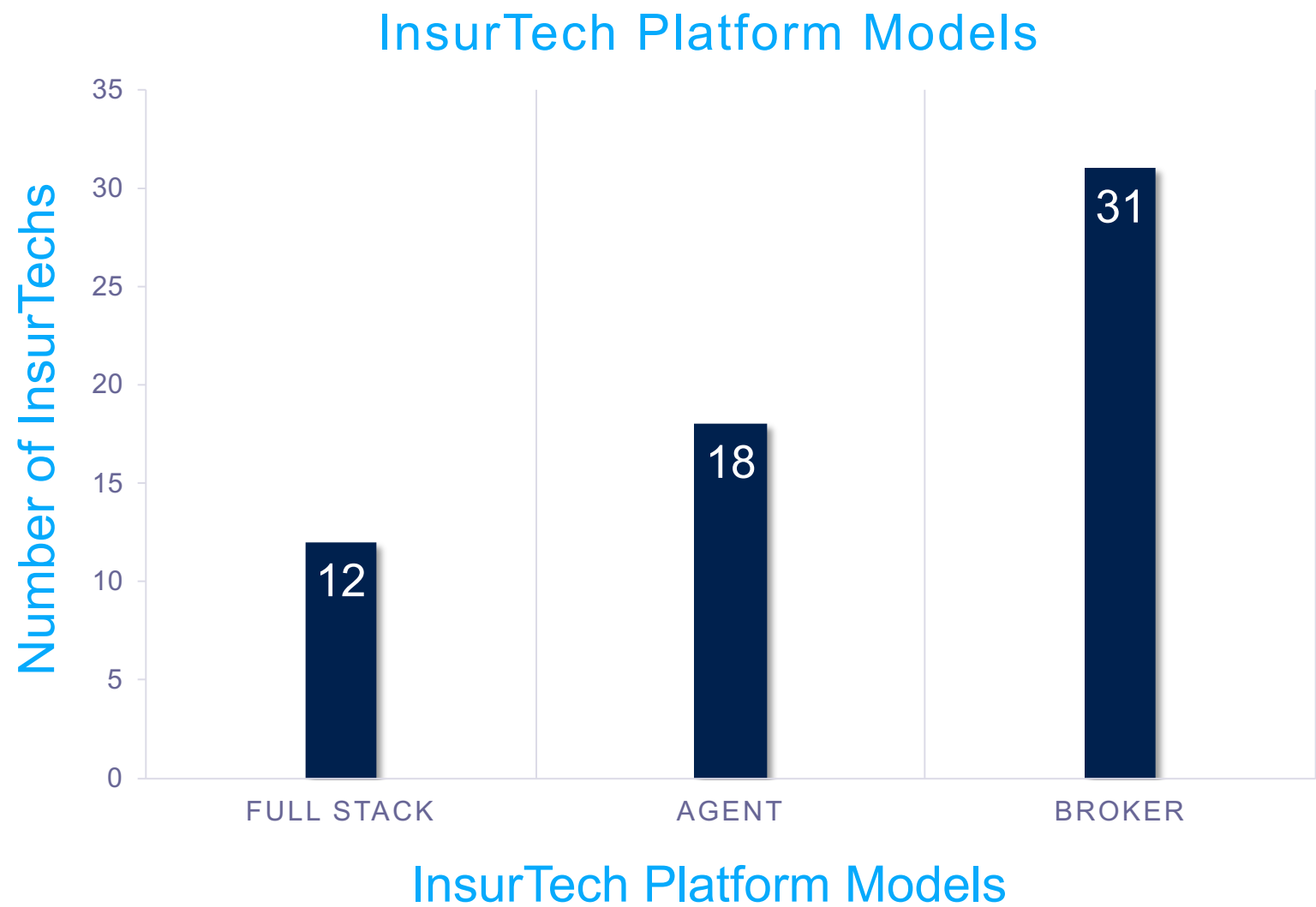
Source: Capgemini World InsurTech Report 2018

Classification of Insurtech Firms: Capgemini



Source: Capgemini World InsurTech Report 2018

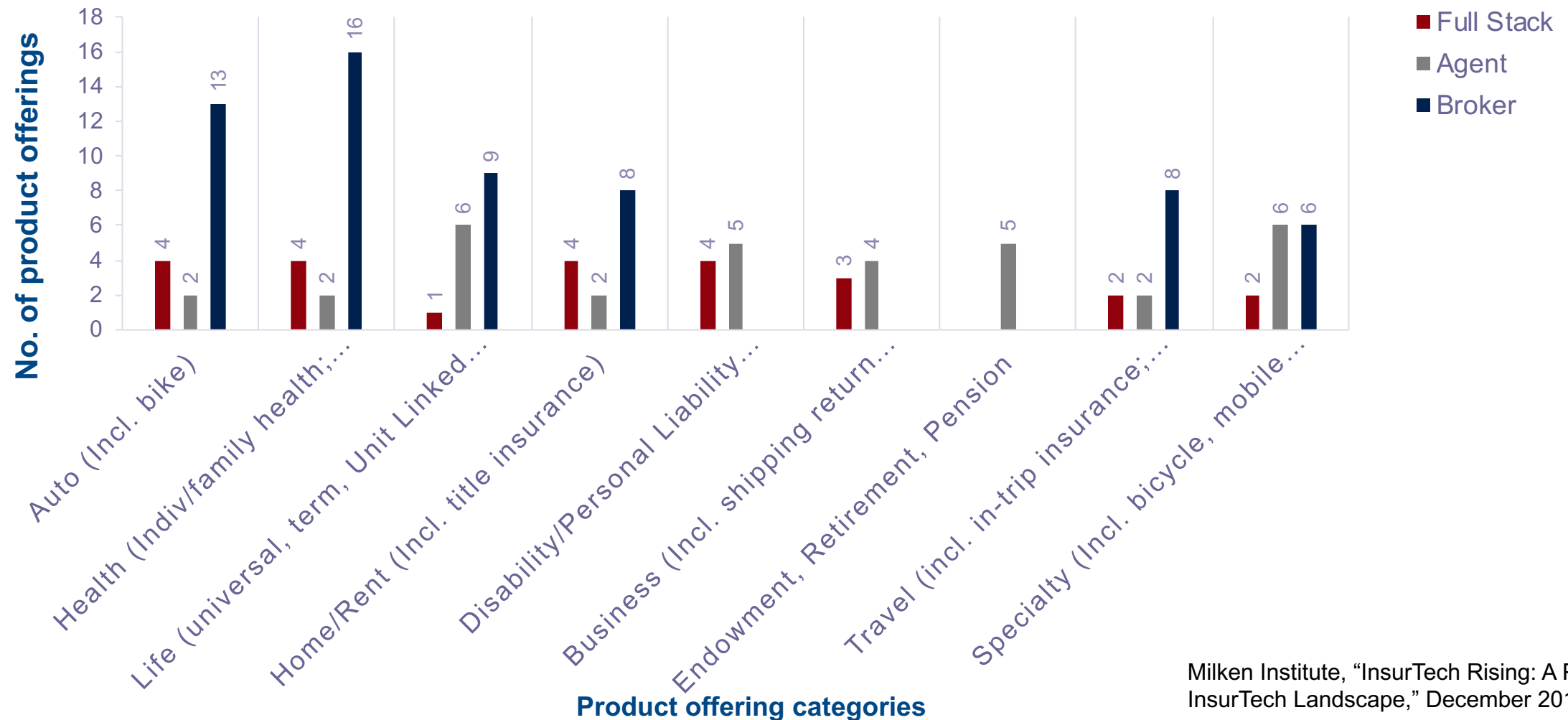
Segmentation of Insurtech Firms by Model



Milken Institute, “InsurTech Rising: A Profile of the InsurTech Landscape,” December 2018.

Segmentation of Insurtech Firms by Model and Product

Type of Insurtech Platform, by Product Offering



Milken Institute, "InsurTech Rising: A Profile of the InsurTech Landscape," December 2018.

Segmentation of Insurtech Firms

- A significant portion (approximately 40%) of Insurtech companies could better be described as technology solution providers
 - Human Resources and Earned Benefits Solution Providers
 - Data Solution Providers
 - Infrastructure Solution Providers

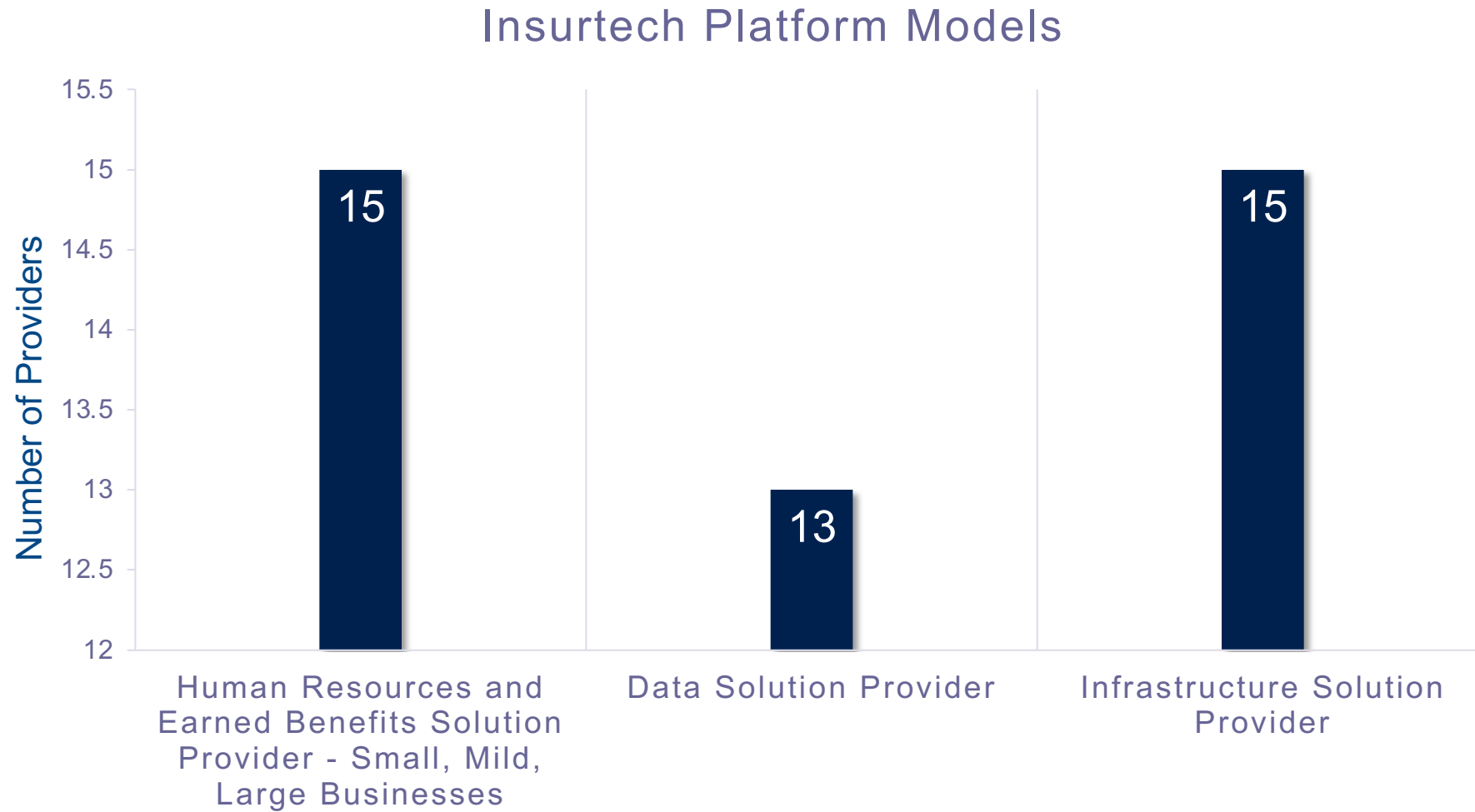
Milken Institute, “InsurTech Rising: A Profile of the InsurTech Landscape,” December 2018.

Segmentation of Insurtech Firms

- Human Resources and Earned Benefits Solution Providers
 - Platforms using or deploying technology to help firms manage their human capital more efficiently and cost effectively
- Data Solution Providers
 - Platforms that specialize in collecting, aggregating, and/or analyzing vast quantities of data to support (re)insurance carriers, startups, and other stakeholders
- Infrastructure Solution Providers
 - Platforms that focus on making back-end processes more efficient through the use of application programming interfaces (APIs) or that provide the means by which platforms can integrate and/or build customizable insurance products and services

Milken Institute, “InsurTech Rising: A Profile of the InsurTech Landscape,” December 2018.

Number of Technology Solution Providers in Insurtech Market



Type of Tech-Solution Providers

Milken Institute, "InsurTech Rising: A Profile of the InsurTech Landscape," December 2018.

Examples of Full-Carrier Insurtech Firms

	Insurtech Firm Type	Products/Services Offered	Example
Full Carriers	Digital Carrier	Traditional insurance model conducted online or on mobile	ZhongAn is a Chinese property insurer that uses the online channel to sell its products and handle claims
	P2P Insurer	A risk-sharing network where a group of associated individuals pools their premiums to insure against risk and generally stands to benefit regarding premium returns	insPeer , a France-based community insurance platform, allows members to pool in money within a group for covering a group member's deductible
	Micro Insurer	Smaller insurance packages with lower premiums and typically lower coverage	Leveraging mobile technology, BIMA offers affordable insurance products to low-income populations in emerging markets
	On-Demand Insurer	On-demand insurance coverage that can be purchased online as well as via mobile apps	New York-based Sure offers on-demand personal or episodic policies that a user can buy either via website or an app
	Usage-Based Insurer	Premiums prices per usage or risky behavior displayed by the customer	US-based Metromile offers auto insurance with fees based on the number of miles the insured's car logs

Source: Capgemini World InsurTech Report 2018.

Examples of Full-Distributor Insurtech Firms

Distributors	Marketplace	Online site enables individuals to compare plans from different insurers	PolicyBazaar specializes in comparative analysis of products from various insurers based on price, quality and key benefits
	Personal Financial Assistant	One-stop app(s) allows customers to manage all their policies, obtain coverage recommendations and compare and purchase plans	Artificially intelligent insurance advisory application Brolly delivers contextually relevant insights through web and mobile applications, so customers can manage policies in one place and know where coverage may be duplicated or missing.
	Digital Broker	Online platform allows customers to compare and purchase policies	Licensed broker Coverfox offers insurance products for vehicles, home, health services and travel.
	B2B Digital Distributor	Online site enables commercial customers to compare plans from different insurers	CoverHound , a US-based InsurTech firm that offers a comparison platform for personal and small commercial insurance products.
	Value-Adding Intermediary	Customized or flexible front-office solutions via partnership with an insurer/reinsurer for risk management	London-based Bought By Many uses social media data to connect people with similar insurance needs and then uses the group's collective buying power to negotiate with insurers for deals that aren't available for individuals.

Source: Capgemini World InsurTech Report 2018.

Examples of Full-Enabled Insurtech Firms

Enablers	Front-Office Solution Providers	Process-improvement solutions for the front office	PremFina's white label solution for brokers allows them to extend premium financing options to their customers and manage insurance policies.
	Policy/Plan Management Solution Provider	Process-improvement solutions for underwriting and policy/plan administration	RiskGenius applies artificial intelligence to streamline the work of insurance professionals by retrieving details on a specific coverage or exclusion, analyzing policies and extracting relevant information such as a premium limit or deductible.
	Claims Management Solution Provider	Process-improvement solutions specifically for claims management	RightIndem has a white-label self-service insurance claims platform for insurers that allows customers to interact with their claim in their own time.
	Data Specialist	Data capture or analytics solutions for use cases or across the value chain	Carpe Data leverages data from various channels such as online content, social media, connected devices and offers predictive scoring and data products for the insurers, enabling them to predict risk better.
	Technology Specialist	Solutions based on a specific technology such as blockchain or drones	Betterview , a drone-technology specialist, allows drone-based inspection or property assessment.

Source: Capgemini World InsurTech Report 2018.



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Investment & Market Size of the Insurtech Industry

Professor Christopher Geczy, PhD

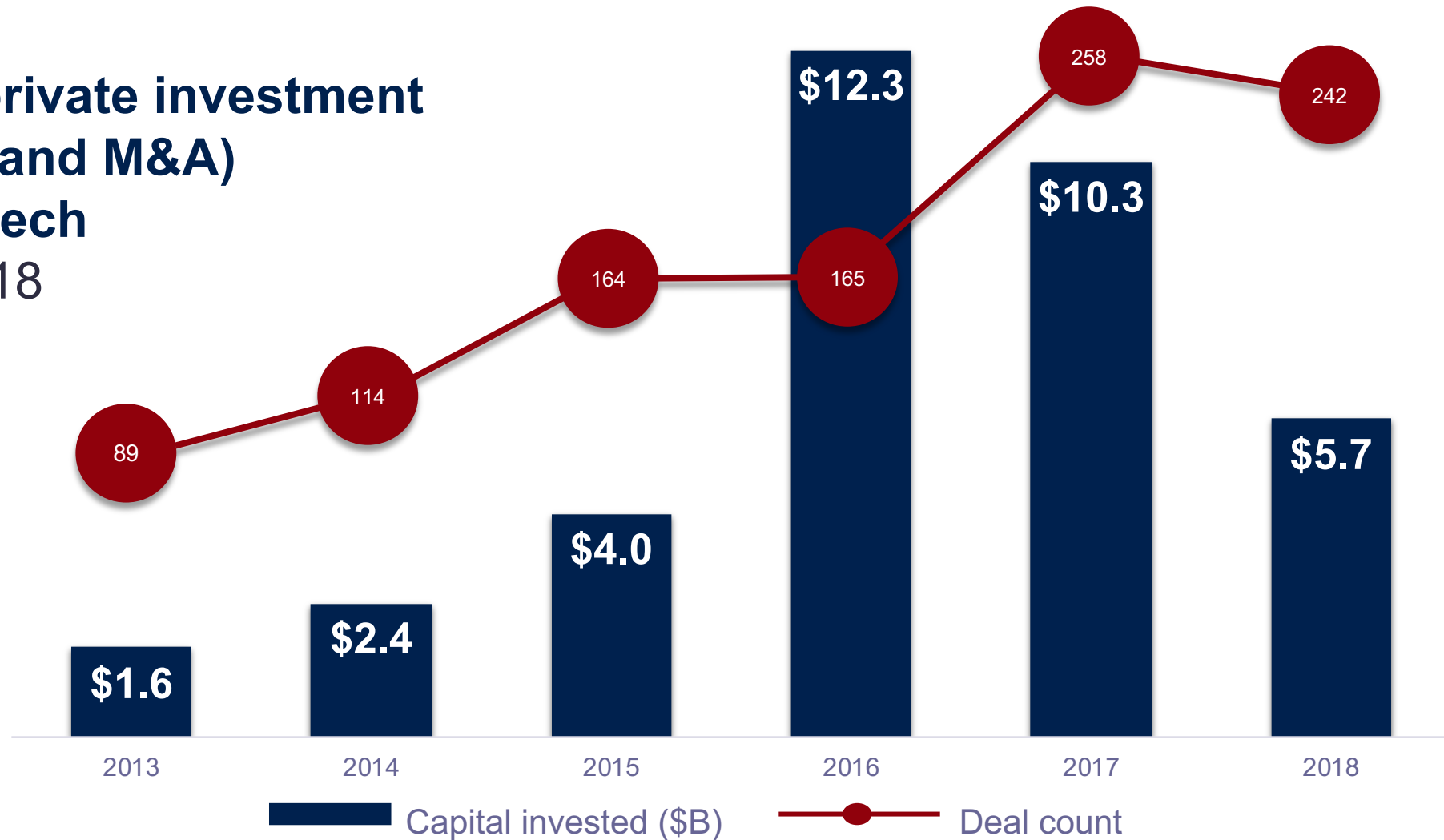
Insurtech: Market Size

- What's clear is that it's large and growing
- Global Insurtech market revenue \$532.7MM as of 2018*
- Market revenue expected to reach \$1.2 billion by 2023 (+16% CAGR, 2018-2023) *
- AsiaPacific will have highest regional CAGR, growing in financial hubs in Hong Kong/Singapore/India
 - Health insurance segment is expected to have the higher segment CAGR*
- Total Insurtech investments, 2017: \$3.2 billion **
- Total deals, 2017: 202 deals for \$2.2 billion
- 83% involved an insurer/reinsurer as investor **
- Estimated 5-year CAGR, 2012-2017: +45% **

*Orbis Research, "Global (Insurance Technology) InsurTech Market Size 2019," Dec. 2018. **Ernst & Young, "Global Insurance Trends Analysis 2018," June 2018.

Size of Insurtech Market

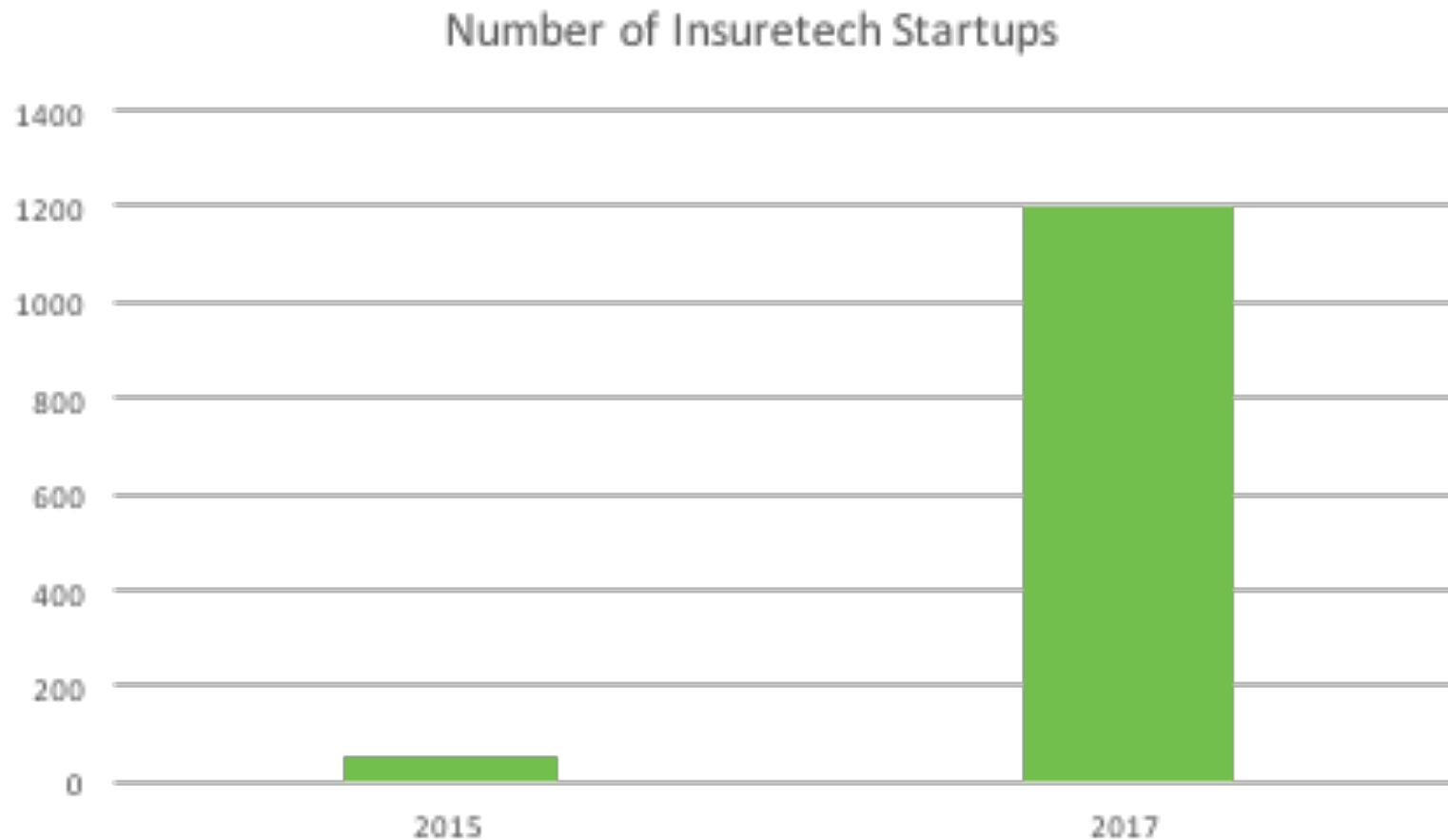
**Global private investment
(VC, PE and M&A)
in insurtech
2013-2018**



Source: KPMG International: Pulse of Fintech 2018,
Global Analysis of Investment in Fintech, January 4, 2019

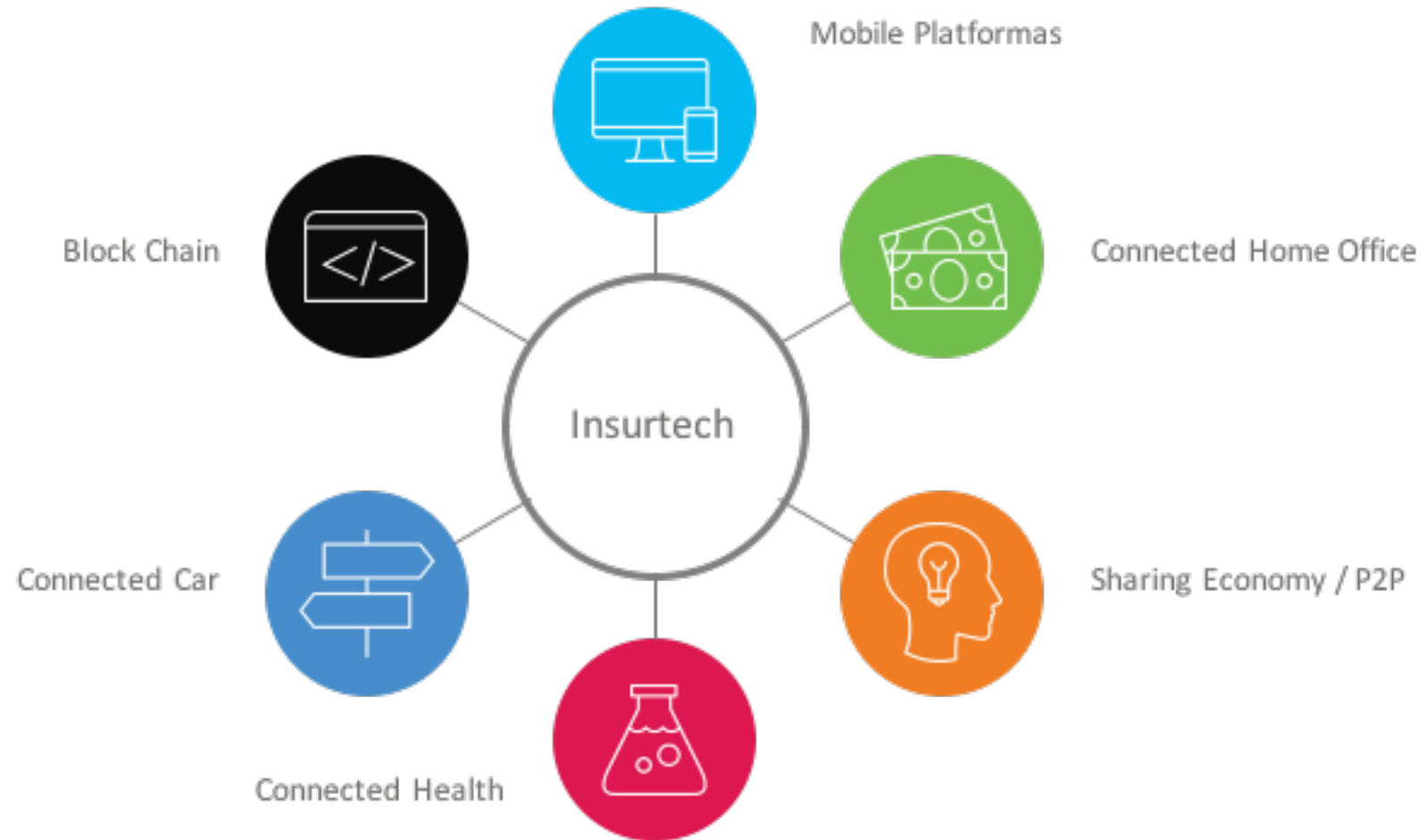
Insurtech: Startup Count

Number of Insurtech Startups Exploded Over Just 2 Years
(Source: SMA – Strategy Meets Action, 2017)



Insurtech: Disruptors

The Top Insurtech Disruptors



Source: AXA, 2017

Insurtech: Key Techs

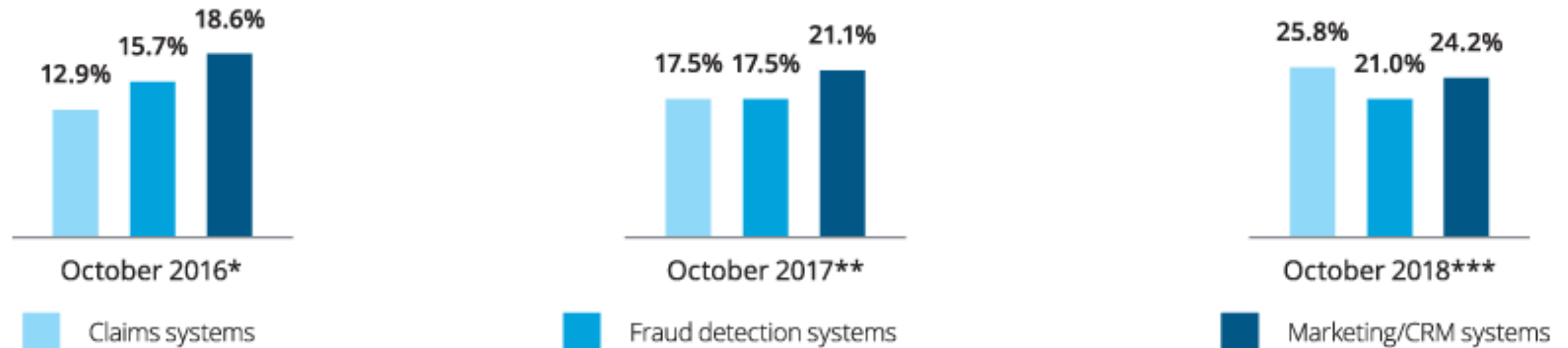
- More and more insurers are moving key business functions to the cloud*
- Tech research firm Ovum's annual survey of penetration of Software as a Service (SaaS) grew from 13% in 2016 to 26% last year

* Source: Ovum survey data cited in Deloitte, "2019 Insurance Industry Outlook"

Insurtech: Key Techs

Figure 3. Core insurance solutions fully deployed externally on the rise

Percentage of US insurance respondents with core functional systems fully deployed using SaaS



Sources: * ICT Enterprise Insights 2016/17 – Financial Services & Payments: Insurance, Ovum, October 2016.

** ICT Enterprise Insights 2017/18 – Financial Services & Payments: Insurance, Ovum, October 2017.

*** ICT Enterprise Insights 2018/19 – Financial Services & Payments: Insurance, Ovum, September 2018.

(Disclaimer: Figures may not be completely comparable year-over-year due to variation in the composition of survey respondents.)

* Source: Ovum survey data cited in Deloitte, “2019 Insurance Industry Outlook”

Insurtech: Key Techs

- AIA Hong Kong has launched a blockchain app to share life policy data with its bank distributors
- AXA Europe is offering flight delay insurance on a blockchain platform featuring smart contracts
- Ovum's annual survey of penetration of Software as a Service (SaaS) grew from 13% in 2016 to 26% last year.
- Carriers and consortiums are expected to launch more impactful blockchain initiatives due to concerns around data technology

Profile of Insurtech Market

- In the U.S., 63 Insurtech deals, with a total value of \$1.59 billion, were announced in Q4 2018
 - Compared with Q4 of 2017, deal count in Q4 increased by 24%, while funding volume also increased by 155%
 - 63 transactions in Q4 2018 – higher than Q3, but lower than Q1 & Q2
- Globally
 - UK investment down 9% from last quarter
 - China the second largest investor for Q4 after the U.S.
 - UK has been responsible for 8% of total investment since 2012
 - Investment from international markets remains strong; transactions outside of the U.S. account for 43% of total transactions since 2012 and 57% in the 4th quarter of 2018

*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018

Profile of Insurtech Market

- While early-stage investments remain strong
 - Seed and Series A account for 64% of total transactions since 2012 and 62% this quarter (up 4% from last quarter)
- Insurtech funding is maturing to mid – and later-stages – 45% of financings in 2018 took place at the Series A, B, or C stages
 - Could lead to consolidation further up

*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018

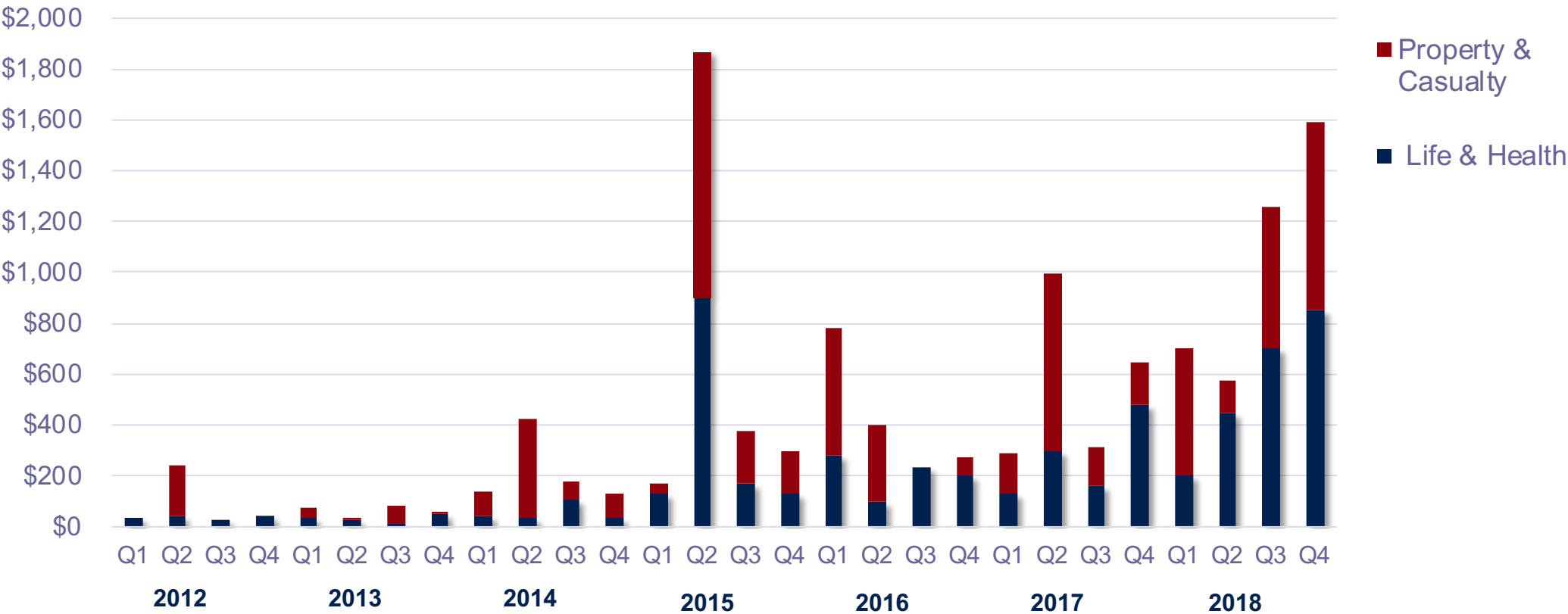
Profile of Insurtech Market

- Property and Casualty (P&C) funding volume increased by 57% from Q3 2018 and increased by 89% from Q4 2017
 - 41 P&C transactions in the quarter was only marginally higher than the 40 transactions in Q3 but marks a 52%
- Life and Health (L&H) funding volume increased by 1% from Q3 2018 but marked a 362% increase from Q4 2017
 - 2018 hits record level of Insurtech investment, driven by large investments; deal count increased by 10% from Q3 2018 and funding volume increased by 26%

*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018

Size of Insurtech Market

Quarterly Insurtech funding volume – all stages
(\$ in millions)



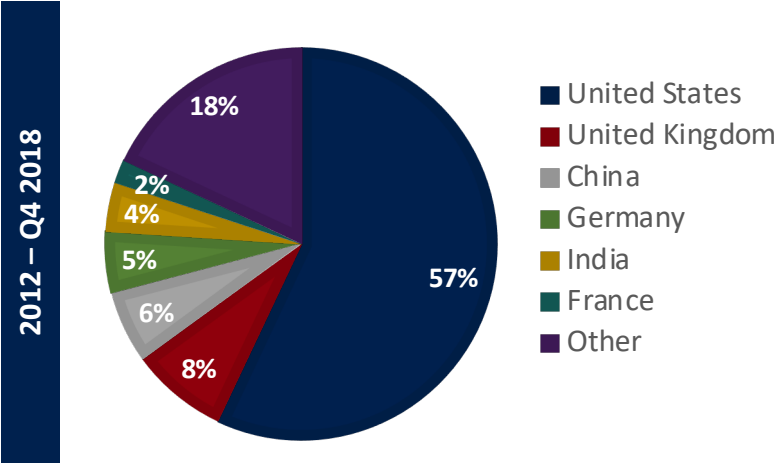
Deal Count

P&C	5	3	4	4	5	4	12	9	10	7	16	8	16	14	16	20	44	18	33	29	23	33	27	42	43	44	40	41
L&H	8	6	7	9	15	8	9	4	9	15	14	15	10	19	14	20	15	16	6	13	16	32	21	9	23	27	17	22

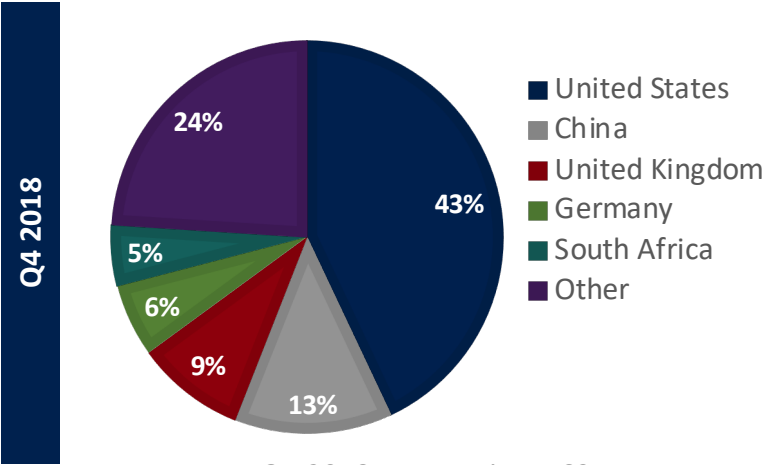
*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018

Size of Insurtech Market

Quarterly Insurtech transaction by target country

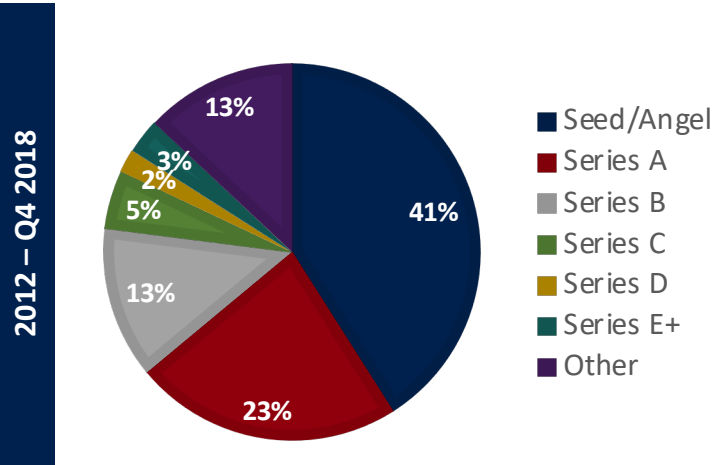


2013-Q4 2018 Transactions: 972

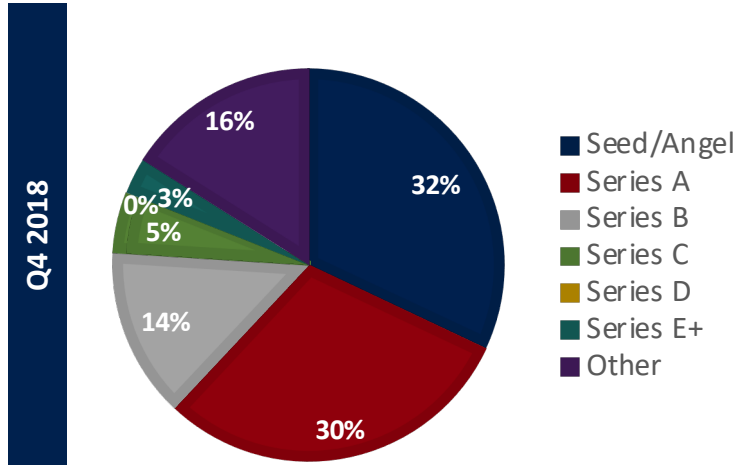


Q4 2018 Transactions: 63

Quarterly InsurTech transaction by investments stage



2013-Q4 2018 Transactions: 972

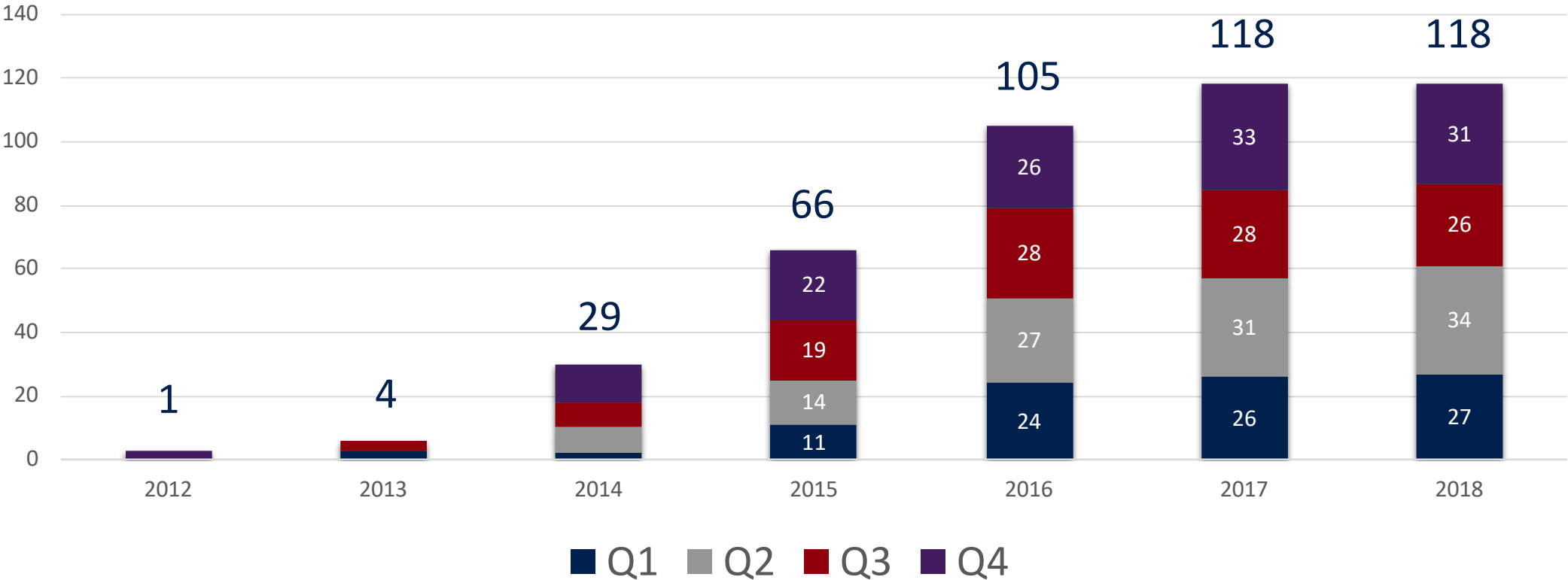


Q4 2018 Transactions: 63

*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018

Size of Private Technology Investment by Insurers/Reinsurers

Private technology investments by (re)insurers





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Insurtech, Fintech, & Financial Inclusion

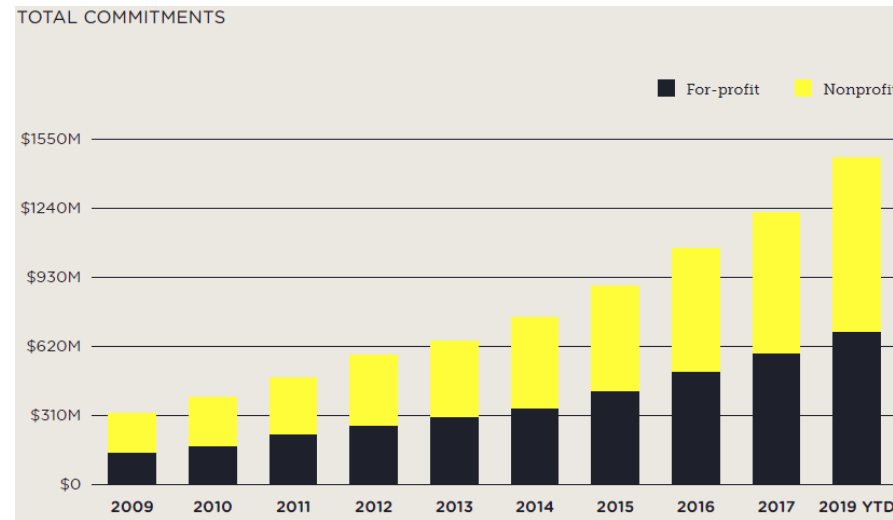
Professor Christopher Geczy, PhD

Microinsurance

- Investment firm: Omidyar Network
 - Started by eBay founder Pierre Omidyar in 2004
 - Model: Combines for-profit LLC with grantmaking 501(c)(3)
 - \$1.5B committed since inception:
 - \$676MM for-profit investments, \$782MM grants



Pierre & Pam Omidyar



Total Commitments by
Year, 2004-YTD 2019

<https://www.omidyar.com/financials>

Microinsurance

- Common feature of microinsurance products is the low-income, low-net-worth population served which otherwise has very limited access to insurance
- Microinsurance products by type (can be group or individual coverage)
 - Term life
 - Health / accident / disability
 - Casualty (crop insurance, livestock, theft, fire, natural disaster)
 - Certain forms of retirement savings plans
 - Microinsurance by underwriter / delivery channel type
 - Large multinational insurance companies
 - Credit unions or mutual associations
 - Government or NGOs
 - Small community organizations

Microinsurance

- Benefits of microinsurance
 - Financial protection through risk pooling
 - Insureds can assume more risk
 - Crop insurance vs. drought enables small farmers to plant crops which have higher yields in “good” years & poorer yields in drought years
 - Safeguard vs. families falling back into poverty due to illness, death of breadwinner, housing destroyed, etc.
 - Indian ministry of health found one-quarter of all hospitalizations pushed individual or family into poverty due to cost of treatment*

* Tina Rosenberg, “The Microinsurance Revolution,” New York Times Opinionator blog, June 6, 2012 at <http://opinionator.blogs.nytimes.com/2012/06/06/the-microinsurance-revolution/>

Microinsurance

- Benefits of microinsurance
 - Can target specific at-risk populations
 - HIV-positive, living in flood zone, microentrepreneurs
 - Can complement social welfare programs, bolster other microfinance initiatives
 - Can assign term life policy to secure business, education or mortgage loan

* Tina Rosenberg, "The Microinsurance Revolution," New York Times Opinionator blog, June 6, 2012 at <http://opinionator.blogs.nytimes.com/2012/06/06/the-microinsurance-revolution/>

Microinsurance



- BIMA – insurance business disruptor, “Insurtech” leader
- Swedish-founded mobile insurance & health company that provides accident, life, & health insurance products to 26 million low-income consumers in 15 countries (Africa, Asia, LatAm)
 - Largest markets: Ghana, Sri Lanka, Bangladesh, Pakistan.
- Mobile technology lowered prices and brought affordable insurance to the world’s poorest

TechCrunch <https://techcrunch.com/2017/12/19/bima-raises-97m-from-allianz-for-microinsurance-aimed-at-emerging-markets/>
BIMA website: <http://www.bimamobile.com/about-bima/about-us-new/>

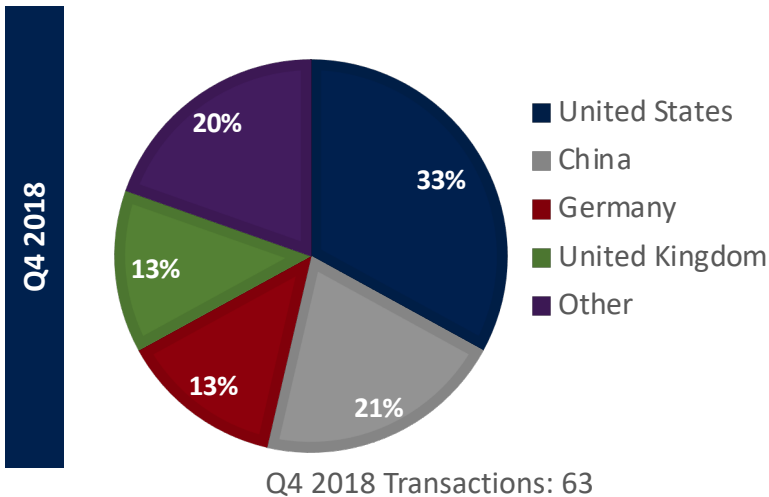
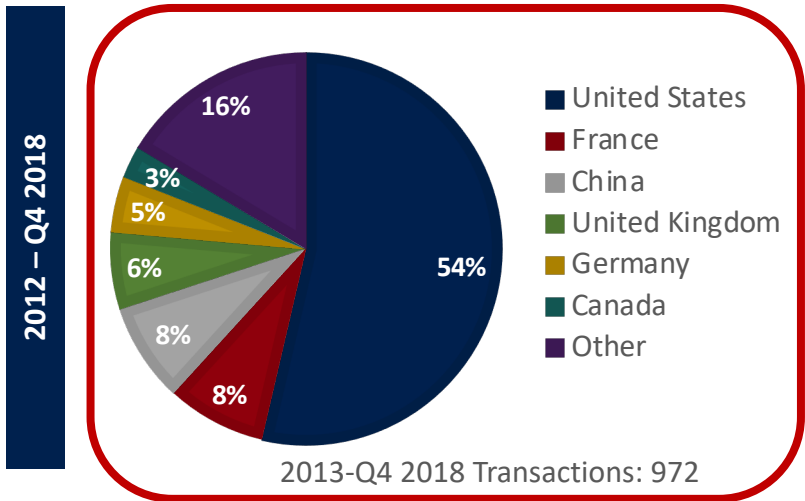
Microinsurance

- Business model: BIMA provides microinsurance subscription via basic mobile phone service for as little as 60c/month on a “pay-as-you-go” rolling monthly cover
 - Offers payouts of up to \$1,000 to the family if the insured person dies
 - Sign-up takes only 3 minutes and payments are collected through basic mobile phone service
- Customer growth: over 550 thousand new customers/month (BIMA, 2018)
- 93% of customers live on less than \$10/day (BIMA, 2018)
- 75% of subscribers never had insurance before
- Educating customers is the top priority
- \$300MM valuation at Dec-2017 sale of LeapFrog Investments’ stake to Allianz for \$97MM

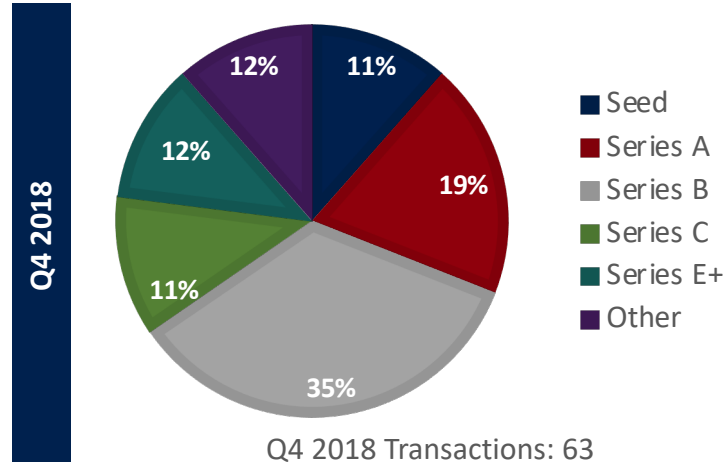
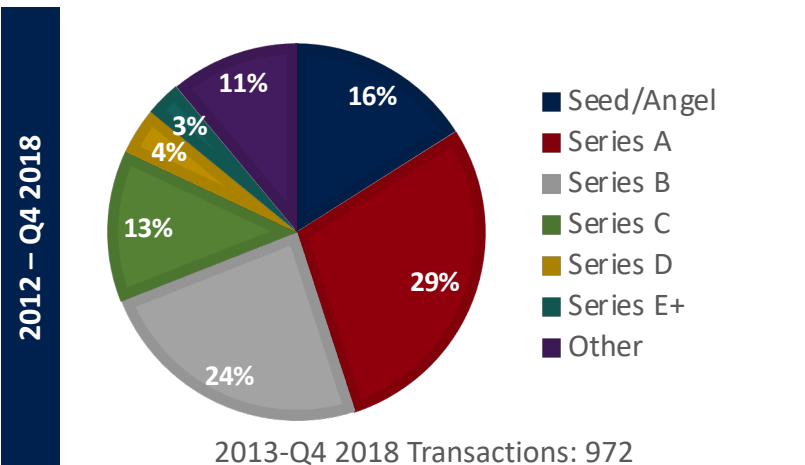
TechCrunch <https://techcrunch.com/2017/12/19/bima-raises-97m-from-allianz-for-microinsurance-aimed-at-emerging-markets/>
BIMA website: <http://www.bimamobile.com/about-bima/about-us-new/>

Size of Private Technology Investment by Insurers/Reinsurers

Private technology investments by (re)insurers by target country



Private technology investments by (re)insurers by investment stage



*CBINSIGHTS: Quarterly InsurTech Briefing Q4 2018



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