Telemedicine
Blockchain
TMED
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Cloud
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Thursday, June 28, 2018
MDsquare Telemedicine System
SEARCH
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TMED
WHITE PAPER

Last Update: Feburary 26, 2019, Version 1.1
Prepared by MDsquare Team
MDsquare Token(TMED)

Incentivized, Blockchain based
Global Telemedicine Platform

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1. Executive Summary

Now, imagine you are on a family trip in Boracay, Philippines. Imagine your child all of a sudden complaining of a stomachache while on a vacation that is supposed to be precious family time away from your busy schedule. You are not sure if they just ate something wrong or just a stomach upset but it is not easy to have a child continuously complaining about a stomachache while you had no idea whether there is a hospital or a pharmacy near by. You are forced to put on hold your precious family vacation to visit the nearest hospital where you are made to wait for more than an hour. You receive treatment and get a prescription from a doctor who you cannot communicate well with due to language barrier. You are not sure what kind of medicine the drug is, and if the prescribed medicine will actually work. Now what if you could meet a Korean doctor who you can easily consult with on your cell phone without visiting a hospital, thereby saving time and money. This actually happened to me and later became the motivation for the MDsquare project.

In similar and other circumstances, when people have health problems they visit the hospital to receive the appropriate treatment for proper recovery. However, due to patients' limited medical knowledge and information it makes it difficult for one to determine whether they need to physically visit the hospital or not. This therefore leads to a lot of time and money wastage on unnecessary hospital visits and also may lead to lose of opportunity for patients who actually need to visit the hospital. With the increase in life span due to medical advancement there also has been rapid increase in chronic diseases of the elderly. This has increased the significance of not only treatment and cure medical systems but also prevention and management medical systems. In addition, a country's regional health care resource bias has led to increased differences in accessibility to health care services, increasing the demand for universal health care accessibility. Recent ICT developments have provided an alternative to current health care systems to solve these problems, and some improvements have been made to existing health care system problems. However, they are used only in limited countries and territories due to differences in the country's health care system, language problems, and the laterality of medical resources. There are also some security concerns about the medical data generated as well as a lack of solutions to cost problems arising from participants of health care services.

The MDsquare team combines the block chain technologies that are central to the fourth industrial revolution with the remote health care platform, and connects the self-healthcare management tools with the remote health monitoring service, AI medical chatbot service and translation solution to make it more convenient, safe and economical. It enables Global medical services, which allow patients to meet with healthcare providers and receive health care at lower cost within a remote healthcare platform that crosses time, physical, and linguistic barriers. It is also possible to maintain high security of the personal health information data registered or generated within the platform and to check the integrity of the health data to resolve issues such as falsifying or hacking increasing the reliability of the data.

TMED remote health care platform will enable medical institutions to effectively utilize medical resources to provide health care beyond the time, physical distance constraints. This has the effect of expanding the medical market. Healthcare providers will be able to perform medical activities outside of the clinic, thereby expanding the scope of their activities and increasing the freedom of their activities, causing the current highly centralized system, to be partially decentralized. It also improves the disproportionate distribution of health resources concentrated in developed countries so that people in the Third World, a vulnerable region of health care, can receive high-quality medical care, thereby contributing to disease eradication and recovery.

MDsquare team has built its own economically sustainable remote Health Care Platform using Ethereum to create their Token (TMED) for a Tokenized Economy Ecosystem to ensure that those who build and participate in the platform can receive and receive fair financial rewards for their activities. In addition, by enabling the use of TMED in actual offline hospitals, it is possible to connect the online platform to offline health care institutions and to guarantee and extend the value of the TMED.

Users are rewarded for storing and disclosing their health information, medical history, from self- tracking health devices that are associated with the platform. Healthcare providers can meet patients on the platform and provide remote video based medical services / offer monitoring-services based on personal health information / offer medical knowledge content thereby receiving financial rewards. These rewards will give incentives to platform participants to promote a plat-form that enables a sustainable economic ecosystem. The funds raised from some of the token used on the platform will be aimed at helping with disease eradication and providing health care services in developing countries and other vulnerable areas. TMED telemedicine platform will enhance the health of individuals and by extension it will enhance the health of the whole world.

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2. Problems with current medical systems

2.1 Problems with medical delivery systems

When a patient has health problems, they usually visit the hospital to see a doctor for medical examination and treatment; this series of events is what is referred to medical delivery system. Several entities involved in the process, including patients, health care providers, insurance companies, government agencies and pharmaceutical companies. The health care delivery system is a complex and multilayered interaction process, and the key part is the patient's face-to-face consultation with a medical practitioner for examination and treatment. As a necessity the patient has to go to visit the doctor at the hospital, which results in time and money spent. In most cases it is very likely that the patient doesn't need to visit the doctor face to face and in counties where health care costs are really high most patients are forced to depend on their own judgment for medicine dosage to manage their conditions and this may lead to even more serious medical conditions. Since one cannot see a doctor for medical advice and consultation without making a personal visit to the hospital even in non-serious medical conditions there has to be effective ways to cope.

The current medical system is based on the hospital, a centralized medical institution. Medical resources, including physicians, cannot exist outside the centralized health care organization, creating the inevitable problems of the biased and unbalanced distribution of health care resources. As health care systems are part of the country's essential health care system in promoting and maintaining national health, the health care delivery systems are formed differently depending on the state of health care and other situations in the country. In terms of the distribution of health care resources, the disproportionate share of medical resources results in differences in access to national health care, and the quality and quantity of health care services vary from region to region. As a result, many people have trouble accessing medical services, and they are in serious health problems.

From a health care provider's perspective, the problem is that the hospital's resources are being used ineffectively because of the lack of a way to reach patients who do not visit the hospital. For example, a practitioner may argue that if his or her care time is not reserved by a patient, the corresponding resources are wasted, and there is no way to make use of his or her empty hours. In addition, the problem is that since health care providers cannot leave their centralized health care institutions to meet patients, they do not have the right solutions to leverage their professional health care knowledge and experience outside of the clinic's offices.

2.2 Problems with Medical knowledge/Information Systems

2.2.1 Problem with Medical Knowledge

Although the supply of health care knowledge has increased with increasing attention to health, the professional nature of health care makes medical knowledge and information asymmetric between patients and physicians. Although that level is shrinking as the Internet and media develop, medical knowledge and information between patients and healthcare providers still vary greatly. Medical knowledge and information can be obtained over the Internet and SNS to narrow the gap, but there are also problems with this, as there are also many erroneous health care information. That is, it is difficult to ascertain the reliability of medical knowledge information gained on the Internet, etc. There is also a problem with the fact that there is not enough informathe health care provider to know which hospital to visit, which doctor to visit when there is a health problem.

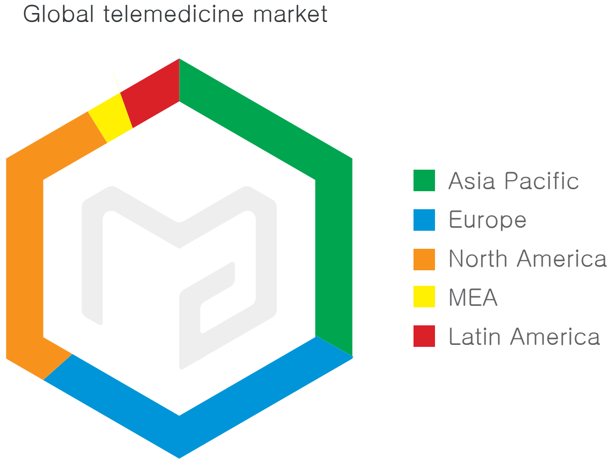
2.2.2 Problems of the Medical Information System

Under the current medical information system, it is difficult for a patient to maintain his or her medical history in one place. This makes it difficult for the patient to accurately understand his or her medical history i.e. when, where, and what kind of therapy he or she received. This is because health records are distributed across multiple medical institutions and patients do not have the means to manage the medical records directly. In addition, problems often arise where the results of tests and medical records performed by one medical institution are often not communicated or shared with other medical institutions leading to the unnecessary expense of performing duplicate testing. The reason why medical information is not shared is that the current medical information system has institutional-centered medical information storage system. This is because it is based on a centralized, institutional-centric health care system.

2.3 Market Analysis

The global telemedicine market is expected to reach $ 111.1 billion by 2025 according to 2017 Grand View Research, Inc. Major drivers of the market include a rise in the incidence of chronic diseases and a rise in demand for self health care. In addition, the growing demand for the development of the Internet and IT technologies, the expansion of virtual medicine, and the decentralization of health care are likely to drive the growth of the telemedicine market, and are likely to be one of the major success drivers. Remote health care can help reduce emergency room visits, hospital visits, and hospitalization rates, thereby providing significant cost savings and facilitating access to health care services to facilitate growth in the overall health care market.

Global Telemedicine market, per region, 2015(%)



The Asia-Pacific region is expected to grow more favorable during the forecast period, as more people will be involved in the region due to economic reforms, the revitalization of the IT industry and the cost cutting effects. Due to the high demand for health care and healthcare management, and the growing government spending on health care, IT services in the health care sector are expected to drive growth in the Asia-Pacific region. For instance, China's health care spending in 2013 was $ 511 million, and Japan spent $ 350 million on health care, and as a result of this staggering cost, it is expected to drive up demand.

The global telemedicine market is estimated to be worth $ 24.49 billion in 2016 and is expected to grow at an average annual rate of 18.8 percent during the forecast period. The ability to monitor a variety of chronic conditions, such as diabetes, cardiovascular disease, and cancer, is expected to produce significant advances in telemedicine during the forecast period.
Increased chronic diseases as a result of the increase in the number of elderly people and concerns about the health of patients will increase remote health care further, especially in the region's emerging economies after the Latin America and Asia Pacific.

Telemvedicine is a technology that can provide health education, health information, and health care through inter-patient communication between patients and physicians, enabling switching from institutional-centric care approaches to patient-centric care approaches. It also helps promote market growth by reducing hospital visits, emergency room visits, and hospitalization rates.

3. Solution : Innovation of MDsquare

3.1 MDsquare Introduction

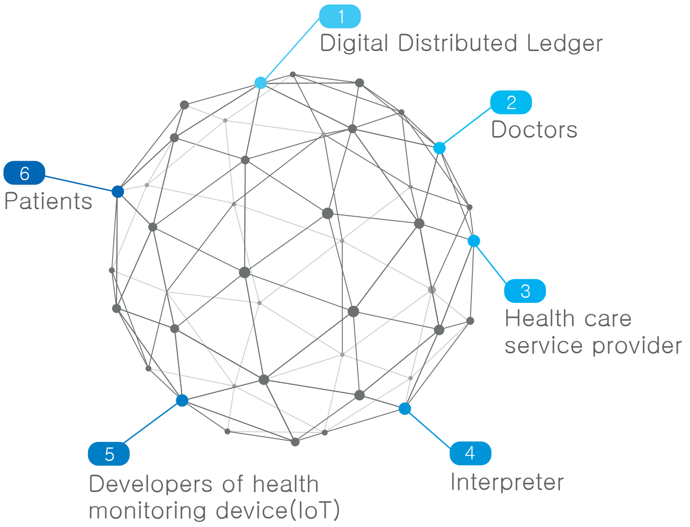
The team has been able to analyze the characteristics and strengths and weaknesses of the medical market, including the United States, Europe, China, and Korea, over the past two years, to develop real-time or scheduled health care solutions between patients and physicians. We also developed a medical consultation chat bot by classifying a large amount of data generated in the medical field into artificial intelligence, grouped by diseases frequency and criticality. Applying block chain technologies to this has enabled secure and efficient processing of personal health information data generated and stored on remote healthcare platforms and enables the implementation of virtuous compensation schemes of platform participants.

3.2 Sustainable Healthcare Delivery Ecosystem-BlockChain Remote Healthcare Platform

There have been several attempts to improve the problems faced by the current health care delivery system, one of which is remote health care (telemedicine). Many countries have had different approaches to telemedicine, but they have not yet been able to replace or significantly complement the existing health care delivery system. This can be found in a variety of areas, including national regulation, technological reality, and the lack of awareness, and is particularly because of the fact that there cannot be a linear ecosystem of remote healthcare and existing medical delivery system.

MDsquare uses the block chain technology to solve this problem by applying it to remote medical systems to solve problems that pre-exiting attempts have not solved. It is not a simple remote healthcare system, but a decentralized platform for a transparent and secure health care delivery system where patients and physicians can exchange and receive medical services based on genuine performance and trust. Here, the crypto currency (TMED Token) is issued so that an economic reward can be obtained for all participants by creating a virtuous economic ecosystem among the participants of the remote medical platform.

Blockchain Technologies for Telemedicine Platform


1
Digital Distributed Ledger
2
Doctors
3
Health care service provider
4
Interpreter
5
Developers of health monitoring device(IoT)
6
Patients

- Excellent Accessibility
- High Reliability
- Millitary Grade Encryption
- High Expandability
- Semi-Decentralized Health Care Delivery
- Enlarged Availability of Medical Resource
- Virtuous Circle of Crypto-currency for Health Care

* Why block chain technology?

The use of block chain technology on remote health care platforms has great implications on THREE main aspects.

The first is that smart contracts achieve a pre-approved contract for telemedicine services between patients and physicians and enable quick and automated health care services without third-party intervention. In particular, if the data generated by IoT based self tracking health devices can be connected to Oracle mechanisms, then real-time Personal Health Data which is available from outside the block chain, can be imported into the block chain, these coordinated mechanisms may enable medical services to respond more rapidly to patient health changes.

The second is the ability to encrypt sensitive, personal health information, personal history and identification information generated from remote health care platforms and to post them on public ledgers using the block chain's distributed networks, thereby enhancing the security of health information by preventing hacking and forgery.

The third is the establishment of an economic ecosystem based on the issuance of crypto currency, so that participants in the platform can receive fair compensation for their activities. This is significant in that it can overcome problems with national barriers and regulations on payments made in intra-platform transactions.

3.3 TMED Telemedicine Platform Structure and Participants

3.3.1 TMED Platform Structure

-Blockchain Layer
MDsquare uses Ethereum as its blockchain layer, so that the private health information data is uploaded to this layer and the generated token is operated on it.

-API layer
The API layer connects Block chain layer with Application layer, and it enables the movement of health information and any other additional data.

-Application layer
This includes a variety of applications that the patient or doctor may use.

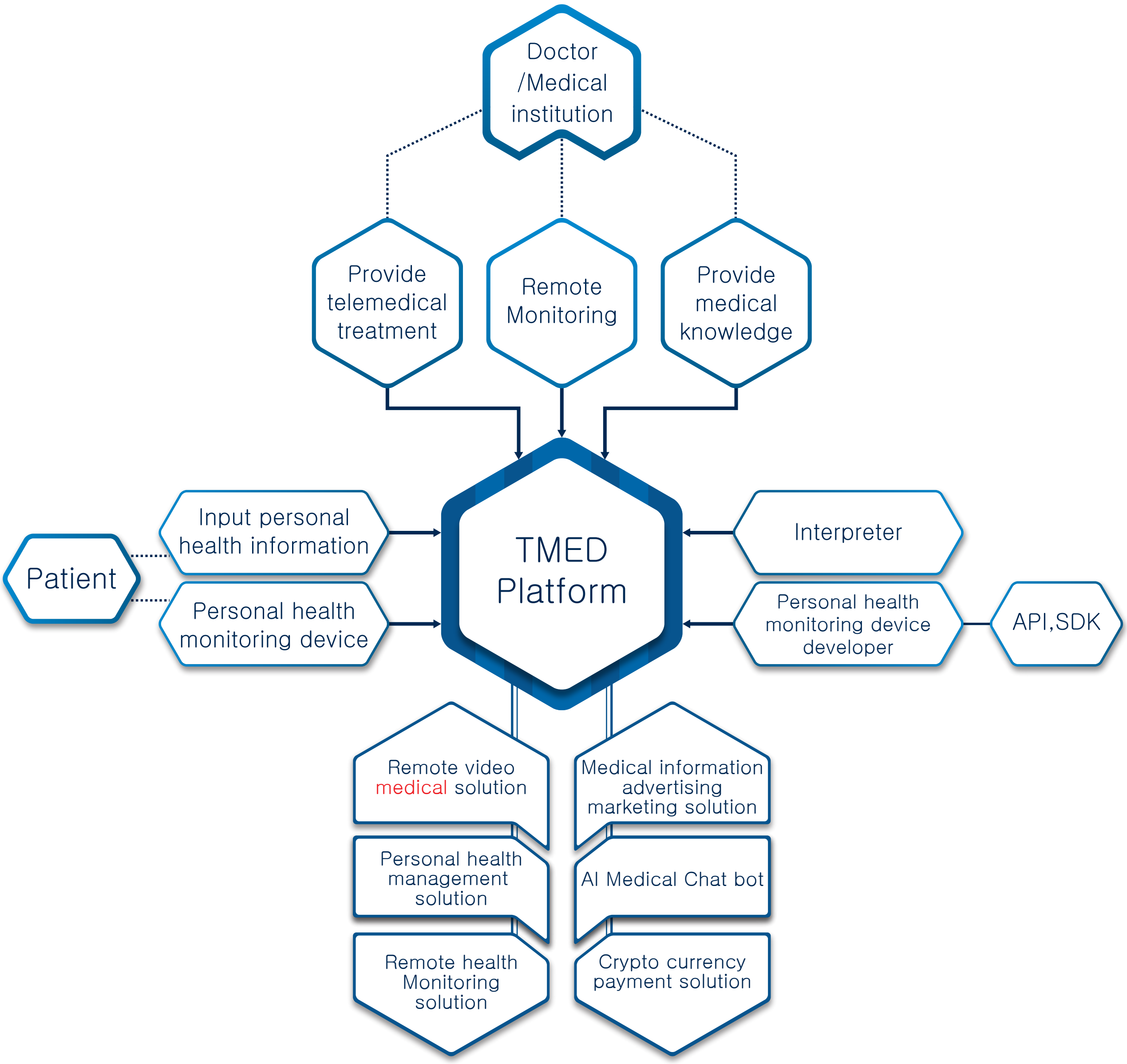
3.3.2 TMED Participants

- Normal users (Patients, patients family etc.)
- Medical servicers providers (doctors, pharmacists, nurses, councilors, fitness experts, dieticians)
- Translators (English/Chinese/Indonesian/Vietnamese/Thai)
- Health tracking devices developers.

3.4 TMED Platform Composition

MDsquare telemedicine blockchain platform is made up of 6 main parts.

- Remote telemedicine solution
- Block chain Personal Health Data Management Solution
- Remote health monitoring service
- Promote sharing of medical knowledge information and marketing solutions
- Artificial Intelligence Medical Chatbot
- Crypto currency payment solution


Doctor /Medical institution
Provide telemedical treatment
Remote Monitoring
Provide medical knowledge
Input personal health information
Patient
Personal health monitoring device
TMED Platform
Interpreter
Personal health monitoring device developer
API,SDK
Remote video medical solution
Medical information advertising marketing solution
Personal health management solution
AI Medical Chat bot
Remote health Monitoring solution
Crypto currency payment solution

3.4.1 Remote Video Consultation Solution

Remote telemedicine solutions feature a medical-specialized communication feature that enables healthcare service providers including doctors and patients to meet, see, and communicate face-to-face online. They will not only be able to talk face to face, but also send medical records and receive medical services all while viewing the affected areas.

Trustworthy medical practitioners and telemedicine service

When scheduling a consultation, input the subject you would like to receive consultation on your medical history and then proceed to a have a smooth face-to-face consultation with the doctor
During consultation you can send messages, share screens, mute and even freeze screen

The following functions are provided to help patients and physicians meet more conveniently and reliably.

-Search doctor/ hospital by region, language, and medical subject

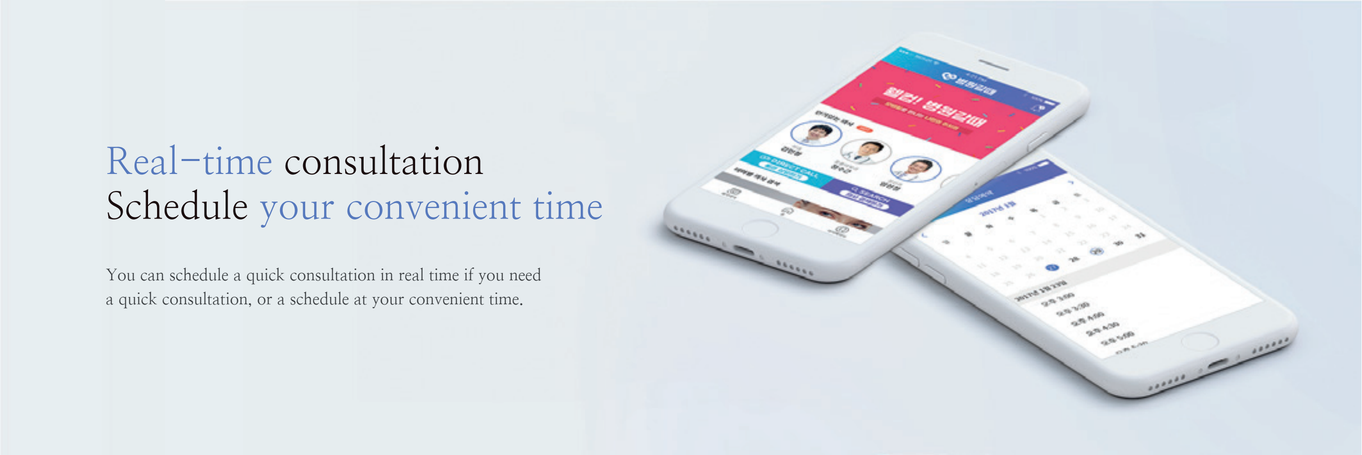
Patients can search for healthcare providers and hospitals in their area or language, and can also search healthcare providers and hospitals in order of the subject, ailment, or ratings and reviews.

For professional consultation search treatment based on subject

You can search by various health care subjects for easy, fast, and specialized consultation. Currently there are 15 medical consultation services available.

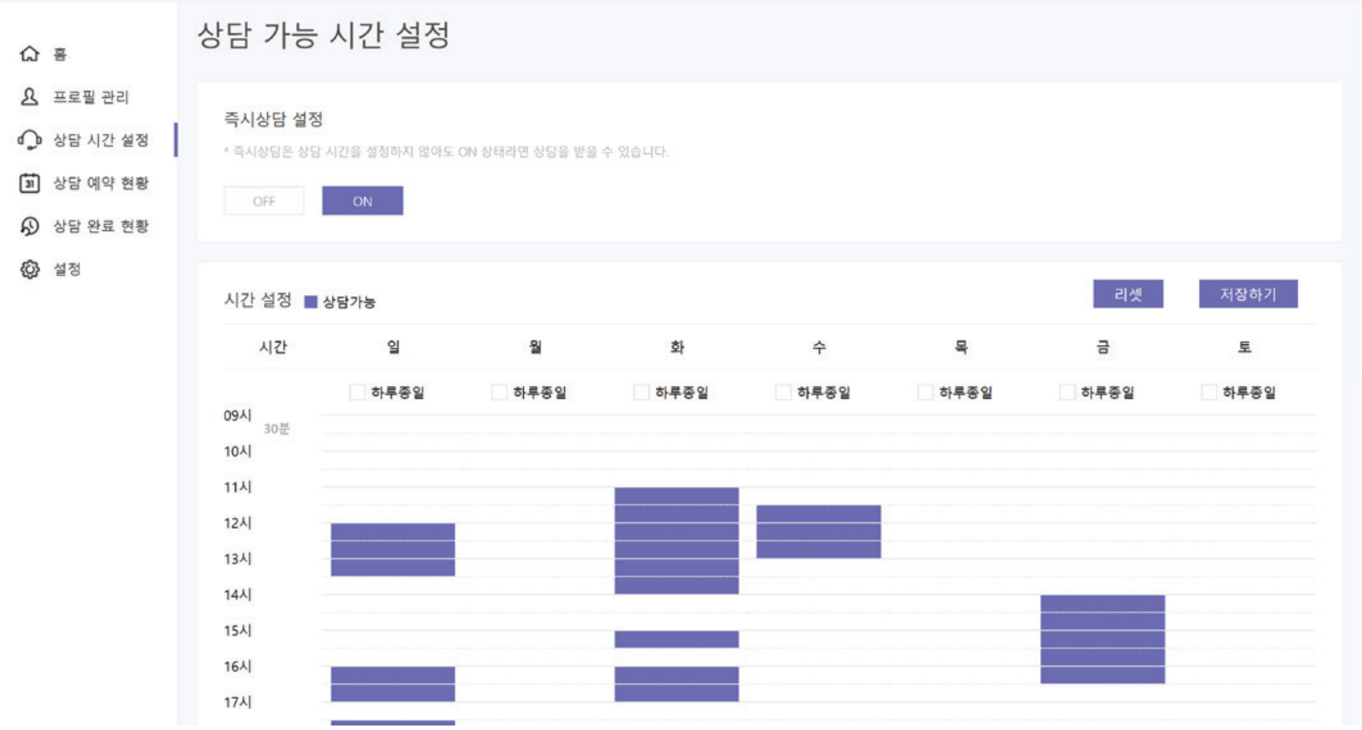
-Reservation Feature

When a healthcare provider releases their time schedule, the patient can execute a medical service request immediately or on a reservation, enabling medical services that overcome the time barrier.



Real-time consultation
Schedule your convenient time

You can schedule a quick consultation in real time if you need a quick consultation, or a schedule at your convenient time.



홈
프로필 관리
상담 시간 설정
상담 예약 현황
상담 완료 현황
설정

상담 가능 시간 설정

즉시상담 설정

* 즉시상담은 상담 시간을 설정하지 않아도 ON 상태라면 상담을 받을 수 있습니다.

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12시
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16시
17시

[Reservation, Schedule screen]

-Share Screen

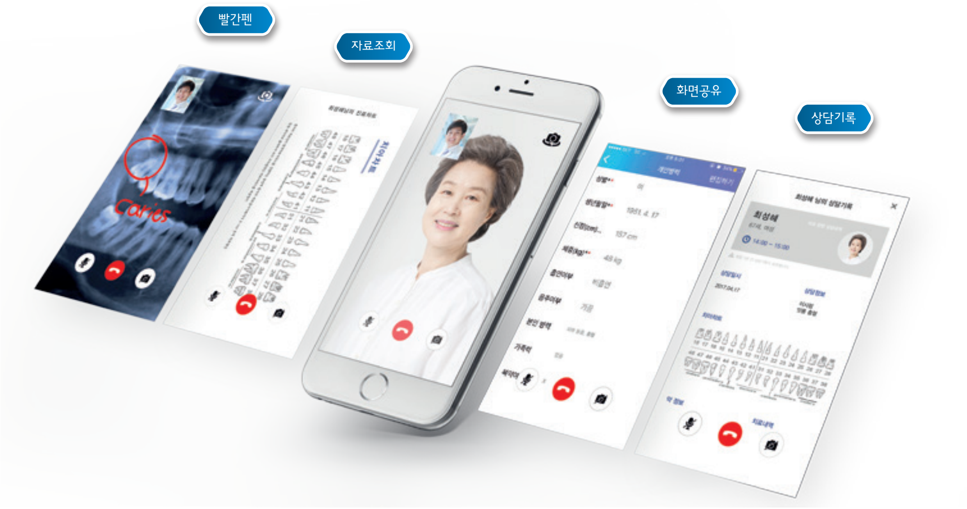
The patient and the physician are able to not only see each other; they're also able to view the same screen (e.g., the affected area, medical records).) It has a function that is different from that of conventional video solutions as it allows communication while screen sharing.

Share Screen

[Share screen image]

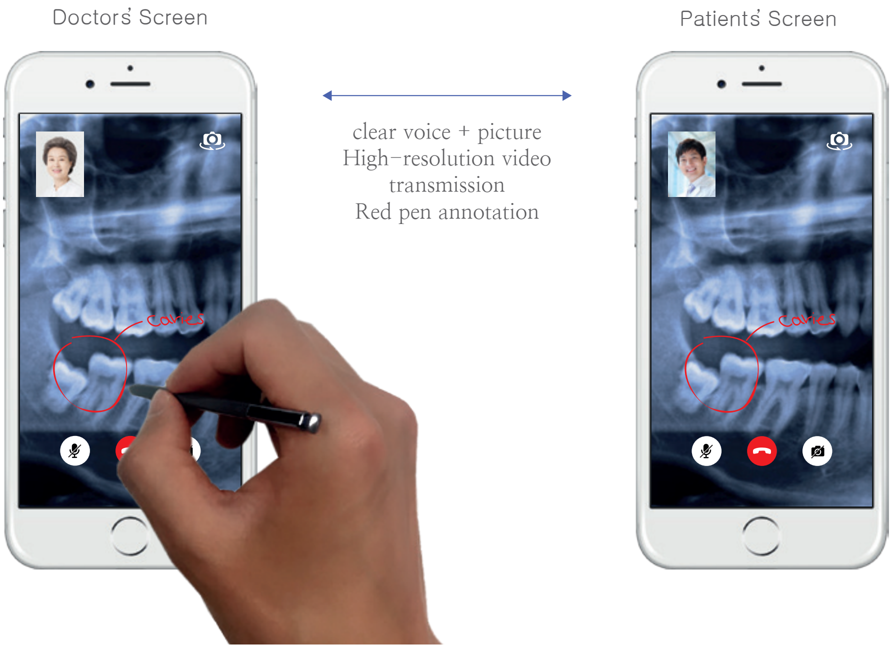
-Ability to retrieve medical examination records in layers

During the video consultation service, it is possible to layer medical images like x-ray and other medical record images to provide a more detailed medical consultation service.



–On–Screen Pen feature

Using the on–screen pen function, medical practitioners can communicate more effectively with patients by making on–screen marks or memos on the affected areas, medical records, and medical images in real–time. It will enable healthcare providers to offer comprehensive health care.


Doctors' Screen
Patients' Screen
clear voice + picture
High–resolution video
transmission
Red pen annotation
caries
caries

–Provides record keeping during or after medical services

Healthcare providers can create and store medical records of treatment provided during or after the treatment are completed. It also provides continuity for medical services performed later on for the same patient, making medical services more consistent.

-Translation services

Translators can participate in interpretation of medical services to overcome the linguistic limitations of medical services. This is possible through the 1:1 video communication capabilities provided by the video services. This means that medical services may extend further beyond the language barrier.

Translation services
가
A

-Review and SNS capabilities

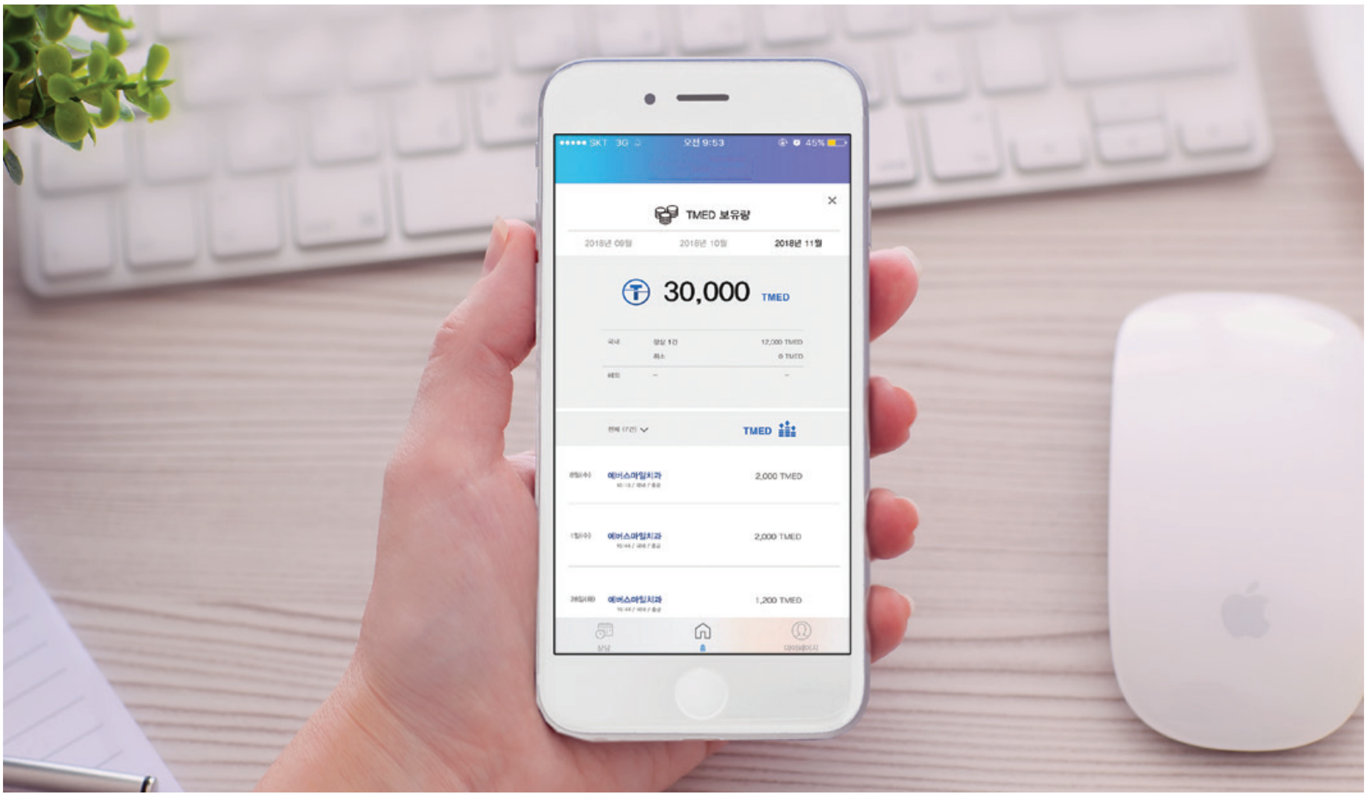
After a medical service is finished with a medical practitioner, the patient may write a review report or give a rating to the doctor. This kind of rating is utilized to analyze the medical practitioner's platform contribution. A bonus is given incase of high rating as incentive to maintain the good rating.

Healthcare providers who register on the platform are provided with profile pages to update about their careers and work practices. By providing SNS capabilities to a healthcare provider's profile, medical knowledge can be registered and released on profile pages, and rewards can be received from the platform depending on the number of views or recommendation by other physicians. In addition, to ensure reliability other healthcare providers on the platform can validate medical knowledge provided by a doctor. It can also be used in the search of healthcare providers and medical institutions to find more reliable medical personnel, and it can also be a tool to provide better health care services.

3.4.2 Block chain Personal Health Data Management Solution

The platform allows its subscribers to store their medical history by recording and storing their health information generated in their daily lives through personal health information management solutions. Moreover, the patients are also required to register and store their examination records, medical imaging data, and other data for convenient verification. Also, through linkage with approved self-tracking health devices within the platform it is possible to automatically update personal health information so that it can be managed efficiently and conveniently.

Actively registering their health information on the platform enables participants to acquire TMED Token. The acquired TMED will be available for remote telemedicine services or for purchase of remote health monitoring services with healthcare providers . Medical information data generated and stored within the platform have block chain technology applied to ensure security and integrity. In addition, health information is delivered only to authorized physicians and is kept safe from hacking and leakage of medical information.



Lately, it has become easier to measure biometrics (weights, body temperature, heart rate, blood pressure, blood sugar, etc.) with the development of a variety of personal health measuring devices. These devices combine IoT technology to collect health information from daily routines without visiting hospitals. Of course, so far, due to technical errors and cost issues it may not be completely possible to replace professional measurement devices used in medical institutions, but their use is gradually expanding. However, since health information cannot be used as long as it is generated, the MDsquare team releases the API and SDK for personal health measuring devices to work within the platform. Patients in their individual healthcare solutions will easily and conveniently manage health information data measured from personal health measuring devices connected to the platform. To increase the effectiveness and value of your personal health information data, you should go further and get regular remote monitoring service from your doctor. This means that health information generated from personal health measuring devices can be used more effectively through remote health monitoring services. Remote monitoring services are highly effective in maintaining personal health, preventing disease, and managing chronic diseases from the patient's standpoint, and will help lower the overall cost of health care. For physicians and hospitals, the new services through the connection with patients who do not visit hospitals will enable the effective use of medical resources and increase revenue

3.4.4 Healthcare Knowledge Sharing / Advertising Solution

-Medical knowledge, information sharing, and compensation systems

To improve the asymmetry of medical knowledge information between healthcare providers and patients, healthcare providers can be posting medical material and information on their profile pages. Medical knowledge and information registered on a doctor's profile page is categorized and viewable to users in a separate medical information section. A platform user can access a pool of medical information in their field of interest through a search, which can improve the asymmetry of the medical knowledge information. Healthcare providers who post medical facts and information may be rewarded with crypto currency and their ratings may increase according to the number of times the users have viewed the information and also recommendation from other healthcare providers.

-Medical advertising Solution

Health care interest is rapidly increasing as the life expectancy increases with the advancement of medicine. Accordingly, as the number of health care providers increases and the number of physicians increase, the promotion and marketing of medical institutions and physicians to patients has expanded, and the costs are increasing. In particular, the promotion and advertising activities in the field of beauty and plastic surgery are getting more intense, and in certain countries and regions. Such promotional marketing activities are expanding across borders, leading to the growing number of medical tourism (Chinese tourists visiting Korea for the purpose of plastic surgery).

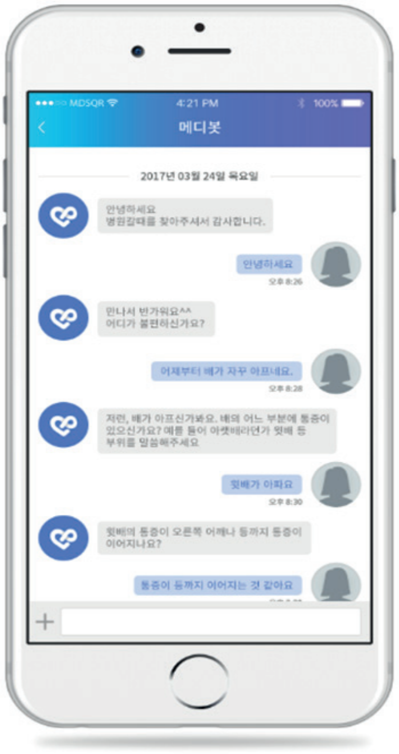
However, advertising in the medical field, has different characteristics from advertising in the other fields due to asymmetry in medical information content. The wrong advertising activities could infringe on the health rights of patients. (The damage could be caused by commercial health advertisements.) The medical practitioners enable the P2P authentication in the advertisement activities.

The MDsquare platform provides physicians and medical institutions with targeted commercial marketing solution. Based on detailed data, such as region, sex, age, disease, and remote health care usage information, the platform-subscribed patients are analyzed through big-data and are provided with regional search priority exposure and patient care information search. This is done through competitive bidding and TMED token is used.

By purchasing the TMED token early on, medical institutions can prepare the resources required for subsequent promotional PR/marketing at a lower price. This is a strong incentive for healthcare providers to participate in the initial ICO.

3.4.5 Artificial Intelligence medical chat bot

If the user wants simple medical counseling or medical information rather than meeting with a doctor, interactive medical counseling with an artificial intelligence chatbot can be used to obtain the desired medical information. In practice, the medical institution builds the frequently generated question-response between the physician and the patient in each medical care field into structured data, and mounts this data in the machine learning enabled artificial intelligence of the machine. The developed medical chatbot enables interactive medical counseling using text/voice, so that patients can provide medical information in the form of text, images, videos, and online links. Appropriate doctor/hospital recommendations and reservation functions can be provided based on the conversation and also based on the patient's location. If the user wants more professional and in-depth medical advice even after interactive medical counseling with artificial intelligence medical chatbot, the chatbot can recommend an appropriate doctor to provide the telemedicine services.



2017년 03월 24일 목요일

안녕하세요
병원갈때를 찾아주셔서 감사합니다.

안녕하세요
오후 8:26

만나서 반가워요^^
어디가 불편하신가요?

어제부터 배가 자꾸 아프네요.
오후 8:28

저런, 배가 아프신가봐요. 배의 어느 부분에 통증이 있으신가요? 예를 들어 아랫배라던가 윗배 등 부위를 말씀해주세요

윗배가 아파요
오후 8:30

윗배의 통증이 오른쪽 어깨나 등까지 통증이 이어지나요?

통증이 등까지 이어지는 것 같아요

3.4.6 Crypto Currency payment Solution

Various medical-related services are available within the remote health care platform, and payments are made with TMED token, which can only be used within the platform. TMED acquired through activity or transactions can be exchanged for TMED, which can be transacted to other types of currency in external exchanges. In addition, the TMED can and will be used for payment within the actual hospital.

Through this payment system, various participants, such as patients, health care providers, health measurement equipment developers, and translators, are able to participate in a virtuous circle of activities, receive fair compensation for their activities, making them more willing to participate in the ecosystem. Additionally, token payments will enable remote health care services to be accessed regardless of region or country, enabling payment related regulations and barriers to be overcome.

4. Competitive Advantage

4.1 Easy Accessibility

TMED remote health care platform provides optimal online access to medical practitioners regardless of time, place and distance across the globe. This not only means crossing the barriers of physical distance and time, but also crossing over language issues through translation services (meaning automatic translation provided by professional interpreters or on the platform) This makes it possible to effectively relocate the Medical resources of the world, especially by providing the right to universal health care for people in need of access to health care.

The platform also stores all medical information on the platform in a distributed data store, providing a convenient and secure means for each participant to gain online access.

4.2 High Reliability

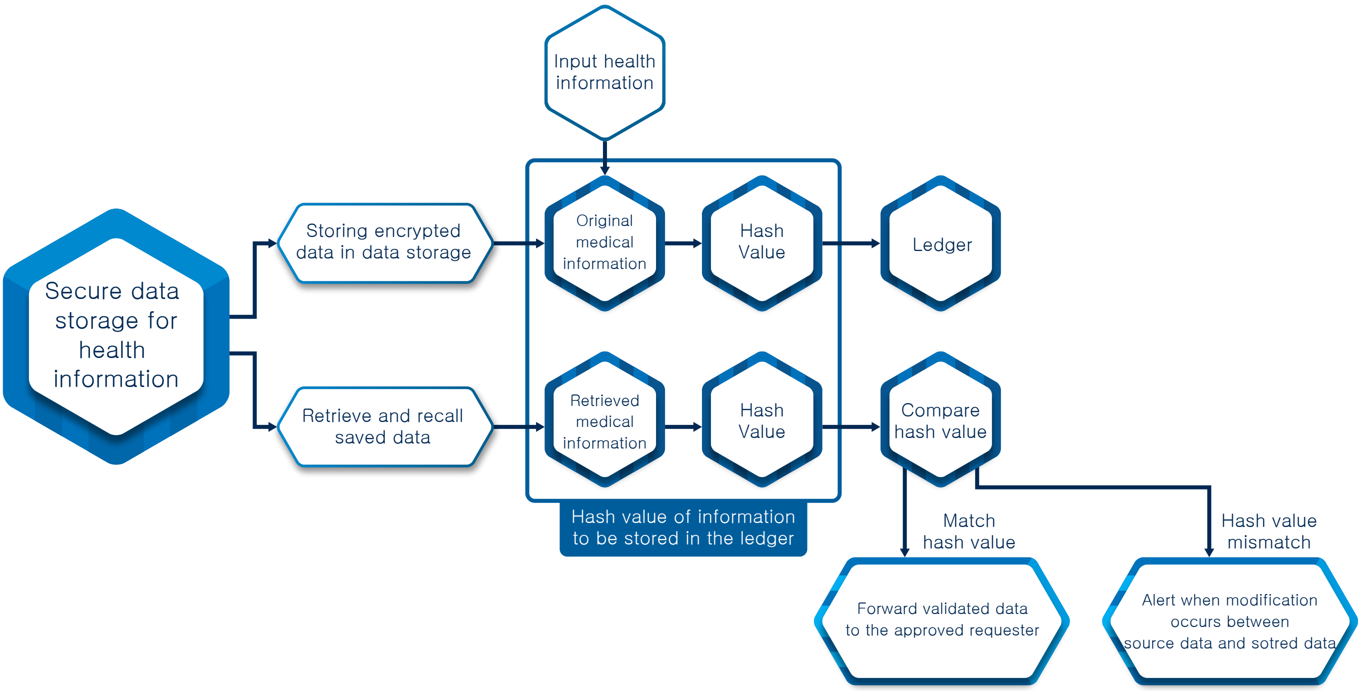
To ensure the reliability of the caregivers, the TMED telemedicine platform provides the profile of the doctor/hospital and provides validation of the information contained in the doctor's profile through its connection with a peer. It also provides a history of the activity of the physician and displays the patient's review and public credit of the physician or hospital so that the patient is more likely to be trusting when choosing a doctor or hospital.

4.3 Excellent Scalability

TMED telemedicine platform allows the Open API and SDK to enable the developers of personal health measuring devices to access the open health care platform using the block chain so that the various personal health measurement devices can work together. This enables personalized medical services that are associated with personal health measuring devices, remote clinical monitoring of chronic diseases, and enhance the level of health care. Patients will be able to better manage their health through a variety of personal health measuring devices, etc., and receive more accurate and relevant health care from the health care personnel within the platform. It can work with a variety of IoT devices to manage the health of individuals, such as blood pressure, blood sugar, body mass, body temperature, and activeness. In addition, the developers of personal health measuring devices may obtain financial rewards within the tokenized economy ecosystem by selling individual health measurement devices to patients within the platform.

4.4 High Security

A high amount of medical information data is created, registered, and stored over TMED telemedicine health care platform, and these medical data contain sensitive and personal content. As a result, security of medical data is a critical issue. To ensure the reliability of medical data, TMED applies block chain technologies to medical information data generated from telemedicine health care platforms. It increases reliability by storing health information data in distributed, secure data storage spaces, and by recording the hash values to the distributed ledgers of the block chain. The medical institution ensures that only medical personnel approved by patients can access, open and keep medical records of the patients. If unauthorized access or modification occurs, comparing the hash values can check it and the backup data can be used to restore the original


Input health information
Secure data storage for health information
Storing encrypted data in data storage
Retrieve and recall saved data
Original medical information
Hash Value
Ledger
Retrieved medical information
Hash Value
Compare hash value
Hash value of information to be stored in the ledger
Match hash value
Hash value mismatch
Forward validated data to the approved requester
Alert when modification occurs between source data and sotred data

accuracy of information, the SHA-256 encryption algorithm (SHA-2 series) uses block chain techniques and data hash (Data Hashing)

The U.S. Healthcare Information Protection Act Privacy Policy (HIPAA) stipulates that a person's health information should be encrypted and stored. Even if the individual medical information corresponding to sensitive personal information is encrypted and stored, there may be problems such as deliberate leakage problems internally or hacking by external hackers.

MDsquare grants access to personal health information to patients, not to clinicians, to safely store medical information generated from the platform and to prevent the possibility of hacking or leakage. The medical institution is designed so that only the patient can decode his or her medical information data, and the access rights to the medical information can only be set by the patient himself, and recorded in the block chain. This eliminates the possibility of medical information leakage and prevents outsiders from intervening. In addition, a medical institution prevents information from being leaked from a number of patients at once, thereby preventing large, frequent medical information leakage incidents.

4.5 Decentralized Healthcare Delivery System.

Under the current medical system, doctors must belong to a medical institution (regardless of form and size) to conduct medical services. Due to the nature of current medical services that require patients to be treated directly, health care providers have only been able to meet patients within a centralized healthcare system, this limits the free meeting of patients and physicians within the medical institution and makes it difficult to expand medical services. In order to improve the problems that these existing centralized health care systems have, MD Square team while maintaining a large framework of the existing healthcare system will implement decentralized healthcare through block chain, It enables remote medical services to be exchanged and received without intervention from the medical institution and in the event physical care is needed, it links patients with direct health care providers, and creates a virtuous link with the global health care institution. It provides more freedom and efficiency for patients and medical personnel at the same time, the expansion of the health care market and the role of medical personnel and medical institutions.

4.6 High Medical resources utilization

Many medical resources are used for patients to visit hospitals, receive treatment, and recover fully. (Medical resources: medical personnel, medical devices, physical locations, time, administrative tasks, etc.) But often-medical resources are not used efficiently. For instance, there are too many healthcare providers and hospitals in big cities and not in developing countries. Another example is a time issue, where most medical resources are used only eight to five hours, making them underutilized during other hours.

On TMED block chain based remote medical platforms, health care providers and medical institutions around the world can effectively utilize their medical resources over time and distance. For example, a doctor may travel outside of the clinic, but still participate in a block chain - a remote health care platform, providing and sharing his health care knowledge and experience with other local patients. The medical institution will release the unreserved care hours and notify patients in the region to use them.

4.7 Virtuous Crypto Currency Ecosystem

The MDsquare team has built a sustainable virtuous circle, crypto currency ecosystem on blockchain for remote medical platforms to ensure that platform participants get legitimate economic compensation for their activities. It issues the Ethereum based TMED token is used in the platform.

Each participant can obtain or use the TMED Token through activities and transactions with other participants within the platform, As such; MDsquare blockchain based telemedicine platform participants can gain reasonable economic rewards for their respective activities. This creates a mutual token economy ecosystem that allows each participant activity to expand and develop further

5. Revenue Model

TMED remote health care platform makes use of both B2B, B2C Business Models as follows.

5.1 Internal Platform Fee

- Platform usage fees
- 5 % to 10 % of the transaction amount will be automatically used as platform fees for transactions within the platform.
- When exchanging MDP (point) points collected by each entity to TMED token within the platform, an exchange fee of 1 to 3 % will be received.

5.2 Subscription Sale

- Sale of medical service pass/voucher by period.

There are passes available that allow for medical service regardless of number of times for a set period. They are available by day, month, or year vouchers and can be used for remote medical services depending on user's health condition or situation.

5.3 Advertising Revenue

Re-processing big data from the platform enables customized target advertising based on gender, age, region and disease information. This will allow for efficient advertising of hospitals or doctors, remote health service ads, health measuring devices, and health-related products.

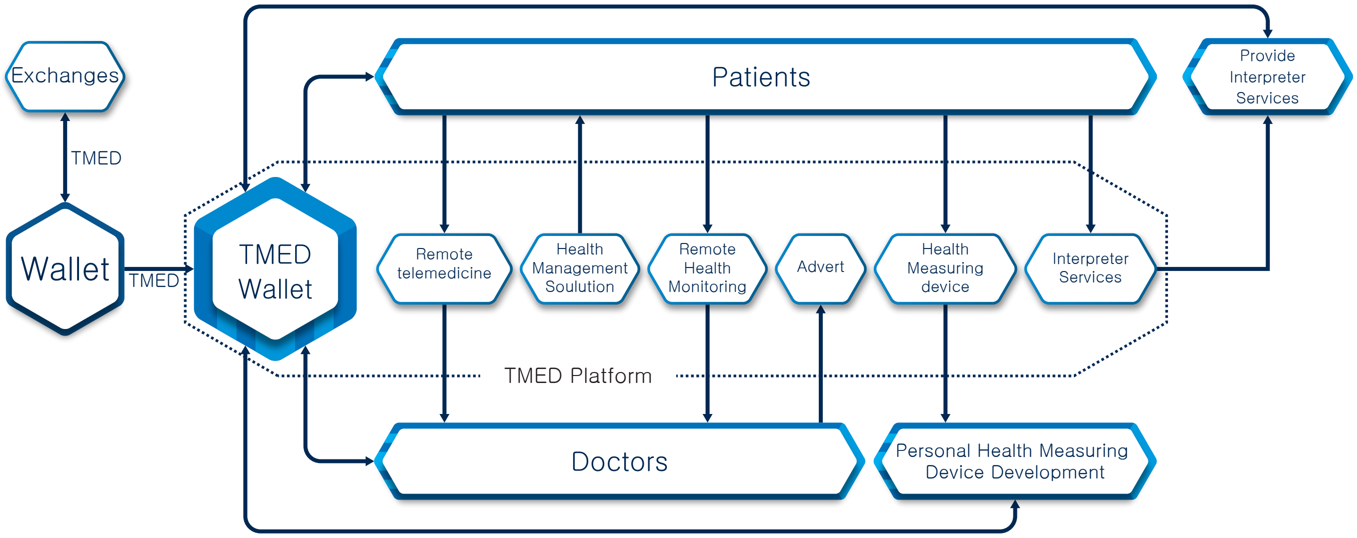
5.4 Sale of medical services passes to groups

The medical service is provided to members of the contracted organization (e.g. charities, companies, schools, religious organizations) and paid for by the contracted entity. In other words, members of the group will be able to comfortably access remote medical services anytime, anywhere. This may improve the health of group members and reduce medical costs; thereby resulting in reduction of the overall medical expenditure of the group.

6. Token model

6.1 Token Issuance Objectives

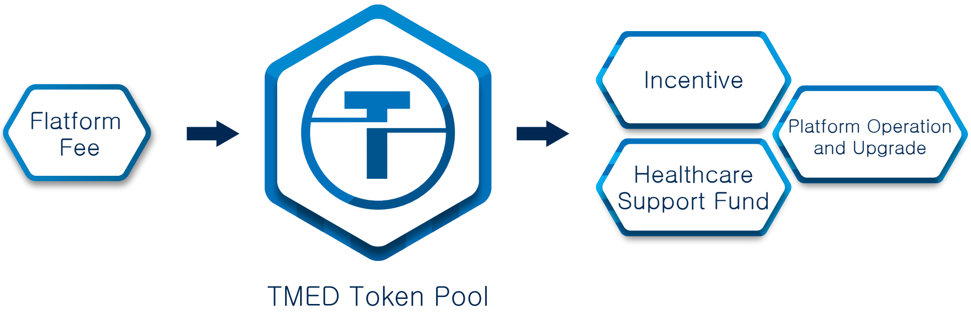
The MDsquare team has prepared to launch services by developing innovative telemedicine platforms that address problems with the existing health care delivery system. Currently, the block chain technology and cryptography economy are transforming the paradigm of industries in each sector, and the health care sector in particular is at the heart of that shift. Meanwhile, new attempts in the medical sector have been made at regulatory review, licensing fees, medical technology gaps, health insurance policy implementation, and payment that are not complicated. In response, the MDsquare team issued the Ethereum Network based TMED token, which addresses the complex and wasteful compliance procedures above and also to create a new and sustainable plat-form compensation system. MDsquare also creates an expanded Tokenized Economy Ecosystem that allows developers of external personal health measuring devices to participate. This will lead the field of online healthcare first, and will lead the future health care development of patients, healthcare providers, personal health measurement equipment developers, pharmaceutical companies and translators etc. and plans to establish a future health care ecosystem that will lead to a new value-chain. It also raises funding for some of the TMED tokens used on the platform to fight against diseases and promote health in areas where health care is not available.


Exchanges
TMED
Wallet
TMED
TMED Wallet
Patients
Provide Interpreter Services
Remote telemedicine
Health Management Soulution
Remote Health Monitoring
Advert
Health Measuring device
Interpreter Services
TMED Platform
Doctors
Personal Health Measuring Device Development

[Tokenized Economy Ecosystem Diagram of MDsquare Telemedicine Platform]

6.2 MDsquare Token (TMED)

MDsquare issues an Ethereum based ERC20 TMED Token. The TMED tokens are available for virtually all activities that occur within the MDsquare platform, and stored in a private Wallet and traded in an external exchange. Within the platform, various advertising and outreach activities, such as medical institutions and IoT health measuring devices, can be undertaken by paying with the TMED Token. As more transactions with the users increase and the platform is completed and upgraded, the value of the TMED is expected to increase naturally and the costs of platform participation are expected to increase. The platform has a Token Pool for controlling the Tokenized economic ecosystem.



To realize the real value of TMED a TMED Payment Solution is provided to enable medical institutions belonging to the TMED Medical Network to pay medical bills with TMED. In other words, the ability to receive physical care and pay with the TMED at physical hospitals that join the TMED platform allows the TMED to have not only have value at the exchange but also at the actual medical institution. The scope will continue to increase.

TMED	Acquisition Process	Uses
Patient	Input Health Information	Purchase of Personal Health Measuring devices Participation in telemedicine services Remote Monitoring Service
Health care provider	Participation in telemedicine services Participation in telemedicine Monitoring Service Provide medical knowledge, information	Profile page upgrade, Advertising
Personal Health Measurement Device Developers	Selling Personal Health Measuring devices	Platform Signup, Advertising
Counselors etc.	Provide remote counseling services	Profile page Upgrade, Advertising
Interpreter	Offer translation/interpretation services	Advertising

6.3 MDsquare Ranking Index (MDR)

This refers to the contribution and position of each individual, including patients, healthcare providers, device makers, and translators, within the platform. This is determined by activities within the platform. The higher the MDR, the better the advertising impact gained based on exposure within the platform.

The activities of increasing MDR within the platform are as follows.

Personal Health Information Update + 1 MDR
Remote consultation (video / voice) + 10 MDR
Remote monitoring participation + 10 MDR
Providing content for medical information + 100 MDR
If recommended by physicians: + 100 MDR (profile, content target)
If recommended by patients: + 10 MDR (health service, profile, content recommendation)

6.4 Incentive Structure

MDsquare platform participants will be granted the following incentives

6.4.1 Transaction and activity incentive

As described above, platform participants will be able to acquire TMED and MDR depending on their activities and transactions.

6.4.2 Loyalty Program

There are two Loyalty programs that exist within the platform to encourage MDsquare service platform participants to participate actively. Throughout the program, active participants will receive bonus TMED.

-Patient Loyalty Program

Additional TMED are offered as bonuses, apart from the basic compensation, either by registering one's health information or selecting users who used the most health care services each month.

-Doctor Loyalty Program

We select healthcare providers with a lot of activities, such as video telemedicine consultation, remote monitoring participation, and medical knowledge and content delivery, each month to offer additional MDP as bonus apart from the basic compensation

6.4.3 Incentive for making TMED payments for actual offline health care services

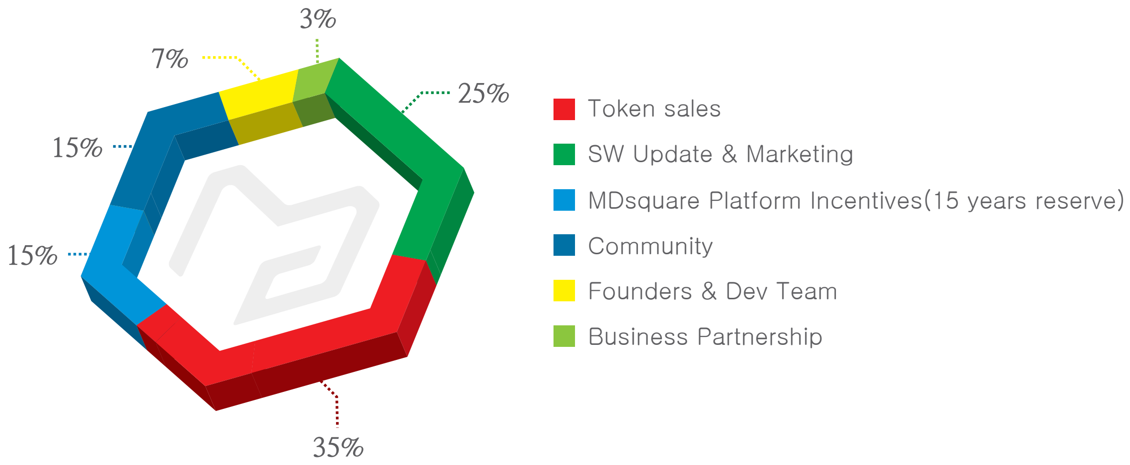
In case users and health care providers pay for the actual medical service with TMED, It gives each side 5 to 10 percent of the transaction as incentive in TMED.

7. Token SALE

7.1 Token Allocation Structure

- Total Token : 28,000,000,000 TMED
- Token Sales : 9,800,000,000 TMED
- 35% : Token sales
- 25% : SW Update & Marketing(3년 Lockup)
- 15% : Community
- 15% : MDsquare Platform Incentives(15년 reserve)
- 7% : Founders & Dev Team(1년 Lockup)
- 3% : Business Partnership(1년 Lockup)

Token Allocation Structure



7.2 Privilege of Token Holders

TMED Token Amount	Holding Period	Patients	Holding Period	Doctrs/Hospitals
5,000,000	3 Months	VIP Membership		
10,000,000	6 Months	VIP Membership Discounts on Medical Service in the Platform	3 Months	-VIP Doctor/ Hospital Membership -Doctor Profile to be expose on top section in Lobby and Category
20,000,000	12 Months	VVIP Membership Free Medical Service in the Platform	6 Months	-VIP Doctor/ Hospital Membership -Doctor Profile to be expose on top section in Lobby and Category -Discounts on Advertisementsd
50,000,000			12 Months	-VVIP Doctor/ Hospital Membership -Doctor Profile to be expose on top section in Lobby and Category -Discounts on Advertisements -Free App Push Notification Ad
100,000,000			12 Months	-VVIP Doctor/ Hospital Membership -Doctor Profile to be expose on top section in Lobby and Category -Discounts on Advertisements -Free App Push Notification Ad -Free Top Banner Advertisements

*The Range of Free or Discounts benefits for the VIP, VVIP Membership Service can be change by company policies

7.3 Use of ETH Proceeds

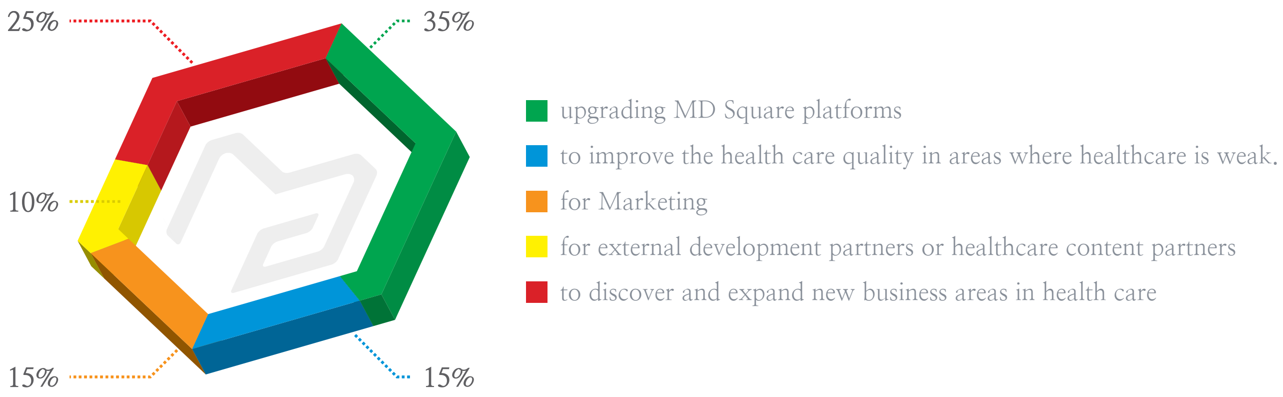
35% upgrading MD Square platforms

15% to improve the health care quality in areas where healthcare is weak.

15% for marketing

10% for external development partners or healthcare content partners

25% to discover and expand new business areas in health care



MDsquare
Telemedicine
Blockchain
TMED
Cloud
Mobile
Computer
MDsquare
09:27 AM
Thursday, June 28, 2018
MDsquare Telemedicine System
SEARCH
END CALL

8. Roadmap

8.1 Milestone History

-2017.1Q Build real time reservation solution

-2017.2Q Create remote telemedicine solution

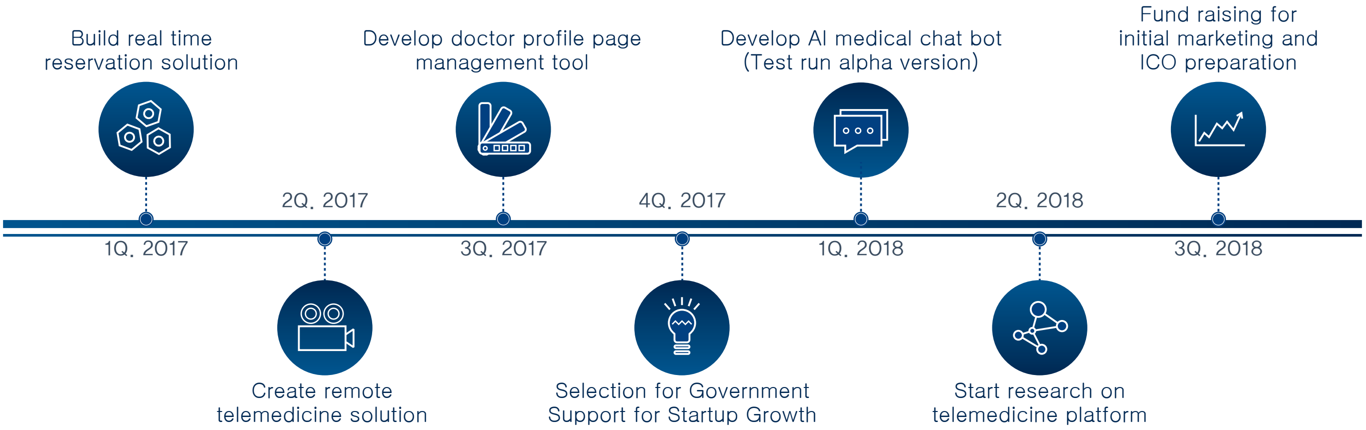
-2017.3Q Develop doctor profile page management tool

-2017.4Q Selection for Government Support for Startup Growth

-2018.1Q Develop AI medical chat bot (Test run alpha version)

-2018.2Q Start block chain integrated telemedicine platform development.

-2018.3Q Fund raising for initial marketing and ICO preparation


Build real time reservation solution
Develop doctor profile page management tool
Develop AI medical chat bot (Test run alpha version)
Fund raising for initial marketing and ICO preparation
2Q. 2017
4Q. 2017
2Q. 2018
1Q. 2017
3Q. 2017
1Q. 2018
3Q. 2018
Create remote telemedicine solution
Selection for Government Support for Startup Growth
Start research on telemedicine platform

8.2 Business Related Timeline

-2018.4Q TMED Stock Exchange Listing

-2019.1Q Upgrade remote video telemedicine solution

-2019.1Q Launch remote video telemedicine consultation platform

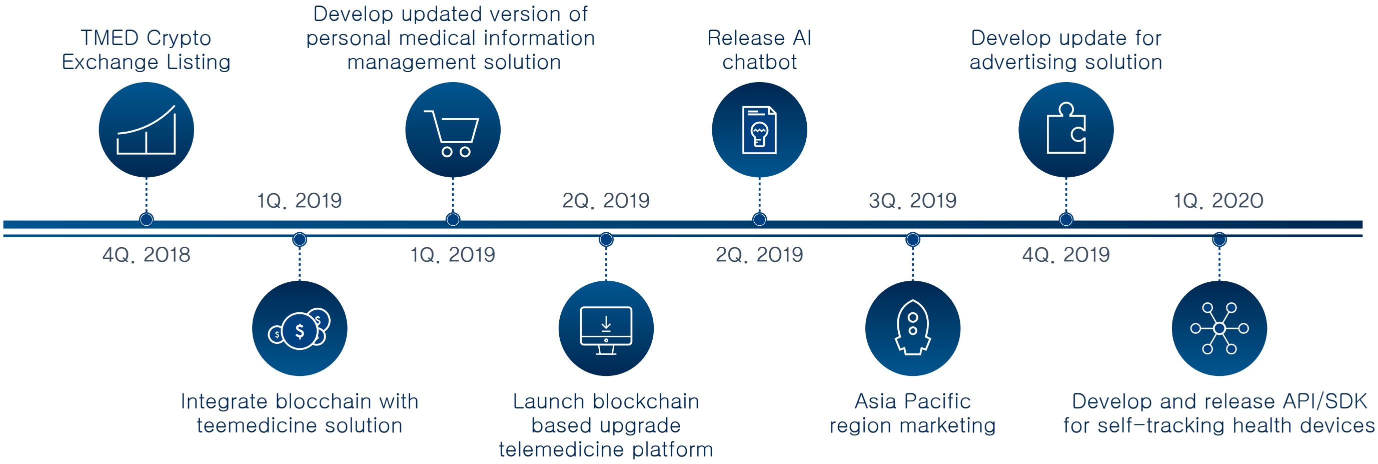
-2019.2Q Release AI chatbot.

-2019.2Q Develop updated version of personal medical information management solution

-2019.3Q Asia Pacific region marketing

-2019.4Q Develop update for advertising solution

-2020.1Q Develop and release API/SDK for self-tracking health devices


TMED Crypto Exchange Listing
Develop updated version of personal medical information management solution
Release AI chatbot
Develop update for advertising solution
1Q. 2019
2Q. 2019
3Q. 2019
1Q. 2020
4Q. 2018
1Q. 2019
2Q. 2019
4Q. 2019
Integrate blocchain with teemedicine solution
Launch blockchain based upgrade telemedicine platform
Asia Pacific region marketing
Develop and release API/SDK for self-tracking health devices

9. Leadership

9.1 MDsquare Core Team

Paul Oh

CEO of MDsquare Inc.
Graduate Electronics, Yonsei University, Seoul
M.S. in Dentistry, Yonsei University, Seoul
Founder of Eversmile Orthodontic Clinic, Seoul, Korea (3 branches)

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Qoo10, Head of Corporate Development
Gmarket, Head of Strategic Planning

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Dreamwise Inc., Vice President / CTO
Fujitsu Korea, Lead of Banking Service Development
Dawin Data Systems, Chief Developer

Joseph Hwang

CMO of MDsquare Inc.
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Eyedentity Games, Business Development Manager
Bidalgo Inc. Korea Country Manager
Rushmo Inc. Mobile Game Producer

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Bachelors Degree, Dentistry, Yonsei University, Seoul

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B.S of Computer Science and Technology Management, UNIST
PwC., Data Analyst/ Shinhan Bank., Data Analyst
Tridge., Product Manager
Robert Walters., Technology Consultant

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B.S in Computer Science, Sookmyung Women's University
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Olleh KT Foundation / Global Mentor and Volunteer

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B.S. in advertising, Zhejiang University, China

Sang Hyuk Shim

HR & General Manager of MDsquare Inc.
Frontend Engineer & HR Manager at Qoo10
HR & General Manager at Mediarae Inc.

Jong Seo Won

Marketing Manager of MDsquare Inc.

9.2 MDsquare Advisory Team

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Graduate of Seoul National University Medical College
Board-certified plastic surgeon
Full time doctor of the plastic surgery department at Seoul National University Hospital
Executive director of Korean Association of Clinical Plastic Surgeons
Scientific director of Korean Association of Clinical Plastic Surgeons
Pofessor of plastic surgery department at Inje University
Currently) Director of BK Plastic Surgery Hospital

Robert Hwang

Graduate Electronics, Yonsei University, Seoul
Microsoft Corp., Industry Business Development Director
SK Telecom, New Biz & Global IT Director
Accenture, Business/IT Strategy Manager

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CEO of MEDI114

Seung Youn Cha

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Bachelor of Medicine at Yonsei University
Director of Chungdam Mirror Plastic Surgery Clinic
Director of Mirror Plastic Surgery & Dermatology Clinic

Yoon Sik Jeon

Ewha Women's University,Graduate School of Dental Medicine, Orthodontics Professor
Former Dean Graduate School of Dental Medicine at Ewha Womens University.
Currently)Dentist, CEO of E-wireligner

Hun Young Kwon

Chairman of the Public Data Strategy Committee
Executive Member of the Public Data Strategy Committee
Chairman of the Special Committee on Legal Systems for Government 3.0
Currently) Professor of Information Security at Korea University Graduate School

Seung Kyu Lee

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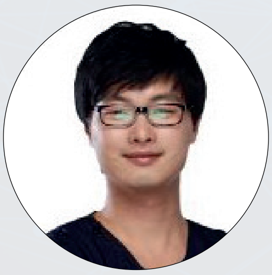
Associate professor at Gyeonggi University of Science and Technology
Chonnam National University Masters in Dental surgery
Seoul National University School PhD in Dental surgery
Currently)Director of Suwon Good Tree Dental Clinic



Yoon Sung Won

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Ehwa Women's University Mokdong Hospital intern,
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Jung Hae Keun

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10. Other(Legal Matters)

The team has created this white paper for reference only to provide specific information to those interested in TMED telemedicine platforms. This paper describes the technical and business aspects of TMED Token, ICO, and Block Chain Remote Medical Platform. This paper is not intended to encourage investments, etc. in TMED platforms, and is not relevant to investment. This white paper is based on the time it was created and is in the process of being updated over time. A series of updates on the use of the block chain remote healthcare platform and TMED token will be released on the website.

There will be no significant changes to the purpose of the platform, the purpose of the token structure, and the key contents of the token distribution and funding, although more information will be added and updated in the future.

Nothing in this white paper will give you a statement of accuracy and no liability whatsoever. If you are using this white paper in your decision-making and other activities, the consequences are entirely on your own judgment. MDsquare team will not be liable for damages, losses, and liabilities incurred.