# Blockchain and Cryptocurrency

A blockchain is a growing collection of digital records, called blocks, that are linked through cryptography. Each block contains details of a timestamp, transactional data and the unique ‘cryptographic hash’ of the previous block in the block chain. In that sense all the blocks in the chain are linked.  
The main benefit of using a blockchain is that it cannot be modified, making all the transactions in the blocks permanent and open to the public.  
  
Blockchain can be used in banking, property records, smart contracts, voting, supply chains and most obviously, cryptocurrency.  
Blockchain technology is implemented into cryptocurrencies, which are virtual or digital currencies that are secured by using blockchains.

According to Jan Lansky, a cryptocurrency is a system that meets six conditions:

1. The system does not require a central authority, its state is maintained through distributed consensus.
2. The system keeps an overview of cryptocurrency units and their ownership.
3. The system defines whether new cryptocurrency units can be created. If new cryptocurrency units can be created, the system defines the circumstances of their origin and how to determine the ownership of these new units.
4. Ownership of cryptocurrency units can be proved exclusively cryptographically.
5. The system allows transactions to be performed in which ownership of the cryptographic units is changed. A transaction statement can only be issued by an entity proving the current ownership of these units.
6. If two different instructions for changing the ownership of the same cryptographic units are simultaneously entered, the system performs at most one of them.

Cryptocurrencies can be used today online as a currency, with the main difference from other forms of currency being the parties involved are semi-anonymous and the currency itself is decentralized, making it immune from intervention from another party, like the government.

The future of cryptocurrency is an uncertain one, but some say that it needs a verified exchange trade fund, so that it is easier for people to invest in crypto’s like Bitcoin. While Bitcoin would still need to see some more demand, it would be the next step for cryptocurrency.  
Some limitations of crypto are potential hackers and computer crashes can wipe out someone’s invested into whatever crypto they are invested in. In time, technological advances will help ease these issues.  
The main issue with crypto is the paradox that if crypto becomes more popular it will attract more regulation from governing bodies, which defeats the purpose of crypto’s fundamental premise.  
For a cryptocurrency to become part of the mainstream, it would need to be complicated enough to avoid fraud and hackers, but simple enough for consumers to understand and use. It would need to be decentralized, but with some appropriate safeguards for the user. It needs to keep users anonymous while not promoted nefarious activities.

The impact of block chains is potentially very useful, having a decentralized recording keeping system can be applicable in multiple ways. Firstly, by removing the need for human verification, the accuracy of the records is highly increased. This also decreases costs, since no human verification is needed.  
The decentralization process makes it much harder for anyone to meddle with any transactions, as all the block chains are linked. This would mean all transactions cannot be changed, removed or hidden from anyone. The records are transparent.  
For example, the use of block chains in banking is highly profitable as it could cut out potentially $20 billion in middleman costs, along with all the benefits that block chain provides, such as efficiency, transparency and privacy.  
Another potential application is voting, while not ready yet, in future the potential for block chains to cast, track and count votes from verified users. This could get rid of the need for recounts and remove the potential of vote fraud or any tampering.  
Block chain can be applied in a variety of ways to lots of different businesses. It’s efficiency and decentralized structure are very appealing for any record of transactions, as nearly all businesses would want this kind of transparency and efficiency.  
Cryptocurrencies have interesting applications for global and various localized economies. Some countries, such as china, have made it increasingly difficult for people, including businesses, to spend the nation’s currency outside of the country. As a result, Bitcoin is coming more popular, especially since more businesses are accepting Bitcoin as a form of payment.  
While in other countries that have become corrupt, cryptocurrency has become more popular. In both India and Venezuela banned their highest currency note in order to make it tougher to make accumulated black money useless, which boosts the demand for Bitcoin so citizens can send and receive money without needing to answer to the government.

In my daily life, blockchains and cryptocurrency do not affect me very much at all. Cryptocurrency is an interesting new idea, but as it stands the need for it in my life does not exist and may not for many years.  
Blockchain technology could start to be implemented in many ways as described above, possibly changing the way my bank transactions work or even my online shopping. Although these might be the closest ways, they impact me directly, I likely would not notice the difference from a consumer perspective.

References:

<http://si-journal.org/index.php/JSI/article/viewFile/335/325>

<https://www.investopedia.com/terms/c/cryptocurrency.asp>

<https://www.investopedia.com/terms/b/blockchain.asp>

<https://www.cbinsights.com/research/industries-disrupted-blockchain/>

<https://www.outsource2india.com/software/articles/impact-cryptocurrency-bitcoin.asp#>

<https://www.investopedia.com/articles/forex/091013/future-cryptocurrency.asp>

## Cybersecurity

Cybersecurity covers a wide range of threats to computer system and networks to access sensitive information. These can range from Denial-of-service attacks, ransomware, malware, phishing, social engineering etc.  
As more businesses and individuals become reliant on computers, cybersecurity becomes increasingly more important.  
Protecting computers and computer networks from these threats can come from different approaches. There’s educating the user, with teaching them about basic security principles such as password strength, two-factor authentication, backing up your data and knowing what suspicious emails look like.  
Then there’s the technology layer, from software and hardware, such as more advanced routers, computers, networks, and smart devices that have newer features like firewalls, DNS filtering, malware protection and antivirus software.

Multi-factor authentication is a simple way to add extra layers of security to a network, account or device. There are 4 different types of factors for authentication. Something you have, something you know, something you are and somewhere you are.   
By adding more factors to the authentication process, it effectively adds more layers to the security of the user’s subject.  
Cybersecurity is a ever-evolving field of technology as the threats are constantly changing and updating, so the security must do the same in order to keep up.

The impact of cybersecurity is huge and extremely important in this day and age. Almost every business, government or any other organization has sensitive information that needs to be protected. These groups will desperately need IT departments that can support their cybersecurity needs.   
On top of that there are PCs that need protecting, user’s personal information, passwords, financial details, photos, files etc. are all private data that everyone needs to protect from hackers. There are plenty of stories you hear about with stolen credit card information, cybersecurity is vital to protect people.  
Nearly everyone is affected by cybersecurity, the risk of not being secure online is far too great considering the purpose of what you do online. Online shopping, using social media, or even just browsing the wrong webpage can all be exploited for your information unless you have some security of some sort on your PC and/or network.  
Here we can see more jobs being available for various reasons. Cybersecurity is a constantly changing technology, as more security threats and vulnerabilities are being discovered, new security must be developed in order to combat it.   
You also need people installing said cybersecurity, whether it be software or hardware.   
There are also hackers that are hired in order to explore potential vulnerabilities in cybersecurity systems so that the developers of that system can fix these vulnerabilities, ensuring a strong product for the consumer.

The impact of Cybersecurity on my life is significant, as I am spending majority of my time online. The security of my PC, my phone and my home network are of great importance to my lifestyle.   
Using a combination of antivirus software, anti-malware software and firewalls, I can stay online safely without worrying about corrupting my PC, or giving up and sensitive information, such as passwords, personal information, bank account details or credit card details.  
My friends and family will and need to use similar precautions as in the digital age, everyone’s information is sensitive and needs to be protected from cyber threads.

References:

<https://www.cisco.com/c/en_au/products/security/what-is-cybersecurity.html>

<https://us.norton.com/internetsecurity-malware-what-is-cybersecurity-what-you-need-to-know.html>

<https://www.onelogin.com/learn/what-is-mfa>

# Autonomous vehicles

Self-driving car technology is becoming more economically and commercially viable for a multitude of different reasons. Previously it wasn’t viable to make automated cars due to large costs of the design, building and maintenance of the technology. The safety of the automated cars is another significant improvement in recent times that actually prove that automated vehicles are better drivers than human drivers. This is especially relevant since nearly all car crashes (94%) are caused by human error.

The following table describes different levels of automation.

Table 1. Levels of automation

|  |  |  |  |
| --- | --- | --- | --- |
| **SAE Level** | **Automation level** | **Description** | **Timing** |
| **0** | None | Human driver responsible for all aspects of driving task (no assistance – not even power steering) | Past |
| **1** | Driver assistance | In some circumstances the system is capable of either steering *or* acceleration (including braking), with the expectation that the human driver performs all remaining aspects of the driving task. | Past |
| **2** | Partial | In some circumstances the system is capable of *both* steering and acceleration / deceleration. The human driver must monitor the driving environment and respond as needed (hands on the wheel at all times) | Now |
| **3** | Conditional | Same as level 2, but when the system is operating in automated mode the human driver is not required to monitor the driving environment. The human driver must respond to requests from the driving system to intervene (hands off wheel – but must be prepared to take back control when prompted) | 2017-2020 |
| **4** | Highly | Same as level 3, but no human monitoring or intervention is required when the system is operating in automated mode (driver no longer needed) | 2020-2025 |
| **5** | Fully | Automated system in control at all times, and in all road environments (no steering wheel or driver's seat) | 2026-2030 |

Source: Compiled form DIRD Submission to Standing Committee; ADVI website

Currently SAE levels 1 and 2 are already available on the market and can be used on the roads. Higher level automation vehicles are being tested and developed in controlled environments.  
The goal for this development is to have driverless cars at SAE level 5 and it is coming very soon. As technology improves, sensors, radars, cameras will become more developed, to the point where it can be combined to produce fully automated cars capable of being used without human monitoring or intervention.

The auto industry predicts we are just 5-10 years away from automated vehicles appearing on the market. This rise in automated vehicles is likely to result in the rise of transport-as-a-service, which is a move away from the privately owned vehicles and is more about different modes of transport as a service. This type of service is predicted to be significantly more affordable than the current paradigm that is privately owned vehicles.  
This could completely change the way we use transport today, reducing the number of road accidents, increased productivity from not needing to drive, improving roads from traffic efficiency and congestion and financially more efficient.  
People will not need to own cars as it is likely to be more financially beneficial for the consumers and businesses alike to use automated vehicles for transporting people or goods.   
Employment regarding automated vehicles will be a transformation of the current automobile industry, while potentially removing all jobs related to humans driving (taxis, trucks, buses, deliveries etc.). While it will remove some jobs, it will also create new jobs requiring new skills. These new jobs would consist of things like roles in supplying, maintaining and operating automated vehicles.  
According to the DIIS, workers that are currently employed as professional drivers are generally less educated, older and have few transferable skills, which could potentially make it harder for these people to find new jobs in the future.

This could drastically affect my personal life as there may not be a need for privately owned cars. I may not need to spend money purchasing, registering, maintaining and fueling my own car while this alternative comes into play. From the finding, it will be more financially viable for someone like myself to use a transport-as-a-service instead.  
The same is true for my family and friends and indeed anyone, so much of world is run by cars, trucks and buses for transporting people and goods. This would be a drastic change for the world once it comes into full effect.

References:

<https://www.parliament.vic.gov.au/publications/research-papers/download/36-research-papers/13839-automated-vehicles>

<https://www.racv.com.au/on-the-road/driving-maintenance/road-safety/car-safety/autonomous-vehicles.html>