INTERNET OF THINGS:
TOWARDS AN ADVANCED AND EFFECTIVE CIVILIZATION

SAM ELEMENT

1. INTRODUCTION

In less than 200 years since Michael Faraday discovered electricity, the world has changed drastically through industrial revolution until the present industry 4.0 era. The Industrial Revolution was noted as a major turning point in the world history, and this revolution affected almost every aspect of life, especially in terms of increasing population growth and unprecedented average income. During that time, the average per capita income of countries in the world had increased more than six times. It took less than 7 generations to vanish thousands of years of darkness.

It was all started with how the electric discovery was applied in making things more effective and efficient. Formerly in the era of the Majapahit kingdom, traveling by horse from one city to another took several days. Today we can reach it only in a matter of hours. Previously, travel around the earth in a short time was considered impossible, especially if the person was not supported by funding and enormous resources such as Christopher Columbus. Today, everyone can travel around the world. It takes less than 24 hours to take us from Jakarta to New York. This of course does not only bring changes in effectiveness and efficiency, but also in many other things, such as security and comfort, and ultimately happiness itself.

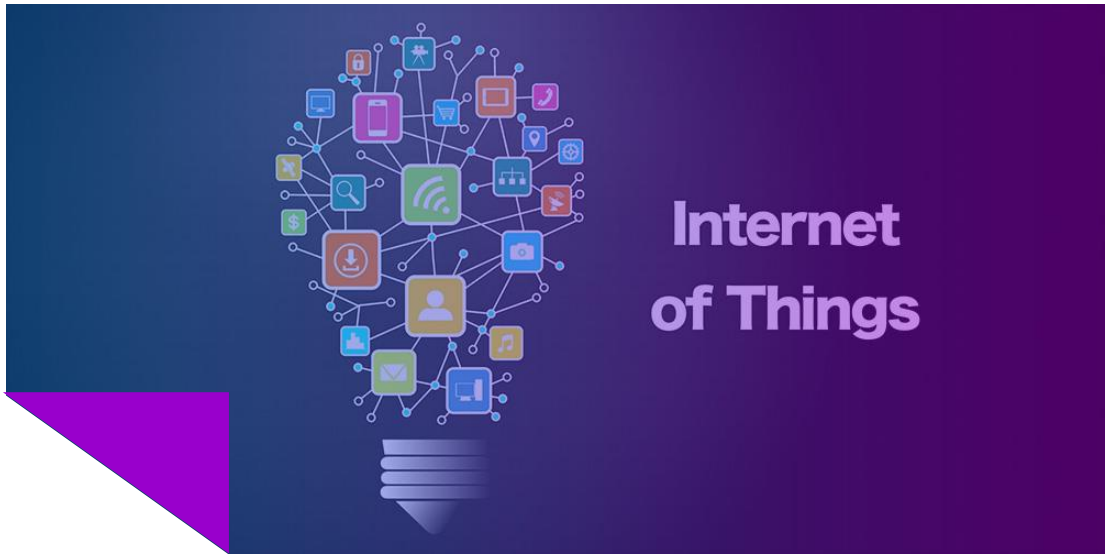
Today, nations are betting time in a new race: the Internet of Things (IoT) revolution. IoT has created new opportunities that have never been imagined before. The idea of connecting all electronic equipment and sensors to cloud computing makes many new application opportunities such as Industry 4.0, asset tracking, monitoring of electrical energy, integrated public security, interconnected cars, and much more. Large companies such as Cisco, GE, IBM, Google, Baidu, and Siemens have invested millions of dollars in this revolution. Dell is said to have poured 1 billion dollars in the IoT division to form a new business. Meanwhile, IBM with the Watson, and Amazon with the AWS.

2. INTERNET OF THINGS REVOLUTION

A great civilization, which lasts for thousands of years, has a special trick that separates them from other civilizations. There are many reasons why a civilization can continue to live, survive and develop to be prosperous and happy. Harmony, rules, and strong defense are some important factors that make them still exist today.

Maintaining harmony and rules in order to remain strong to create stability in society is certainly not an easy thing. Effectiveness and efficiency are needed in leading, within the government apparatus, and in each sub-system of civilization to keep everything running as it should. A small hole or wound, a system defect, which is left open, will obviously undermine a civilization, and ultimately make it collapse.

Today the nations in the world are competing not only to make their civilization survive, but also become stronger in taking leadership positions in this world. In addition to culture, technology is one way to strengthen position, as well as to be the leverage power for the progress, prosperity, and happiness of civilization itself. Even today, technology has begun to change into the culture itself.



Internet of Things (IoT) became one of the technological revolutions, to create a multiplication effect of strength, which if used correctly it can place a nation a few steps ahead of leaving other nations.

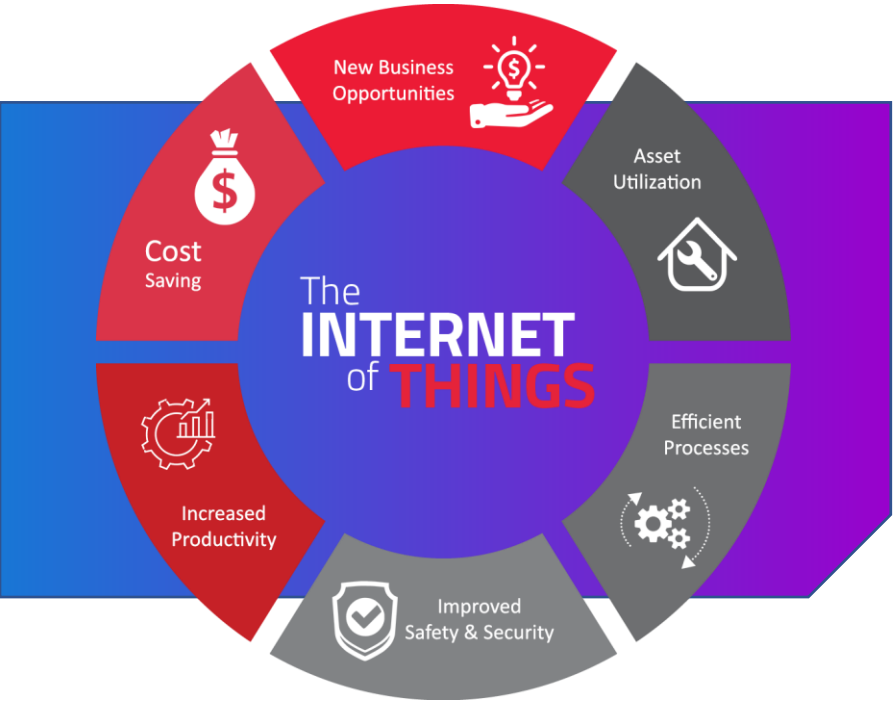
The same trick has been seen by many companies today. They started using IoT as leverage power, starting from the process of hiring employees, business processes, asset tracking, product development, and so on. Google, Facebook, Amazon, IBM, and Alibaba, are some of the technology leaders who have applied IoT in their companies. Soon, all other companies from various industries and sectors, will inevitably adopt IoT, if they don't want to be left behind and eventually get out of the market. Why this happened? Because what IoT offers is something sought by all companies and all nations.

With IoT, we will see all electronic devices and sensors that previously cannot communicate with each other, but now they come alive! They will be able to communicate with each other, they can give orders and take orders. Do this and that, give reports and warnings. And much more.

3. BENEFITS OF INTERNET OF THINGS

Every nation does not want to be left behind from other nations. Every nation competes to be at the forefront of everything. Utilization of IoT technology is one of the steps that must be adopted by every country, company, and even non-profit organizations, in order to continue to exist and do not get immersed in the bustle of the world competition.

There are at least 6 important things about the benefits of IoT, namely as follows:



1. Asset Utilization

   Asset utilization has become the main topic of the company and the government system that adopts IoT, because of its direct contribution in confirming the condition, performance, quality and use of each asset of tools and equipment owned.

   By knowing in detail how the equipment works, they can focus resources on improvement in order to improve OEE (Overall Equipment Effectiveness).

In reality, the data obtained provide far more benefits than thought. By looking at data more broadly and deeper, companies (or governments) are now able to make better long-term decisions, such as asset design, to save money and even increase Return of Investment (ROI) and operational or service performance in the future. Usually companies, or operators in this case, often find it difficult to track assets in the field and find out how effective the assets are working/used. With a good asset utilization strategy, the data obtained can be used by operational managers to see the condition of assets better and in real-time.

Furthermore, asset utilization data can be used to extend the useful life of capital equipment for greater asset returns, to see which assets are not maximally utilized in real-time, and can be used to make better equipment designs in the future.

2. Efficient Process

With inter-equipment connectivity and the ability to communicate with each other, IoT has become the target of many companies and governments to make their unit systems work more effectively and efficiently.

From the manufacturer's side, IoT can be utilized to significantly improve efficiency, reduce production defects, and increase customer satisfaction.

The use of energy is often the biggest expense for manufacturers. By monitoring energy use in real-time, the manufacturer can easily find out the power consumption outside working hours, optimize the production schedule, find out if there is an anomaly, and see new savings opportunities. The data obtained can also be used to conduct a comparison of equipment, to find any system that does not work properly so that the unnecessary use of energy can be avoided.

Furthermore, historical data support can be used to predict future improvements, so that resources can be optimized at the right place at the right time, while avoiding unnecessary costs caused by inefficient repairs. Ultimately, IoT is expected to provide benefits to produce greater output with less energy input or resources.

3. Improve Safety & Security

In addition to efficiency, IoT can have an impact on security improvement, both in personal (safety) or assets (security). Imagine if all the cars are well connected to each other, even well connected with other transportation system components, such as fire officers, ambulances, highway cleaning officers, road repairs, etc. Autonomous systems can communicate with each other, know which ones will stop, which ones will go left and right, which ones will increase speed and decrease speed, what obstacles are in front, track closure schedules, priority for passing fire engines, and so on.

The use of IoT will certainly directly increase the safety of highway users, and indirectly reduce the number of accidents, and if it continues of course it will reduce many kinds of unnecessary costs, even reduce the number on insurance costs.

IoT can be used in the monitoring of border area, public security, disaster early warning system, highway lighting system, home security systems, fire warnings, and much more.

4. Increase Productivity

The easiest example on how IoT can increase productivity is an access control system. With access control, each employee can only enter certain floors and rooms, and at certain hours and days. HRD and interested officers can easily monitor where, when, and with whom an employee enters a room. Make it easier for HRD to carry out inspections of attendance schedules, overtime, and so on. Everything can be accessed in real time.

In warehousing systems, such as those built by Amazon, IoT applications are very helpful in monitoring the placement of goods, robot paths, stock aging, quantity and quality checking on each product, and so on.

The data obtained can be used in deeper analysis data, for example in the HRD system, in assisting the assessment of employee performance indexes, comparisons with other employees (by following a fair comparison system), to the case of very large companies with large buildings, make it easier for management and architecture, to design the placement of rooms and the location of canteens, parks, bicycle lanes and so on, more effectively and efficiently for each occupant inside.

For warehousing, the data obtained can be used for example to analyze the busiest robot paths, so that it can be used to build better robot track designs.

5. Reduce Cost

If effectiveness speaks of the use of assets, and efficiency speaks of reducing resources, then cost reduction speaks of the consequences of both. With the effective use of assets supported by production efficiency, thus the system will produce more output, with better quality, but with fewer input. Each of these components is literally translated, then the result is a reduction in costs, maximum savings and can even be allocated to other things.

The use of IoT for government is in the matter of shorter bureaucracy, better public services, leaner management, which indirectly will impact on the maximum use of taxpayers' money, and it will result in the welfare and happiness of their own citizens.

6. New Business Opportunity

IoT has actually opened up many new business opportunities. Supported by real-time databases, historical data, and combined with other data that are mutually influential, companies or governments can find a broader, deeper, more advanced picture of how to manage future strategies, and to make decisions - important decisions with far greater returns with a higher probability of success. More detailed data can open new income pipelines, new business units, new opportunities, and new innovations.

Continuing to innovate is very important for the survival of a company and even a nation, in order to stay ahead and not be eliminated from the competition.

Implementation of Artificial Intelligence (AI) and Machine Learning (ML) is an important factor in the development of IoT. The idea of reviewing and processing data so that it doesn't stop at humans, but let the computer tho process it, is a brilliant and genius idea, because computers can process far more data, far more options, and certainly, much faster than humans.

4. FIRST STEP: HOW TO START

IoT implementation can be very complex. Not only because there are many moving parts in an IoT system, but also because predicting the future turns out to be quite difficult. IoT solutions are complex because they involve hardware and software simultaneously, and require them to work together well. Each must be able to function properly and must be able to communicate through a network properly. IoT solutions are also becoming increasingly complex, because they involve data processing. Data obtained from sensors will not be useful if not cleaned of any interference, processed properly, and presented correctly.

It doesn't stop there, the use of IoT is even more useful when the data are processed together with other data, which may not be obtained from the same source, but from a third party, to be able to produce a much better and deeper analysis.

The way to start IoT is the problem of most companies and governments who want to adopt IoT. What kind of ecosystem do you want to use? What needs do you want to fulfill? What kind of results do you want to achieve?

Businesses are currently rushing to get into the market. But being faster doesn't always end in success. Being slower also does not always end in failure. Just don't be too late. In general, IoT adoption can be started through the phases as follows:

Phase 1. Project Definition, Boundaries, and Feasibility.

It starts with defining what the project intended to carry out, the boudnaries, expected results, and the most important thing is whether the project is feasible or not. Once more, IoT development can be very complex. Always start from small boundaries, initial ideas to be developed later. Spending more time in this phase is better than throwing away more time and other resources in the future in vain.

Phase 2. Design Approach: Build or Buy.

Since the IoT system involves hardware and software, it also involves many components of connectivity, so the next thing to consider is where to start, whether to create everything from scratch by yourself, buy hardware but make the software yourself, make hardware but buy the software, or buy both of them? Most companies or governments want to start everything from the beginning. Choose a team, then make everything yourself from scratch. But in the current IoT ecosystem, this method is known as the most inefficient and most dangerous way to start implementing IoT. The faster it enters the Proof of Concepts phase, the lower the risk.

Phase 3. Choose the right and competent IoT partner.

After setting the design, determine who makes what, it's time to choose IoT partner.

Fase 4. PoC – Proof of Concept.

Next phase is to prove that the theory of ideas and concepts that have been described in the previous phase can indeed be implemented. This phase is often referred to as the Alpha test, or Alpha release, which is the initial release to prove that the concept can be done with expectations of results that can be accounted for.

Fase 5. Field Test.

Field tests are needed to ensure that the PoC has been carried out can be applied in real terms. Success at this phase is a good start in starting the correct IoT adoption. This phase is often also referred to as Beta test.

Fase 6. Product Launch.

The last phase is the launch of the product itself. It's time to start thinking about business scalability.

The above phases are IoT business standards that must be carefully and precisely implemented. Imagine if you have worked for months in the development, only to find out that the products and services offered to the public turn out to end with very low market acceptance. This can be avoided if the developer chooses a modular system, instead of making everything itself. Developer can more easily and more quickly make modifications and do more market tests at the same time. For example, IoT sensors made can be tested in the agricultural, manufacturing, oil and gas, and health markets, simultaneously. Choose the market with the warmest acceptance and start there, to increase the chances of success.

In addition, by using proven modules, it will be faster and better to immediately enter the Alpha and Beta phases, so as to minimize the risks.

One important problem in IoT development is connectivity issue. The more connectivity options is better, because it will also be better in improvising needs in the field. By using connectivity modules provided by trusted IoT partners, developers can focus more on developing and to produce sensors with reliable quality.

5. BECOME SAM ELEMENT PARTNER

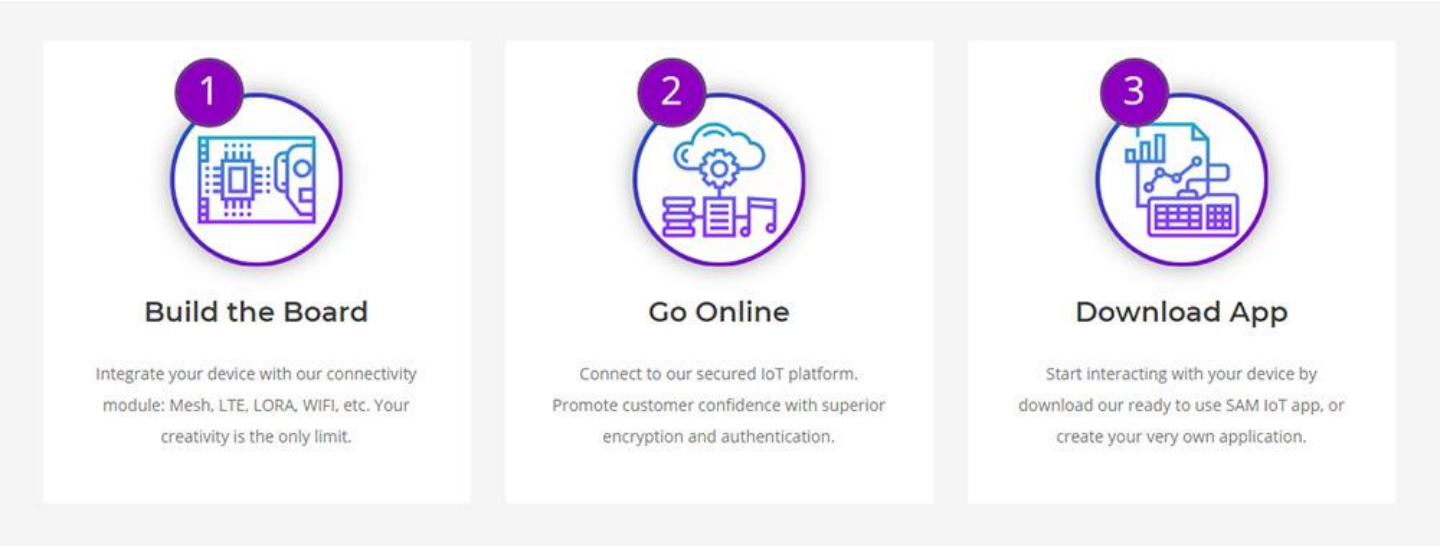
Building from the bottom up alone is known as the most risky and uneconomical way. Therefore, choosing partner who can be relied upon is one way to accelerate development, minimize risks, and accelerate to get into the market. Many things must be considered for IoT developers, including hardware, software, connectivity, radio frequency requirements, antennas, security, certification, feasibility, tests and production.

IoT development is very complex, because what is thought and developed is not only the connectivity issue, but also data center development, data processing, to the development of cross-platform end applications for users. Every part requires large resources and really time-consuming.

SAM Element is a reliable IoT partner. By partnering with SAM Element, the development time can be cut quite large, because connectivity problems to the final application have been provided and can be used immediately.

By partnering with SAM Element, developers can focus more on developing the hardware to produce quality, reliable IoT devices, with faster development time.

In addition, developers also do not have to worry about the various legal requirements and radio frequency certification processes that are tiring and costly, because SAM Element will take care of it.



3 easy steps to connect to the IoT world:

1. Create IoT sensor and integrate it with the connectivity module from SAM Element. There are various choices of connectivity modules ranging from Mesh, LTE, LORA, WIFI, and so on.
2. Connect it to the internet, your IoT device will be securely connected to the SAM Element IoT platform. Supported with the latest encryption and authentication process to ensure data communication security.
3. Download our ready to use app on Google Store or Apple Store, and start interacting with your IoT device.

Who can be partners with SAM Element?

Private developers, government agencies, any business, can be SAM Element partner. Some of them, but not limited to, are as follows:

- Palm oil, mining, oil and gas companies.
- Transportation companies and automotive manufacturers.
- Logistics companies.
- Companies of household electronic devices.
- Government services.
- Firefighters.
- State Electricity Company.
- Water supply companies.
- Schools and Universities.
- Environmental observer organizations and other non-profit organizations.

Why SAM Element?

We understand you have a choice when selecting a technology partner, so here are 6 reasons we think you'll be completely satisfied when you partner with SAM Element:

1. Reliable and High Durability.
   With a strong RND team, we'd like to release product and its update as fast as possible, while ensuring that the releases we approve maintain the highest standards of quality.
2. Data Security.
   Data security is one of the most important factors for SAM Element. Every SAM Element service is equipped with the latest encryption process and every data transaction must pass a strict authentication process. To ensure the data security, each partner must also comply with the security standard rules set by SAM Element.
3. Ready to Use Connectivity Modules.
   SAM Element provides a variety of connectivity options that can be integrated with your IoT devices, ranging from connectivity for Mesh, LTE, LORA, WIFI, and many more that will follow later.
4. Ready to Use App.
   With ready-made applications provided by SAM Element, developers can stay focused on producing quality sensors. The IoT SAM application can be downloaded for free through the Google Store and Apple Store.
5. OEM Service.
   Ready to expand the market with your own brand? No problem. SAM Element provides developer API so you can make your own application under your own brand and designed specificcally according to your own needs. SAM Element also partners with several certified software houses, and if you want to, we can connect them to you.
6. Friendly Support.
   The SAM Element believes that each partner's success is the success of SAM Element. Therefore, SAM Element places technical support as one important thing in building a sustainable business. SAM Element will ensure that as a partner you can obtain maximum service.

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