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AI City's Solar Energy Collaborative Commerce and Sharing Economy

(Full Paper)

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ABSTRACT

The advent of artificial intelligence has brought many changes in people's lives, and because of the rise of artificial intelligence, the city has gradually become a smart city. Smart City, as defined in Wikipedia, is an urban area that uses different types of electronic data collection sensors to supply information which is used to manage assets and resources efficiently. It is evident that the city cannot function without water, electricity and air. Especially electricity, due to the development of technology and the internet, has been the most important origin of resource in the city. Under such resources, two important groups are generated: the sharing of people and the resources of electricity. People represents the grouping benefits, which made the sharing economy more rationalized and creative because of the internet platforms. As stated in Wikipedia, sharing is to fully utilize resources for more efficient use, so to raise up the overall efficiency of the resources. So as solar energy, a natural resource, has existed on the earth for a long time like the air. These will be the most important components in a smart city. However, with the current Internet technology platform, the artificial intelligence, AI, will be a tool under the system we are already familiar with. Artificial intelligence such as AI uses the knowledge that the machine obtains from the use of input data and information. It's a way to let machine learn from the data first and then allows the machine to automatically calculate and judge the corresponding results. Such artificial intelligence is applied in the computing system of many industries, it reduces many possible errors, and relatively improves the efficiency of problem solving, and significantly increased the efficiency of obtaining new messages and information to users. Both supervised and unsupervised learning methods will be applied to the case study of this study. How to make the relationship between platform and consumer supervised, let AI artificial intelligence because supervised learning is only given some training samples of the machine, and inform the sample category, allowing AI judge automatically the conclusion of the samples, and accurately pass it to create information on the shared solar business platform.

Consumer psychology is also the focus of this research. Investors' transparency and simplicity in the application of goods, as well as the most important investment rewards and independency of consumers, will also be a discussion focus of this study. In this paper, the smart city of AI artificial intelligence allows the solar energy to create a business-style analysis of the economy, design, finds a platform model to establish Internet sharing, and achieve a large circulation and sharing of demanders and suppliers. This article uses the traditional field of goods, combined with the needs of multiple resources sharing and co-creation, combined to solve the existing information shortage and cross-domain strangeness. Utilizing the case study of solar energy company's discussion method, the smart city solar energy will create a commercial business entity, so that people can participate and identify with such industry, and then find more business models to create and share, and the realization of smart cities as a sharing platform mechanism all people shall be involved.

Keywords: smart city, solar energy, resource sharing, sharing economy, AI

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INTRODUCTION

With the changes of the times, the development of computer technology and Internet technology is booming and rapid. The universalization of the Internet has affected all levels of society as the rapid growth of the Internet relatively directly and indirectly let the Internet of Things centralizes the management and control of objects, devices, and people, so that it can integrate a large amount of information and data, so that the global information of the entire city has revolutionized the way and use of the Internet. In the same way, it has changed the lives of people, the society and the usage behaviors. However, the birth of Smart City is an ingenious mechanism and information to apply Internet of Things, big data, cloud computing as core. No matter if there are the communication between the government and people, or the intercommunication and connection between people, nature disaster, crime prediction, and control of a large number of epidemics, etc., they shall be fully integrated because of the birth of Smart City.

These integration shall have the support of the overall economic planning of the government. Taking Taiwan as an example, the resource gaps between urban and rural areas, local financial problems, tax burdens and disputes over the sharing of common facilities, and political issues (Xu, 2014). These are the problem to be solved before the birth of a Smart City, the overall planing, environment and economy, politics, etc., however, there are two major roles, the people and the electricity. If human behavior changes but there is no electricity, everything will go back to starting point. Therefore, this study will explore and analyze based on these two important roles, so people would start to understand that themselves are playing an important role in creating or

supporting a Smart City. In the current situation of sharing the economy as the starting point, we utilize the sharing and co-creation method, so that participation is no longer just observing, it is a kind of authentic participation in the interests of one's own life.

RESEARCH MOTIVARION

The original thought of Smart City is to promote the city to a state of sustainable development, however, to have a sustainable development it ought to have a balanced relationship between being environmental friendly and progress, so that the Smart City has a smart environment. The government has developed long-distance 24-hour monitoring, urban weather conditions, transportation, resources, air pollution and other emissions data through the internet. These are the basic factors the AI built intelligently in a Smart City. The direct and indirect relationship that these elements can perform is the platform, how the network platform connects these data and the circulation to the database of the demand side. In addition to the technological transformation, electricity is the most important part.

Based on the aforementioned research motives, this study intends to clearly find the relationship between solar energy and consumers based on the existing large amount of solar energy advocated in Taiwan, clearly find the positioning of cities and citizens, and plan to improve the general public's direct improvement of the city. Working with indirect construction of a smart city, such research can be organized into the purpose of two studies:

1. Put forward the economic benefits generated by solar energy, how can such economic benefits affect the citizens in this city, analyze the fields such as AI smart cities by analysis, from the platform, environment and space needed for solar energy production, and a complete model under Taiwanese regulations

2. The role of the sharing economy and the co-creation of the economy in the smart city, the use of interest distribution and innovative thinking in solar energy, the important role played by the platform.

3. Realize the commercial style of smart city solar energy to create economy, how to use platform resource sharing, and benefit sharing mode, find a co-creation of a solar economy business model, the relationship between supply and demand, let the role of the bilateral market sharing and co-creating another business model under the sharing of solar energy resources.

RESEARCH

The sharing economy is a resource that drives from a limited resource to a complete and sufficient benefit. The sharing economy is a term that emphasizes the diffusion and reuse of resources. This is a strategic thinking of having resources to use resources. There are many real cases to share in the current market to analyze the sharing economy, like the well-known Uber and Airbnb are structured upon the logic of sharing economy. Nowadays, the sharing economy is not enough for the use and spread in more innovative industries and ideas. Therefore, thanks to the Internet, value creation will be the core value of the sharing economy. The characteristic of value creation is the process of understanding the true value. This perception of value will be in the individual's emotions and personalization. This is a kind of cognition. This kind of cognition is the creation of value. This kind of connection includes the connection of problems between people, that is, the relationship between interests, and the connection of resources, because through the interaction of people, the exchange of information and the movement of information between each other, generate bigger cognition and the value of knowledge is elevated. In simple terms, useful value are created because of a kind of interactive communication. In today's society, because of the basic concept of sharing economy, the participation of the public in such a market behavior mechanism, requires only to increase the motivation and convenience through the platform. However, the economic core of the platform is that it can be used to create greater value. The concept of a bilateral market comes from 1833. Such a B to C (B2C) sales model, whether it is a bilateral market or a multilateral market theory, defines a bilateral market from an academic perspective. A market has two different users or industries, the interaction among two or more economic groups needs to be traded through one platform, while the overall decision of the user will affect the outcome of the other seller or consumer, and the platform will offer both parties different needs, one party's income will come from the number of another party's participants. Such a transaction can be a service or a commodity, or it can be a concept of co-creation. Of course, in order to attract the participation of both users, and the persistence of adhesion, the bilateral effect is still maintained and operated by the current market platform. It is usually seen that platform pricing has become a core issue of bilateral long-term bilateral market theory must achieve a major consensus, and the price of the platform to the other side of the user is not only related to its marginal cost, but also an external benefit. However, in the bilateral market, we can say that it is a buying and selling act, but perhaps he is actually a demand side provided by products and services, and the platform is transparent, so that the platform enterprises include products and services with value, and such value will make consumers or sellers generate a lot of trust and adhesion. Because of the extensive use of such internet and platform and the rapid timeliness, such a platform will play an important role in the network industry of all kinds of industries, with the maturity of the current global platform, regardless of It is the cash flow, logistics, security, communication, artificial intelligence AR and brand positioning, which can make consumers or investors feel comfortable using and recommending. Therefore, the platform is no longer just a page, and its multi-function has replaced many marketing roles in today's society.

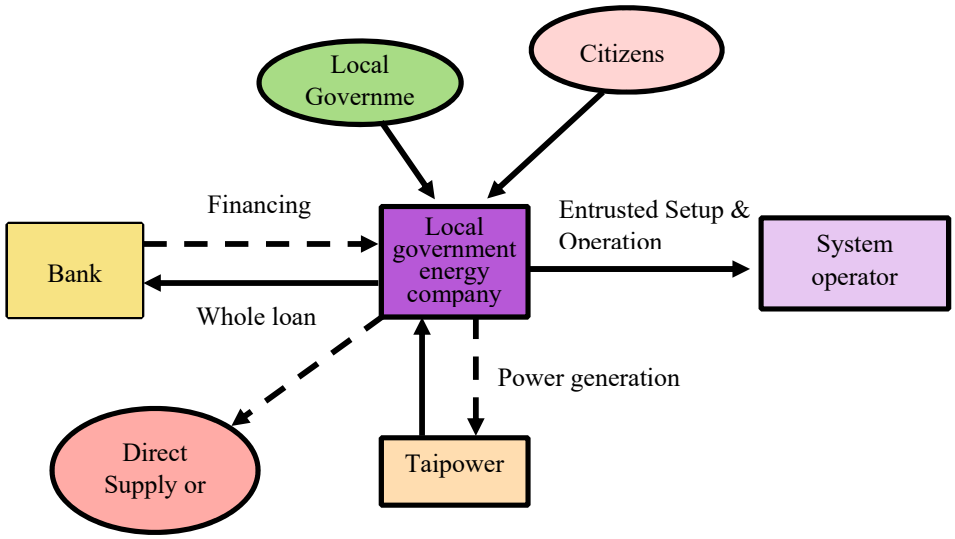
After all, in the overall sharing economy, sharing, co-creation, and platform, these three necessary factors must be combined to produce sustainable value. As mentioned above, the birth of the platform is a series of bilateral or multilateral markets. Such combination, linkage, and connection of resources in sharing to generate valuable knowledge and resources, that is, co-creation. This is an ecology will also increase the relative adhesion due to the sharing of benefits and resources, and the sense of identifying and awareness will increase. This is a model of achieving value co-creation, and is also a model of how to make smart cities in solar power generation, because the co-creation of value realized the co-creation model.

As for the role of consumers, we know that thanks to the Internet, consumption is no longer being passively informed or believing in sellers and advertising, and proceed to make purchase. The transparency of the Internet allows consumers to find what they need outside of the information, they can also give feedbacks and comments regarding to the product they choose. Under such information, Internet, artificial intelligence, service satisfaction, information transparency, etc., are important factors for a product or industry to survive, especially for experience marketing, current consumer experiences, commodities, platforms, services, and real experiences are the most important aspects for consumers to own this item, and to whether agree with the product.

EXPECTED FUTURE RESEARCH

The Core Elements of Sharing and Co-creating

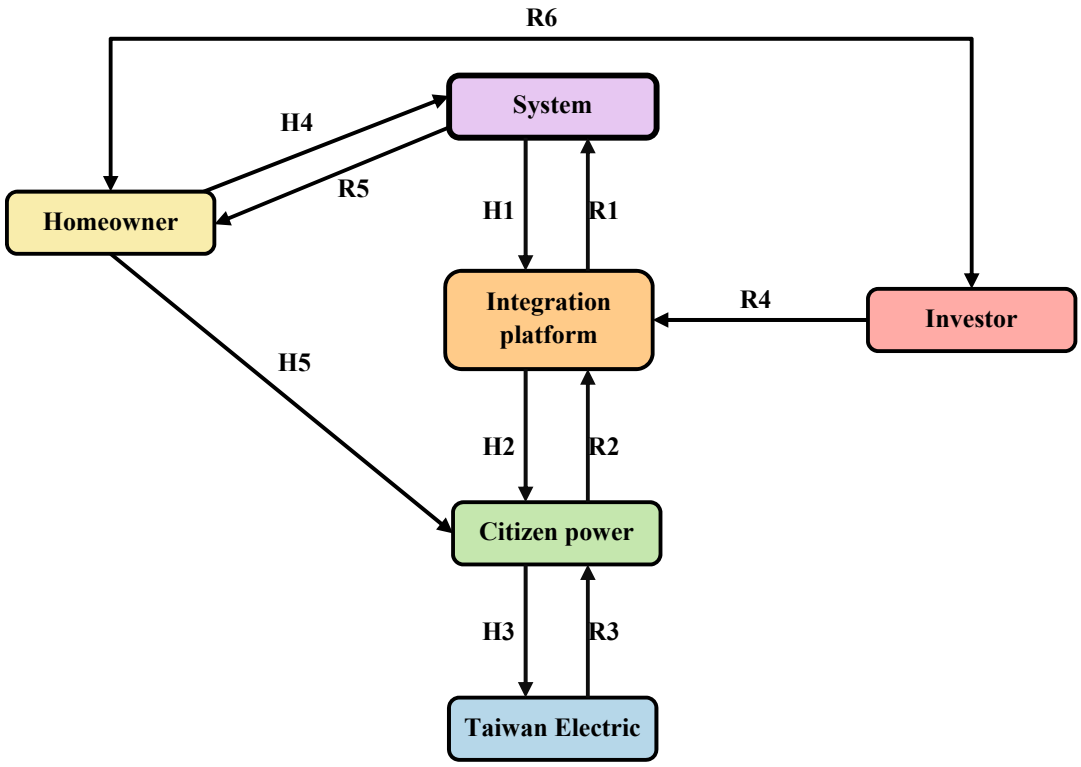
This research mainly propose an integrated business platform though the model of co-creation of the economy, utilizing solar power, to realize the concept of citizen power station, and realize the commercial style of the smart city solar energy co-creation of the economy. The so-called people's power station, mentioned in the energy transformation white paper stacking program published by the Ministry of Economic Affairs on December 14th, 2017, the definition and connotation of the citizen power plant, the so-called citizen power plant is through the participation of citizens in renewable energy generation. It is a principle of self-sufficiency, autonomy and autonomy of real estate electricity and electricity in the local area, with the goal to help achieve good energy and encourage renewable energy development and promote the so-called energy transformation goals. The current model of operation is dominated by local governments, calling on the industry and the public to buy shares, or setting up energy companies by the people to set up a renewable energy power generation industry, as shown in Figure 1, investors will use the concept of raising capital and buying stocks. Shareholders can recover electricity bills according to their holding ratio. Such a beginning model, let the researcher think about the platform and the co-creation of the tandem platform to be more in line with the citizen's position.



Source: This study.
Figure 1: Current Taiwan solar business model

Citizen power plants are converted into individual power stations of the power station, the same theory, but different business models, so that all citizens can participate in the birth of smart cities. We can see from the information of the Ministry of Economic Affairs, there are many large and small developers of solar power systems in every corner of Taiwan. Every solar system developer belongs to an independent entity. They all need customers to provide roofs, banks for financing, report to the government, pass the regulations, and bring power to Taipower, negotiate with Taipower, and sell the solar power to Taipower in exchange for cash. Then these are the same problems solar system developers in various regions of Taiwan have to face: the regulations, where the

building is located, the knowledge of solar power generation, and the maintenance of 20 years, etc. As mentioned above, how to integrate the entire developer and investors would be a business model that is based on a platform that integrates a multi-body system, collectively referred to as the integration platform, which is the most important core of the overall operation. As the previous research finds, because of the convenience of the Internet, the platform can connect investors and operators, that is, a series of platforms between production and use. The following explains each role separately.



Source: This study.
Figure 2: Vendor and industry related links

This study has six roles and structures

1. System Developer: Solar power must be performed by professionals and installed and maintained for 20 years.
2. Integration Platform: A complete integration platform that includes rectification of upstream and downstream vendors, Taipower, and investors' funding and investment plans.
3. Citizen Power Station: Collection point that integrates electricity into a physical but institutionalized location.
4. Taipower : Legal purchase of electricity to convert into cash.
5. Investors : General public, company number, legal person.
6. Homeowner: Homeowner and landlord with legal roof or factory.

Such a platform needs to achieve the overall power generation and profit-making search function according to the link of the foot speed relationship

H1 The system developer building solar panels in a building or the roof of the factory according to the regulations.
H2 Giving the citizens a power station after the integration platform system developer has completely completed the relevant solar energy system power plant elements.
H3 Selling the electricity generated by the solar power system to Taipower
H4 The homeowner must be the owner of the legal land and the land to entrust the roof to the system developer to build the solar system power station.
H5 The homeowner's electricity will directly transmit electricity to the citizens' power station.
R1 The integration platform converts the sold electricity into a fee format to the system developer.
R2 The citizen's power station convert into Taipower amount after integrated sales.
R3 Amount after sale.
R4 Investor, general public or entity group ◦

R5 System developers can invest in their own to find constructable buildings。
R6 Homeowners can be investors.

Sharing economy from solar power generation to resource sharing

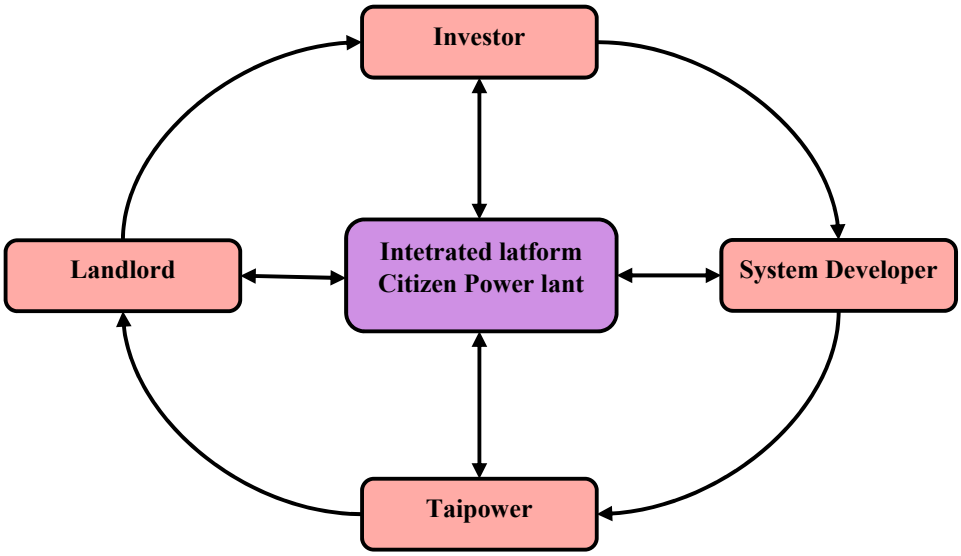
At present, the total number of solar power system developers in Taiwan, the quantity and quality and the size of the company are very different. Relatively in the system engineering of solar power generation, there will be a big difference in price. The specifications of the solar panels themselves must be consistent and the price difference will not be too high. In the case of a relatively high gap between the overall cost and the profit, it is necessary to discuss the current sources of industry differences, most of which must be cost generated during the establishment. Even though in the end, solar power is denominated in watts, but because of the different roof sizes and forms, the functions that the homeowners want to retain, etc., additional construction costs will incur. These costs and construction time will become the format of the system developers. The maintenance costs included in the 20 years after completion of the work, of course, also include the tangible and intangible expenditure costs, which will be the reason for the relatively large price difference between the relevant system developers in the industry. Therefore, the integration platform will enable such large and small system developers to integrate the electricity generated by the solar system power plants developed by individual system developers into the platform for the platform to sell to investors. Such an integrated platform approach will make the price of the market transparent. After all, the solar panels required for solar power generation and the cost figures generated by the surrounding construction can be calculated. However, the service surface is the biggest difference that cannot be controlled. Such a solar panel covered on the roof will give a good feeling and income of appearance and actual power generation due to weather, environment, air, etc. However, this is a 20-year service, so a complete platform system is needed to make each link transparent and complete. This will be a complete platform to create a basic infrastructure for the sharing economy. In the homeowner's part, in the case of Taiwan, small-area roofs have a lower market share in solar power generation. However, due to the manpower and time required by the operators, the construction costs are high, so they are currently large. Large-scale construction projects such as farmhouses, houses, buildings, hospitals, and schools to set up solar panels. Take Kaohsiung, Taiwan as an example. Kaohsiung's Government Public Works Department promoted the Kaohsiung 2016 Green Light Roof Project and provided many subsidy programs, such as the Kaohsiung City Public Works Department's 2018 annual three-dimensional green energy and green roof subsidy program, and green renovation. Government subsidies such as the highest subsidy of 800,000 rooftop high-rises, and the green rooftop farm of the Kaohsiung Medical University have promoted the incentives for many buildings to increase solar power generation. Behind such incentives, they will definitely their own interests.

Through the incorporation of AI co-create value to increase the value of investors and system developers and house owners, a three-win situation.

In the construction of a solar power station, in addition to the basic roof and system developer, the most important thing is the funds. With the funds to buy all the materials and the system developers, currently the majority uses bank loans to implement. But if such a source of funds is from a consumer that is, an investor, playing a small role in the whole process, stacking out shades after shades of solar energy panel, and sale the power generated by solar energy to Taipower, the integration platform clearly divides the relationship between the three roles. In other words, investors who have no real estate, factories or even land can buy monolithic solar panels because of such platform. Relatively, there are real estate owners who want to build solar power plants can also buy other solar power station developed by the system developer, these roles will change at any time because of personal needs. Similarly, because of their own preferences, they will exchange their solar panels for sale on the platform. Taking advantages of the security of the platform, the autonomy of funds on the platform is increased. It is different from the way the fund is purchased. It is only waiting for it to rise in the sell-off, but every investor can overdo the solar energy of his own commission. In addition to investing in countless single-chip solar panels, the generated electricity can also use the solar power generated by everyone to generate electricity. Such power generation can be calculated and used in units like a centralized station. The same is true for the membership card, you can see the amount of electricity generated by your own mobile phone, tablet, computer, and the amount of power generated by your own investment.

AI Smart City, platform, co-creation, sharing.

When every citizen is an investor, a consumer, or a business operator, for such an issue, they will relatively begin to care about and pay attention to all the things that are invested in. However, in addition to the large amount of electricity, the Internet, and the platform, the smart city itself is the most important common interest. In addition to the real money, the common interest is the subject and consensus of participation. This is a clustering effect. When the aggregation effect reaches a certain amount, the economies of scale effect will occur. Such economies of scale will not be based on regional restrictions, but the combination of knowledge and capital of each individual. You are a doctor, a lawyer, a small business boss, an office worker, a student, or a housewife, can all participate in such a solar power industry. When everyone is eager in certain events, there will be a common connection between people. The use of modules of interest, plus the maturity of the Internet and platform integration have allowed the solar power to play a common win-win role in both implementation and economics. Like Figure 3 illustrates the role of integrated platform includes the citizen power plant.



Source: This study.
Figure 3: Overall operating structure

DISCUSSION

Most of the energy on Earth comes from solar energy, coal, oil, water, wind and so on. According to the Global Renewable Energy Reactor Group, the total investment in renewable energy in 2014 was US$270 billion, solar energy was US$177 billion, and solar power generation increased by 40GW. In 2014, global renewable energy generation reached 312GW, ranking among the top five were the countries of Germany, China, Japan, Italy and the United States. Currently, the global solar energy generation accounts for 3.9 of renewable energy, and the total global power generation is 0.9% (Xu & Cai, 2018). The solar industry has always been called green energy, energy-saving industry, solar power generation, and Sola Power is a renewable and environmentally-friendly power generation method. It does not generate carbon dioxide in the air during power generation, and it will not pollute the whole environment. The history of power generation can be traced back to the 19th century. A French discovered the phenomenon of photoelectricity, which was less than 1% at that time (Li, 2012). With the advancement of technology, the successful development of solar panels with raw materials, which uses sunlight to convert into electrical energy, is a lens or mirror, plus a tracking system that uses optical principles to focus large areas of sunlight onto a relatively small Light and bend. The concentrated heat is then used as a heat source for conventional power plants. These heat sources are the source of power generation.

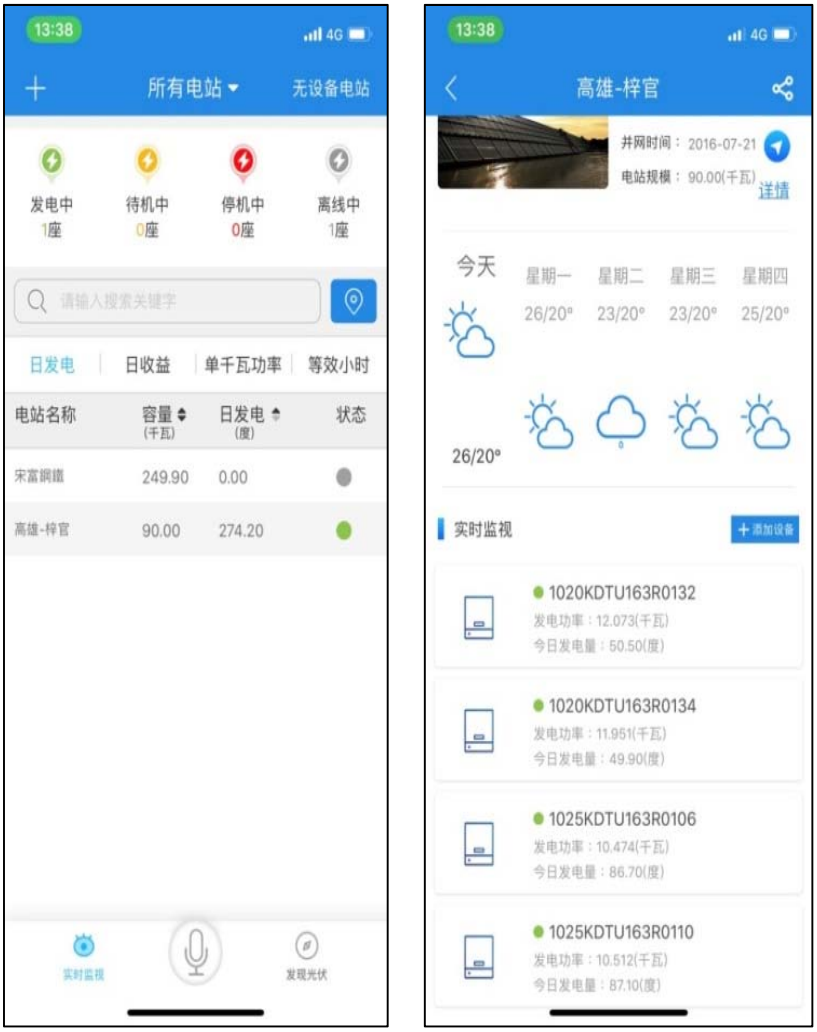
According to the Taiwan Enterprise Performance Journal (Wang, 2008), the performance evaluation of the solar power industry in the Asia-Pacific region, with a growth rate of more than 40% per year, is one of the fastest in all industries in the world. According to the study, the top three cumulative devices in Japan, Germany, and the United States account for nearly 90% of the total global installed capacity. Currently, the capacity of solar cell devices continues to grow. In Taiwan, the Taiwan solar cell industry is also great growth in recent years

Judging from the current situation in Taiwan, the government plans to promote the solar photovoltaic two-year promotion plan (2018-2020) to promote the roof line setting, including the central public roof, factory roof, farmhouse thinking and other roofs (data source : Solar photovoltaic Information Network). Such an idle space, because of solar power generation, generates extra income other than environmental protection. Currently, the implementation methods are divided into two types. The electricity generated by daytime solar power generation equipment is sold to Taipower, and the other way is to use surplus electricity to sell electricity. This is to give priority to the electricity generated by daytime solar power generation equipment. For home or homeowners, the remaining electricity is sold to Taipower. However, the solar power system built on the roof by solar power is not a solar-powered solar energy system. It does not have the function of tracking the angle of the sun. Such solar power generation will be limited to twin crystal solar panels, which include single crystal germanium solar panels and polysilicon solar panel (Xu & Cai, 2018). The 100% of single crystal is high in twin crystal structure, polycrystalline 80% twins 20% other master alloy. Single crystal is higher in cost, high power generation per unit area; polycrystalline is lower in cost, better market price acceptance. The conversion rate of these solar panels and the design specifications of the modules, the cost recovery period, the cost of the overall module includes the conversion efficiency, the cost per turn, the cost per kWh, and the actual conditions of the installation, etc.,

basically solar panels' life span can be up to 35 years in theory, but the guarantee issued by the industry can be for 25 years, and actually will be 20 years of economic life. Therefore, Taiwan's Taipower's contract to sell electricity to the homeowner will be rented for 20 years. The area of each solar panel is 1.65m2. The current mainstream single-chip 300w module in Taiwan is calculated based on the total power generation of Taipower for 20 years. The analysis of the North and South report is different (it differs in sunshine hours North 2.8-3hr South 3.6-4hr). If the number of power generation hours is less than 20kw in Hsinchu, the electricity price of solar photovoltaic power generation is NT$107.08/degree. The annual electricity generation hours are 2.8 hours*365 days=1,022 hours. Electricity revenue: The first year electricity income is: NT$7.008 * 1,022 hours *15.6kw = NT$1111, 730 / year.

The use of AI intelligent monitoring allows the platform to have complete monitoring, in order to be fully satisfied in many aspects. At present, there are many solar energy production teams in Taiwan industry. It has already used AI in the overall maintenance system, including artificial intelligence AI capabilities. Highly scalable, O&M for single system, simple setup and one-line diagram for instant data. The focus is on the ability of AI, which allows the engine to learn historical and real-time sensor data, help the power plant to implement protection and timely maintenance needs, and comprehensively assist the relevant information of the needs and maintenance of the power station.

At present, a large number of companies in Taiwan already have complete monitoring system development and use, such as Rishan Energy and Hyelin Technology. These monitoring systems collect Invereter data and upload it to the cloud. For example, Hyundai has developed PHOTON intelligent monitoring software. Operators can monitor the damage at any time and remind the industry of the best time to clean the solar panels. Such a research and development and research, using artificial intelligence and other means to assist data and report analysis, so that the industry's case power generation revenue is on schedule, can use AI technology to convey the best power generation to the industry and the surrounding data.



Source: This study.

With complete data, AI can be used as the role of communication and monitoring. The functionality and transparency of the platform will have more trust. This transparency and trust will make the platform more valuable, and more convenient. This study found that such a phenomenon of solar energy income and the way of investing in the face of increasing global warming, solar power will be one of the important energy sources in the future. However, Taiwan will also encounter relative problems: capital costs, land costs, regulations, solar conversion rate, residual value, and most important economies of scale, these are the problems faced by current solar companies, whether they are homeowners or assisted erected solar companies. But we all know, electricity is the most important role in smart cities. If there are no citizens with roof tops or factory roofs, there won't be any solar power. Thus through this research, I would like to study and create a business model that allows people who do not have any real estate to invest in an industry like solar power.

CONCLUSION

Corporate Social Responsibility in Smart Cities

The ultimate goal of a smart city is that the people have a perfect living space and of quality. The researcher suggests that such an integration platform is best ran by the government and the private sector altogether. This way of doing business will permit many minority groups in Taiwan also be able to participate in or share the value generated by such a platform. Because of such a platform, mainly based on solar power, more public activities can be planned allowing more young children to participate in the matters of nature, environmental protection, internet trust, investment, economic scale, and social pulse are all social education courses for personal education. Let solar power generation no longer be just a proper noun. It is a gift of nature as familiar as the air. We must understand the protection of environment and pass on a good environment to the next generation. We can educate the next generation in the simplest way with solar power generation, smart city, internet, platform integration. Let solar power bring out the power of smart city.

Due to the gradual popularity of AI artificial production and the increasing convenience of its usage, the creation of such a platform for sharing creates more opportunities and possibilities, whether it is scholars' research or collecting research materials. It can be seen that when solar energy is used as a product in the operation, the sharing mechanism will be a win-win trend. We can take advantage of the improvement of technology, and use artificial intelligence to integrate business opportunities so that bilateral effects are no longer just bilateral profit generation, but an increase of multilateral opportunities, the combination of business behavior and environmental protection and the basic needs of the city's survival, resulting in a permanent concept of ecological cycle.

In the current overall environment of Taiwan, the relationship between the three parties of solar power generation, consumers, and owner of assets, in addition to the application of the platform and the artificial sharing of AI artificial intelligence, can be used in small areas, so the planning of taking advance of small facilities should be an important issue. How to generate sustainable benefits will be the highlight of every member of the city.

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