

Technical concept report

Technical summary

“U-lean on” is developed to be a toilet accessory for collecting health data from the user’s urine by using chemical indicator. The main mechanism of this device is examination the amount of certain substances in the urine by the appearances of the color occurred on the test strip. In order to check the abnormalities of the user’s body, the data from the device is then transmitted via Bluetooth to an application which the user can get access to the analyzed result on the website on mobile phone. First, for the urinalysis, several chemical substances that was used as indicators are dyed on the dipstick; such as, sulfanilamide salt, P-dimethyl amino benzaldehyde, 3,3,5,5-tetraclorophenol, etc. The indicators will take up space of the test strip as little as their color change can be detected. After the test strip was soaked by the urine, it will react with the indicators. The colors of them are changed into some shades of color depended on the amount of the intended substances. The chemical reaction changes the color of the indicator molecule. Then the color change will be measured by the colorimeter in the form of $L^*a^*b^*$ coordinates which is the standard defined by the Commission Internationale de l’Eclairage (CIE). The colorimeter is a highly sensitive device that can measure the concentration and the intensity of a particular color. It can measure the characteristic of the color by analysis the reflected light from an object comparing with a standard in the form of reflectance curve. Different shades of color on the object will create the reflection with different wavelength. The function of colorimeters is mainly based on the Beer-Lambert’s Law. It states that the light absorption passing through a medium is directly proportional to the concentration of the medium. When the colors of the test strip are measured, the beam of the light with a certain wavelength passes through different lenses. Then the device will analyze the reflected light and compare with a standard.

Need statement

The main problem which we have considered as our challenge to solve is finding ways to detect and warn the patients with non-communicable diseases, diseases that are not transmissible directly from the patients to other people. These diseases cause the death of 41 million people or 70% of all deaths worldwide, with 15 million people dying prematurely (aged between 30 and 69). Most of non-communicable diseases occur from poor lifestyle and environment and these risk factors are different for each person. So, it is hard to control the occurring and to notice the diseases without having medical checkup. This problem is considered as one of world health challenges in 2019 by WHO—World Health Organization—which are working with governments to reduce physical inactivity of world citizens in case of decreasing risk factors of these diseases. By the way, this is just a long-term plan that aim to reach only 15% by 2030. That means medical checkups are still necessary for the controlling of these diseases.

We have found that normal medical checkup might not be the best solution for detecting the diseases, it can still be improved. Since medical checkup must be processed in the hospital, patients can have their checkups only when doctor and medical staff are available, and vice versa. The cost for each checkup is also excessive. Some people, especially for the ones in lower and lower-middle classes, may consider the checkup that it is unaffordable and decide not to have the checkup. Unfortunately, they do not know that they have lost another chance to know their health abnormality as soon as it presents. Moreover, medical checkup cannot give the most recent health results and warnings since most people have a medical checkup annually, not frequent enough to update the latest symptoms of the diseases. After having the checkup, the hospital will give the medical examination report to the patients in paper format which is inconvenient for some people.

It requires spaces for collecting health data of every patient and takes time while searching for the collected result. In these days, it is better to collect the data online or in electronic devices since it is convenient when inserting new data and searching for old data. The device we are going to design and create must be suitable to use daily, give a result to user instantaneously via electronic devices, with an affordable price.

We focus on urinalysis which is a process of urine testing to detect abnormalities in urine and analyze the result to detect diseases, including non-communicable diseases such as diabetes, chronic kidney disease, liver disease. Urine is classified to be one of human body wastes, even it sounds bad, but it could be used as a health indicator that contains substances from human organ systems. The patients collect their urine into containers provided by the hospital, the doctor then send them to the laboratory. Urinalysis looks for the quantity of each substance in the urine, so the urine used in this test cannot be contaminated. Unconsciously, the urine could be contaminated during the collecting and transferring processes. The patients may not have enough skills for collecting samples and incidentally contaminate the urine. The transferring process takes too much time, considering when the urine has been collected until it is analyzed in the laboratory.

These challenges are worth to be solved. We have inspirations to create a device which can lessen these bad effects to the people around the world. U-lean on gives the easiest methods of testing urine and urinalysis to the users, just urinating onto the installed device. Then, the result will be sent into your smartphone via Bluetooth.

U-lean on is designed to be applicable to everyone. We have planned to distribute this device to household users. After they purchase the device, they can easily put it in the toilet by themselves and use it anytime as they want. Everyone who lives in the house can use this device together, there is no need to purchase a new one.

Furthermore, installing U-lean on in hospitals is also preferable. The doctor can let the patients use this device for urinalysis and then collect the results online, also can compare the recent result with the previous ones for tracking symptoms and creating treatment plans of each patients with more convenience and less time.

To maximize the advantage from the using of U-lean on, we recommend installing our products in public toilets. Most people spend their free time in parks or shopping malls, so we suggest putting the device in the toilet of these places. Everyone in the community should have an opportunity to have a health checkup nearby their accommodations without fees and costs, so they could have more awareness on their own health and try to maintain good health for having a better life and having an acceptable result on the health test as well. Moreover, for the organization which can provide this device to people publicly, this could be a corporate social responsibility and be used for creating a brand image. They can also collect the health data of people who have used the devices. This could be analyzed to find the overview health of people in the community. Local health organization can prepare a proper healthcare plan that serves people's desires, finding ways to get rid of health problems they are having and ways to improve their life.

Before selling, we will install prototype products in these places. The users who are in the targeted market can try to use this device without any cost. After using, we will send the assessment and request the feedback from them. Then, we can fix and improve the device to make it better for each target market.

Background technology

Urinalysis is one of the screening tools for the diagnosis of urological conditions such as urinary tract infection, sub-clinical kidney disease, and diabetes. But today, the toilet that has been provided the urinal test device is rarely seen in daily life. The reasons are the conditions in the toilet cannot be controlled and unpredictable such as the contamination between users, the toilet for men or women, a short time to analyze the results, also costly and low demand.

For example, one of the existing smart toilets that had been built in Japan, Toto Intelligence II toilet. [1] This smart toilet can analyze sugar levels, check blood pressure, body weight, body temperature, hormone balance, and transmit the information wirelessly to a PC. But this intelligence toilet can be used only in women. And the cost is totally high, at around \$3,500-\$6,100. Toto's invention uses dipstick for analysis of a urine sample which is not viable and feasible for automatic methods. Also, this toilet is not implemented for public usage. Toto, Ltd. had been released many patents about smart toilet devices in the 20th century, such as the Toilet device with the health examination system [2]. This system had been proposed as a urine sampler in the toilet to sampling a portion of urine from a urine receiver. A method and an apparatus for sampling urine at a toilet equipped with a standard water closet bowl fixture. An elongated, curved, urine sampling trough having a U-shaped cross-section is used [3].

Another relevant patent of Toto's company is "Stool-type apparatus for sampling and assay of urine with swingable carriage", this toilet system has a frame which is mounted on the toilet stool to support a testing sheet handling and transfer mechanism which comprises a swingable carriage between the oriented toward the sampling cavity and the lateral side of the stool wherein a disposal station is provided [4]. Another relevant paper is the "Intelligent Toilet System for Health Screening" had been proposed by Thomas Schlebusch and Steffen Leonhardt [5] which only focus of the system is to check and support the treatment of diabetes and chronic heart failure.

Of course, the smart toilet or device in the toilet that can examine and analyze is not commonly invented and known because of some limited functions but there are some departments that are now studying and inventing these technologies, such as, Coon's research group of the University of Wisconsin. The team is designing a "smart toilet" that will incorporate a portable mass spectrometer that can recognize the individual and process samples across a variety of subjects. The results will go to a patient's smartphone, where they could monitor their health in real-time. Other companies, Panasonic and Google, have made moves to develop smart toilets. So nowadays, most of the smart toilets that can examine the urine are just the concept and idea to the future smart toilet.

Our proposed concept, U-lean on. U-lean on is the toilet accessory for collecting and analyzing the health data from the urine. This device will be installed in the toilet and done all processes automatically. Most of the existing concepts about a smart toilet are trying to build the toilet, not the device or toilet accessory, like Toto's company. It means that the customers had to buy the whole new toilet which unnecessary for every household or department. And it has a high cost as well when you had to build and install a new toilet. But our U-lean on is the small lightweight device that you can install easily yourself with your old toilet. So, it has a low cost and convenience. Some patents of Toto's company proposed the way to collect the urine in the hole or bowl. So, it will be contaminated between the previous user and the next one, if the toilet cannot clean all of the urine. But our device does not necessary to collect the urine of each user for examination because we make the pathway in the toilet for the urine to move through and contact the biodegradable dipstick. Then, the urine will move down to the water with no contamination. After taking a picture, the used dipstick will be cut and go away with the flush water. The user does not have to collect the

used and unsanitary dipstick by yourself, all of them will be degraded like a tissue paper. The pathway will be washed by the flush water. Hence, all of the processes will be clean every time used.

Concept details

“U-lean on” is the novel innovation which help people diagnose their health by using urine secreted out from body. U-lean on innovations can be divided into two main parts; “U-lean” box and “U-lean” test strip.

Overview, “U-lean” test Strip is the semi-quantitative assay using the appearance of color to determine amounts of each substance in urine; for instance, glucose, pH, ketone, nitrate and others. The color on the test strip has displayed by the chemical reaction between indicators screened on test strips and urine. Different shades of color on test strips gradually appeared, after the strip had been contacted by the urine. Afterwards, color will be tracked by camera for identifying each component that can be found. The indicators and resulted color of each type of components were described as table 1 below. To explain the principle of color appearance, different kinds of testing substances were used different kinds of indicator to show different shades of color, to illustrate, some reaction has existed azo dye as a final product or some reaction can abstract proton from indicators that causes their chemical structure changes which resulted in making their color change. However, this assay cannot indicate the precise value of each component, it still shows only the range of value from the color change.

Neg*: Negative, Mod*: Moderate, Hem*: Hemolyzed trace

Tests	Indicators	Result (mg/dL)						
Nitrite	sulfanilamide salt	Neg*		Positive				
Urobilinogen	P-dimethylaminobenzaldehyde	0.2	1	2		4	8	
Protein	3,3,5,5-tetrachlorophenol	Neg*	Trace	30	100	300	2000+	
pH	Methyl red & Bromothymol Blue	5.0	6.0	6.5	7.0	7.5	8.0	8.5
Blood	H ₂ O ₂ & Chromogen	Neg*	Trace	Mod*	Hem*	+	++	+++
Specific gravity	Poly-(methyl vinyl ether/maleic anhydride)	1.000	1.005	1.010	1.015	1.020	1.025	1.030
Ketone	Sodium nitroprusside	Neg*		5	15	40	80	100
Bilirubin	Diazonium salt & Bilirubin glucuronide	Neg*			+	++	+++	
Glucose	Methyl red & Bromothymol Blue	Neg*		100	250	500	1000	2000+

Table 1 shows the parameter, indicators and pictorial result of each components found in urine

In accordance with the appearance of color due to the chemical reaction, the amount of testing components in urine can indicate the abnormality in health. These parameters are literally relative with human health due to the reason that healthy people would have the ordinary levels of these components in urine. The abnormalities values founded in patients' urine can basically predict some diseases which are normally found in humans; for example, diabetes mellitus, kidney disease, liver disease and others. Moreover, it would be helpful for doctor to determine the amounts of basically chemical components for investigating or diagnosis the diseases and symptom easily. There is the limitation of value that can separate the normal person and patient from each other. Consequently, that values can also describe what types of diseases or symptom are. The determined value for each kinds of abnormalities was showed below in the table 2.

Disease	Test (mg/dL)								
	Nitrite	Urobilinogen	Protein	pH	Blood	Specific gravity	ketone	bilirubin	Glucose
Disease of kidneys and urinary tract			>300		+				
e.g. chronic kidney disease, glomerulonephritis, proteinuria, hematuria									
Carbohydrate metabolism disorders							>5		>180
e.g. diabetes mellitus, glucosuria, ketonuria									
Liver disease & Haemolytic disorder		>1						+	
e.g. liver disease, cirrhosis, urobilinogenuria, bilirubinuria									
Urinary infections	+			>7					
*Specific gravity can indicate the water content and impurities in urine (inferred as body health) >1.010 ; mild hydration >1.015 ; there are some substances contaminated in urine ; for example, glucose, protein, bacteria and others									

Table 2 shows the diseases examination by using the abnormalities amounts of each components

For the material being used as a “U-lean” test strip, Cellulose-based materials, such as nitrocellulose membranes, are commonly used as the substrate for point-of-care diagnostic devices. Considering a lateral flow assay, a simple and accessible testing which reactions take place on the horizontal-planned paper, “U-lean” test strip consists of a paper-based pad and a reaction zone with test indicator lines or symbols. Urine which was secreted out from body will flow along the test strip and be absorbed in the pad, accordingly, the reaction will be occurred afterwards.

In order to display the result, the “U-lean” test strips should be firstly released out from “U-lean” box by detecting the intensity of light, for example, If people sit on the flush toilet, then, There will be no light inside it and “U-lean” test strips is going to turn out. At same time when “U-lean” test

strips are going to turn out, Bluetooth will connect to the nearby telephone automatically. In addition, Electricity from charged battery have demanded for driving “U-lean” test strips to run through all processes. When urination has already finished, light sensors in “U-lean” box will detect the more intensity of light while you are standing up for analysis the result. After that, the process had better be done to accomplish the step of processing data from color appearance to be numerical values represented amounts of each components in urine. All types of component founded in urine will be reported as semi-quantitative values on telephone by Bluetooth; for instance, some components were reported as only the presence and absence, but some component can be reported in the range of quantities. However, all these parameters can analyze the abnormalities in tester’s health.

Alternating and adding “U-lean” test strip can be easily done, since, we already provide the space in “U-lean” box separating from other spaces. Thanks to “U-lean” test strip should be considerably concerned about the contamination between each other’s, as a result, the space that we provide for the alternating and adding are significant to be convenient for actual usage due to users will not need to do with it meticulously. We have separated 3 spaces for preventing contamination between each other’s; testing area where each of “U-lean” test strip is released out, processing area where continues from testing area and preserved area where unreacted “U-lean” test strips are.

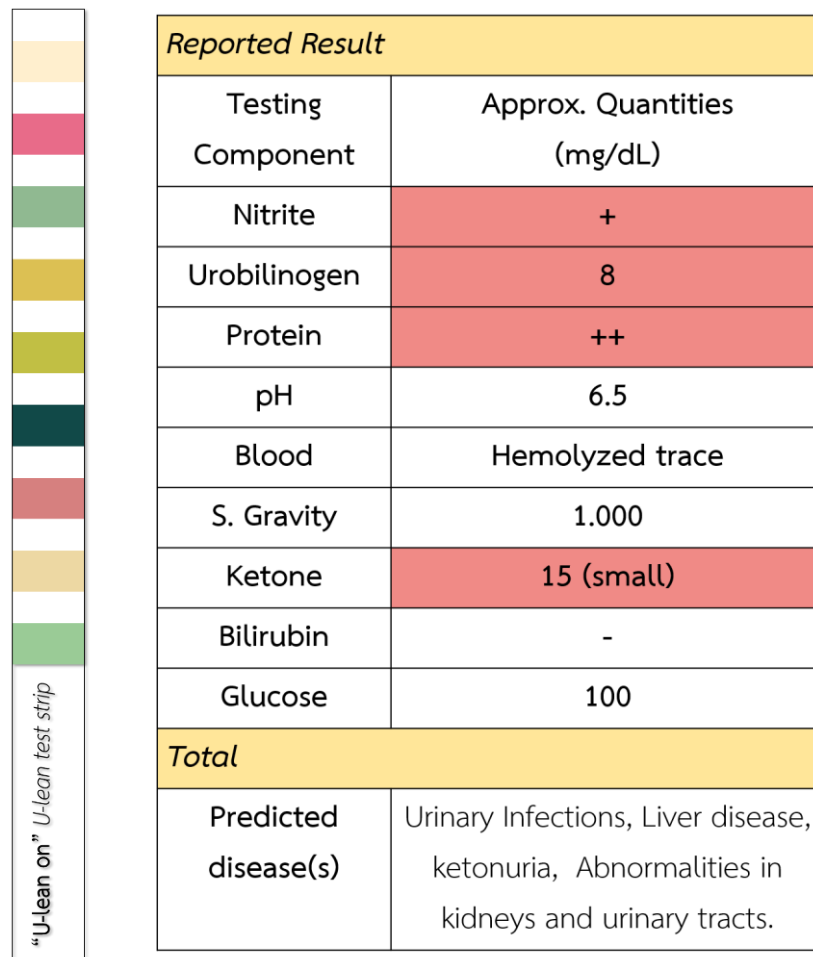


Figure 1 shows the example of color appearance from abnormal urine (left) which can predict some diseases or abnormalities form abnormal value (right)

Business plan

company introduction

These days, everything was developed to be smart, connecting with smartphone. However, there is not much innovation on toilet technology for several years. Normally, a toilet that we have been using has adequate ability for urination and defecation, and it was used as a pathway and collection of human urine and feces. On the other hand, when we take a sample of our urine for medical checkup, we struggle with lots of problem, such as the Therefore, one of us came up with an idea to utilize the trash of the body waste as a place for health diagnosis. Our group has “Palmy”, designing the structure of the device to be the most convenience for the users. This part is important for commercial business analysis. Another member who is in charge of programming is Faye. Since our designed algorithm is quite simple, the processing time

business description

“U-lean on” is a device used for analyzing user's urine automatically during urinating and sending a result to a mobile application. Before using this device, the users need to install this device with the toilet and download the mobile application. When they want to have a urinalysis, or urine test, just connect the smartphone with the device via Bluetooth. After the urine contacts “U-lean” test strip, the colorimeter inside “U-lean” box will detect the appearance of colors on the strip occurred from chemical reactions. The colors illustrate the amount of substances in the urine which refers to how each human organ system works and identify the abnormality if it presents. These data will be sent to the mobile application for interpreting into health diagnosis and some suggestions for each user. The results are collected over time, so the users can see the changes or make a comparison.

This device fits with healthcare industry, especially in hospital sector, since it solves the problems found in normal medical checkup in hospitals. For the ordinary urinalysis, the patient needs to make appointment or go to the hospital only when the doctor is available. While having the test, it takes a long time and many steps that the urine might be terminated during collecting and transferring processes. Each checkup also costs a lot. On the other hand, “U-lean on” can be used anytime, without making an appointment in advance, since it is always available. Moreover, it requires just a few seconds for detecting, analyzing, and showing the results to the patient. If the patient recently has a disease, this device can give the warnings and suggestions in the initial phases, it is better to have a treatment as soon as possible. To use the device, the user needs to purchase the device only once, there is not necessary to purchase the new device when the user wants to have the test again or when other users want to use this.

In these days, many people around the world had died from not knowing that they already had diseases, maybe they did not have or have infrequent medical checkups. This makes healthcare industry still be important. People in this field have to work with high-technology medical devices. Therefore, this industry could be grown by improving medical technologies to fully support doctors and staff. We hope that our device will be the technology that help the staff and save the people’s life from the diseases.

This is the first product created to make urinalysis easier and faster. So, the main point of this device is its novelty. We try to lessen the cost of doing the test and set the price to be affordable as well, so the people will be pleased to purchase it. Another important factor of making this business successful is the business plan. We planned and analyzed the demand of users in each targeted market, then found out how the users use this device after purchasing and how to sell.

market analysis

“U-lean on” presents the several advantages to human’s health; for example, predicting several diseases from urine. Consequently, this novel innovation is likely to be more beneficial and convenient for actual usage. Currently, the idea of urine analyzes have been used in medical usage for examining human’s health, however, there are not exists innovation that apply this medical checkup in everyday life. Due to the reasons that there are several disadvantages in order to go to hospital for medical checkup, such as, wasting your time and money. Therefore, we believe that our novel innovations will make a big change throughout the innovation and technology and make a difference among the uncertainty of human’s health.

Accordingly, our product will get into people and entrepreneurs’ minds easily because it is convenient to use in everyday life. As a result, we will license to make sure of world standard quality; for example, ISO (international organization for standardization), IEC (International Electrotechnical Commission), CSTD (United Nations Commission on Science and Technology for Development), Declaration of conformity and others. After that, product distribution has been provided into houseware stores and hospitals through those companies as our patient innovation.

Due to the more convenient medical checkup, “U-lean on” can easily dominate the ordinary household and hospital, moreover, it will overcome the obsolete medical checkup in hospital. People who normally take a medical checkup in hospital will notice this novel innovation where they do not have to waste their time and money in medical checkup for many times in hospital. Ultimately, “U-lean on” will be cheaper than the actual medical checkup because you can use it until the “U-lean” test strip runs out. Although “U-lean” test strip runs out, customer can alternate it with the new sets conveniently, nevertheless, price of “U-lean” test strips are still low.

In the same way, “U-lean on” is going to add value to the ordinary flush toilet. We have design it for being used with the actual flush toilet. In order to set up our devices, it is literally uncomplicated and easy to learn how to set up and use it. Moreover, It is still accessible for anyone who use flush toilet, to illustrate, when you use the flush toilet in public toilet, you can checkup your own health information with precise predicted diseases particularly and safely cause of sending information one on one via Bluetooth.

According to cheaper and more convenient compared to previous innovations, we can ensure that every place including household, hospital and public toilet could reach our product. We can affirmatively improve the medical checkup throughout every place around the world for a better life. In other words, not only is our product used by some of wealthy institutions, but also every person, every place and every country can receive the benefit of our innovation for promoting and developing of quality of life of people’s health.

competitive analysis

The first competitive company about the toilet is Toto’s company. This company has one of the existing smart toilets that had been built in Japan, the Toto Intelligence II toilet. [] This smart toilet can analyze sugar levels, check blood pressure, body weight, body temperature, hormone balance, and transmit the information wirelessly to a PC. But this intelligence toilet can be used only in women. And the cost is totally high, at around \$3,500-\$6,100. Toto's invention uses dipstick for analysis of a urine sample which is not viable and feasible for automatic methods. Also, this toilet is not implemented for public usage. Toto, Ltd. had been released many patents about smart toilet

devices in the 20th century, such as the Toilet device with the health examination system [], Toilet-Bowl-Mounted Urinalysis unit, Toilet with urine constituent measuring device, and Apparatus for sampling urine. This company already makes a smart toilet for use in hospital; Toto's Flowsky, a toilet that can check the urine flow that might signal bladder or prostate problems. But now, these patents and projects of Toto's company had not been working for many years.

Company of Gambhir, founder, and CEO of the San Francisco-based startup Toi Labs. His company is currently testing its device, "TrueLoo". It is the toilet seat that can scan what is in the toilet to analyze urine and stool abnormalities in color, consistency, volume, and frequency; future models will also chemically analyze the urine. And he hopes to bring his innovation to market in several years. Gambhir and his team are also developing a smart toilet for residential use. The device will replace a conventional toilet seat and flush handle, the sensors will be housed on the underside of the seat, including a cartridge with paper strips. Then, it uses the camera to take a picture. It has the motion sensor to detect when a person is sitting down and the processes will start.

Another company is Panasonic, which also released a health-tracking toilet in China that tests the urine blood, protein, and other key health indicators. The device also measures a person's body fat and identify different users by scanning their fingerprints.

Our planned product, U-lean on. The toilet accessory for collecting and analyzing the health data from the urine. This device will be installed in the toilet and done all processes automatically. We have planned to build a small device which is cheap instead of building the whole smart toilet which very expensive. We have designed our product in a convenient and economical solution and mechanism for being used in the real market. We have calculated and discussed the direction of the flush direction to clean all of the machines without contamination. Also, our dipstick in our product is an environmentally friendly material that can be degraded in water. And all processing can be done automatically by using a very low amount of power resources. The data from the examination will be analyzed by using our database. Finally, the user then receives the results and the suggestions from the application which real-time connecting on your smartphone via Bluetooth. We also planned to contact the government to install our product in public places, not only for the local people to use and have their medical check but get the health data of the population in the society to be the way for the Ministry of Public Health to solve the health problems in our country.

cost

"U-lean on" consists of 2 main components: "U-lean" box (the part that is the main part which control all system) and "U-lean" test strips (testing part). For "U-lean" box, it consists of many components, for example, plastic box, LED, rechargeable battery, silicone case, colorimeter, rotating motor, microcontroller board and electric wires. To invent this innovation, costs of devices typically are significant to be considered whether it can access to household, hospital and public toilet or not. By the reason of these the price, all of materials which was used to invent is considerably low. The price of plastic box, LED, rechargeable battery, silicone case, colorimeter, rotating motor, microcontroller board and electric wires is about 1.00, 1.00, 15.50, 0.70, 7.68, 1.50, 3.15, 0.2 USD per each one respectively. Despite the moderate price of rechargeable battery, but it can be used to discharge and charge all the time. Consequently, it is considerably useful owing to its reusability. Furthermore, price of colorimeter is normally high because of its advance. However, we still use only the microcontroller camera to take a picture of "U-lean" test strips, then, it was analyzed by using the written program which can clarify the value of each pigment in numerical values. As a result, we can invent the "U-lean" box with low cost and high working time.

For the “U-lean” test strips, there are two main material which are indicator and nitrocellulose membrane. We literally use nitrocellulose membrane as a basement material for having a lateral flow assay with urine because it suggests the most appropriate absorbent materials. The cost of the nitrocellulose membrane is really low, with a price 1.00 USD per each test strips. Moreover, the amount of each indicator which was screen on “U-lean” test strips is typically low, therefore, the price of all indicators screened on membrane is negligible.

In order to estimate the cost, “U-lean on” I planned to be used inside the flush toilet with composed of the described materials which were used to invent “U-lean” box, and test strips. From calculation, the total cost for the materials which was used to invent “U-lean” box is about 30.73 USD. Despite the high cost of overall materials, it can be used ultimately infinite until some parts of it destroyed or deconstructed. Due to the fact that rechargeable battery can work for about 10 hours continuously, moreover, it can be renewed its charges by connect to the electricity, it is still advantageous in practical usage. However, the working time will be varied based on the frequency of toilet usage, for instance, it can be used for a long time about 1 month because there are only low frequencies of flush toilet usage in household. For the total price of “U-lean” test strip, it is about 1.00 USD per each usage. In conclusion, overall cost per each usage is acceptable to be accessible in actual usage.

funding sources

Before beginning the explanation of how we are going to raise the funds, firstly, we need to introduce our school, Kamnoetvidya Science Academy or KVIS. This school aims to be a leading science high school by educating gifted students in mathematics and science, for inspiring future researchers, inventors and innovators. Thus, as the Conrad Innovators, we can have school’s support by using provided laboratory equipment and facilities, then we can test and develop our device to increase the accuracy of “U-lean” test strip, also mechanical workshop for producing “U-lean” box. These facilities from the school reduce costs of production since we can use them without the expense.

Furthermore, KVIS is supported by the Power of Learning foundation, along with the contributions from the PTT Group of Companies, oil and gas companies with the largest corporations in Thailand. The school can provides financial support if the students require. To achieve the final round of Conrad Challenge, the Innovation Summit, there are some costs we need to pay for traveling to the USA. We will request some funding from school. For the last 3 years, our seniors and friends could reach their goals to be the finalists of Conrad Challenge. They have received the financial support from KVIS. If we have been selected to be the finalists, their works and awards could help the school deciding to give us the supporting and increase the chance of earning the sponsorship. For additional costs and personal expenses during the Innovation Summit, we still have some private savings that are allocated to spend on living expenses and unexpected expenses.

We have considered the ways to assemble the funds for developing the product and expanding the market if needed, by comparing pros and cons of each way. Subsequently, we decide to choose Crowdfunding, which is suitable for new and small business with small amount of starting money. We will launch our business plan into online platform, such as Crowdfunder, Kickstarter, and Indiegogo. There are also several crowdfunding platform for Thai entrepreneurs, including Dreamaker Equity, Asiola, Sinwattana. We expect that the challenge we are trying to solve interests lots of people, making them want to use our product and willingly give us the funds.

With several types of crowdfunding, our venture can be presented on any platform and type. We are pleased to receive the funds from donation-based crowdfunding, which the donors will not be given any financial return. We can fully use this received pool of money to develop our product and give the finest device to the donors and customers. On the other hand, equity-based crowdfunding is proper to our project as well. We welcome our contributors to trade capital for equity shares. If we can attain our funding goal, we will process and sell the device to make a profit, consequently, the contributors will obtain their returns.

Preparing to be funded, we need to have a strong business profile and background to strengthen our reliability. We will then be ready for joining crowdfunding which is easier and more convenient to create funding projects in constructed platforms than raising the funds by ourselves. Moreover, the contributors will have a chance to gain the profits from equity share. Additionally, Thailand has just got the regulation of crowdfunding from Securities and Exchange Commission in 2019. However, the investors should concern about the trustworthiness of the platform since all funds from the supporters will be gathered there before sent to the investors. We will choose the platforms which fulfill the business goal, have clear rules and regulations, and provide secure funding systems.

Prototype

