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The Dawn of the Machine-to-Machine Age and Its Implications for Insurance

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Machine-to-machine technology (M2M) essentially involves sensors in an internet of things (IoT) environment where data is sent wirelessly to a server or another sensor. That other sensor or server uses artificial intelligence (AI) to analyze and act on the data automatically in real time. The actions can be anything from sounding alerts and warnings to changing direction to braking and even making transactions. As M2M increases exponentially, we will soon see a reinvention of whole business models and customer relationships. Indeed, the applications will be limited only by the imagination of businesses.

This article will explore the following:

1. An overview of key M2M technologies and their disruptive potential
2. M2M transactions—a whole new revolution where machines can transact directly with other machines, leading to a machine economy
3. An insurance business model of the future, with Insurtech start-ups based on blockchain

AN OVERVIEW OF KEY M2M TECHNOLOGIES

Imagine some real-life scenarios:

- Your car senses your travel itinerary and automatically buys insurance on an on-demand basis by the mile (meaning a machine buys its own liability insurance as needed).
- Wearable exoskeletons give law enforcement and factory workers superhuman strength and agility.
- Intelligent computer interfaces merge with our brains to create superhuman intelligence (for example, Elon Musk's Neural Lace).
- We take smart pills and don health wearables that directly assess our mortality and morbidity risks.
- You get life insurance from taking a selfie that is analyzed by an algorithm that medically determines your biological age through the image. (This is already being done by start-up Lapetus Solutions' Chronos software.)
- Your refrigerator understands your regular shopping and stocking habits. It finds that some item like milk is past its use-by date, so it buys milk directly through an online shopping site. Your fridge is continuously restocked based on your most common purchases. You can continue to buy new products and unusual items independently and stock them in your fridge as usual.
- Self-driving cars interact with each other on the smart grid to avoid accidents and collisions.
- Your robot senses that you are getting more upset and depressed lately, so it tries to cheer you up. It tells your health coach bot to increase content for emotional resilience.
- Sensors sense that a pipe in your home is about to burst and send for a repairman before this can happen.
- Your chatbot is your personal assistant. It does your shopping, senses when you need to buy insurance (for example, when you are traveling), handles your daily chores and



keeps you updated on your daily schedule, which you have made in collaboration with the bot.

- You have a 3D printer for making new toothbrushes. The current smart toothbrush senses that its filaments are about to be worn out, so it sends a signal to the 3D printer to make new filaments.
- Instead of bird swarms, we now see drone swarms flying off to carry out their tasks with collective (swarm) intelligence.
- A machine plays chess against itself without any training data and beats just about everyone and everything. (AlphaGo Zero already does this.)

Two meta-themes arise out of M2M technologies: prevention and convenience. Self-driving cars can eliminate or radically reduce accidents as the majority of car accidents are caused by human error. Wearables can lead to a healthier lifestyle, home sensors detect water or gas leaks and other issues before they occur and rectify them. These types of prevention decrease traffic accidents, morbidity and other adverse events. Convenience is an overarching aspect in that almost everything happens automatically from one machine to another, and in few cases, it is still augmented with human expertise and attention. The machine learns what it is programmed to learn on its own using data from its sensors about our behaviors over time. It carries

out its tasks automatically in the background to free up our time for human endeavors like being creative.

These emerging technologies are leading to changes in exposure and have huge impact on insurance. There is a large number of touch points where the insurer can engage with the customer; there is less focus on personal coverage and more on commercial aspects (for example, if a self-driving car malfunctions, a home assistant gets hacked or a smart pill poisons someone instead of providing real-time data to dynamically assess mortality and morbidity risks). The frequency of claims is set to decrease radically, but the severity of claims can be more complex and difficult to assess because various stakeholders will have to be taken on board to assess the damages and see how the share of loss coverage varies in proportion to the faults of different stakeholders. Cyber hacking can be expected to flourish, which will lead to new opportunities for insurers in the machine economy.

These technologies don't exist in a vacuum; capitalism cannot exist without constantly revolutionizing technology and, thus, our relationship with it. If you need proof of this, see how algorithms and technology are molding our thinking and attitudes, our behavior and actions, and see how rapidly all this technology evolves. What's surprising is that this observation was made by Karl Marx, someone who lived from 1818 to 1883, which shows that all the tech in the world is no substitute for deep thinking and erudite wisdom.



Social changes go hand in hand with technological changes. Now we are seeing peer-to-peer (P2P) business models that focus on social impact (Lemonade, for example) instead of just making the rich richer. The sharing economy is boosting the use of technology as it gives us access (but not ownership) on an on-demand basis. The millennial generation is also very different from previous generations, and we have only started waking up to what millennials demand and how they want to shape the world around us. The sharing economy can mean that machines with their own “wallets” can perform services for humans on an as-needed basis and carry out transactions independently.

M2M FINANCIAL TRANSACTIONS

Our future customers will be machines with wallets. A crypto currency called IOTA (Internet of Things Application) aims to propel the machine economy into our everyday reality by allowing IoT machines to transact directly and automatically with other machines (see IOTA’s website at <https://iota.org>). This will lead to the rapid emergence of machine-centered business models. IOTA does this by removing blockchain and adopting a “Tangle”-distributed ledger that is scalable and lightweight and has zero transaction fees, which means that microtransactions are viable for the first time. The key advantages of IOTA over current blockchain systems are as follows:

1. To allow a clear idea, blockchain is like a restaurant with dedicated waiters (miners) that bring you your food.¹ In Tangle, it’s a self-service restaurant where everyone serves themselves. Tangle does this through a protocol whereby a person has to verify his or her previous two transactions when performing a new transaction. Thus miners, the new middlemen building up immense power in blockchain networks, are made useless. The promise of blockchain is that middlemen exploit us whether they comprise the government, money-printing banks, or other institutions, but another class of middlemen “miners” (especially those in China) are becoming powerful, leading to a huge concentration of power in a small number of hands. Bitcoin mining takes as much energy as the electricity produced by more than 159 countries,² so it is a huge waste because huge computing hardware is required to crack complex crypto mathematical codes to validate a transaction.
2. As mining is time-consuming and expensive, it doesn’t make sense to perform micro- or nanotransactions. The Tangle ledger allows transactions to be validated in parallel and requires no mining fees to allow the IoT world to conduct both micro- and nanotransactions.
3. Machines are “unbanked” sources in today’s time, but with IOTA, machines can generate income and become economically viable, independent units that can purchase insurance, energy, maintenance and so forth on their own.

IOTA provides a know your machine (KYM) process for secure identities, similar to the know your customer (KYC) regulations currently used by banks.

IOTA is a new breed of crypto currency that aims to solve problems that previous cryptos were not able to solve. The Tangle ledger is a nickname for a directed acyclic graph. An acyclic graph is a cryptographic decentralized network that is supposedly scalable to infinity and resists attacks from quantum computers (which are yet to be fully developed and used in mainstream life) by using different encryption forms of hash-based signatures.³

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It can be reasonably forecast that many cyber physical systems such as supply chains, smart cities, smart grids, shared computing, smart governance and health care systems will emerge and be based on artificial intelligence and IoT. One country with very ambitious and aggressive plans to become well-known in AI, beside the United States and China, is the United Arab Emirates (UAE). The UAE has instituted many AI initiatives such as drone police, plans for driverless cars and hyperloops, and governance based on blockchain. It is even the first country in the world to have a state minister for artificial intelligence.⁴

The quest for efficiency was the quest that first drove capitalism, and now that same quest is working to end capitalism. Three-dimensional printing and a sharing economy are radically lowering costs and upgrading efficiency levels, and the machine economy is the next logical step. For the first time, a machine will be an economically independent unit, earning income by performing physical or data services and spending on energy, insurance and maintenance. The on-demand economy will boom because of this distributed trust. Three-dimensional printing will radically bring down the cost of making materials, and robots and economically independent robots will soon start providing humans with services on demand.

INSURTECHS OF THE FUTURE

To make the process seamless, agile, robust, invisible and as easy as child’s play, blockchain technology is used with smart contracts that self-execute when prescribed conditions are met. This new P2P insurance model is doing away with traditional premium payments, using instead a digital wallet where every

member puts his or her premium in an escrow-type account that will be used only if a claim is made. In this model, none of the members carry an exposure greater than the amount they put into their digital wallets. If no claims are made, all digital wallets keep their money. All payments in this model are done using Bitcoin, which further reduces transaction costs. Teambrella claims to be the first insurer using this model based on Bitcoin,⁵ and it is not alone. There are many blockchain-based start-ups targeting P2P insurance and other areas of human activity. Here are some of them:

- Etherisc
- InsurePal
- Aigang
- REGA
- Bit Life and Trust
- Unity Matrix Commons

Thus, a lot of crowd wisdom is used as the insurer “Learns from the people, / plans with the people, / Begins with what they have / And Builds on what they know” (Lao-tzu).

Instead of maximizing profits for shareholders, sitting isolated from ground realities, lacking skin in the game, and having far less access to awareness (i.e., data) of people relative to their peers, this P2P process empowers the crowd and taps into its wisdom (instead of getting wisdom from books), which is far better. There are also no unfair pricing practices such as ratings based on gender, pricing optimization that charges you more if you are less likely to shift to another insurer and so on. The giant insurers cannot know you better than your peers do, it’s as simple as that.

This same P2P insurance can also be carried out on non-blockchain-based distributed ledgers such as IOTA, Dagcoin and Byteball, with the additional technological benefits of these new ledgers over the current blockchain. These digital tokenization start-ups promise to radically reinvent business models where transactions, pooling and just about everything gets done for the community and by the community in an automated, fully trustworthy manner with no middlemen like governments, capitalist businesses, social institutions and so on. Peer-to-peer insurance is just one part of the whole program.

Smart contracts have built-in conditions that are automatically triggered when a contingency occurs, and claims are paid

instantly. The need for a highly qualified labor force that essentially does clerical work is removed to build a sleek, autonomous organization of the future. The middlemen called “shareholders” are avoided, which means that consumer interests are acted on by providing convenience, low prices and good customer support. In this peer-to-peer setting, the benefits go to the community instead of to shareholders. IoT provides the main source of data to these pools to develop protocols about when (not) to release claim payment. The same tokenization means that anyone anywhere can have access to the insurance pool instead of being limited by geography and regulations.

CONCLUSION

The scenario pictured here of M2M transactions and the machine economy will seem distant to many, especially as the current realities of insurers are still the same as they were 200 years ago. The machine economy is still nascent and emerging, but exponential results can mean that it will become a large part of our lives very soon. The current insurers have yet to embrace emerging trends with more immediate impact that don’t use blockchain, such as Trov, Lemonade, Verify and many others. We await the full-blown use of IoT and M2M, and we are certainly seeing the dawn of their influence. ■



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ENDNOTES

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