CRITICAL NATIONAL NEED IDEA:

Digitization of Commonly Used Printed Forms Using Human Interface Device (H.I.D.)

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A. Maps to Administration Guidance and B. Justify Government Attention

Societal Challenging Resistance

There are many varieties of paper forms printed and filled in by people everyday such as job applications, federal and state forms, hospital admission forms, etc. Printed forms are used as an interface communication tool between people who request services and people or companies that provide services. Once these printed forms are filled, the information is typed into computers. When service is completed, it is either stored as back up or thrown away.

With advent of Internet technology, people are reading newspapers on the Internet and are accepting to read electronic books using high-tech devices such as notebook computers. Also, other publications are being converted into electronic format. However, the conversion from the daily use of printed forms into electronic forms has not progressed well except in large companies and document applications on the Internet. In general, converting such printed forms into electronic format has very a high barrier or most businesses do not to convert because the cost is not justified. Another reason is that the specification of printed forms changes frequently. Therefore, most business owners simply ask printing companies to re-print forms again when changes are made. The most obvious and the strongest *societal challenging resistance* to change from printed forms to electronic forms come from the fact that human beings have used paper since the ancient Egyptians. Everyone uses some sort of printed matter made out of paper, since it is a part of our daily life created by the entire paper industry as communication tools. However, because of its high carbon dioxide emission rate, the daily routine of handling paper needs to be reviewed seriously now. In order to change such resistance without having a *societal challenging resistance*, Global Multimedia Systems (GMS) Inc is going to introduce a simple technology with subtle improvement over the current technology having greater results than just pushing conventional electronic tablet technology. *This could impact the nation in a transformational way.*

Electronic Medical Record System (E.M.R.S.)

One of the important industries on this white paper to be discussed with regard to reduction in the usage of printed forms is the health care industry. When a new generic electronic medical record system (E.M.R.S.) is introduced to a hospital where doctors, administrators, and nurses are used to operating in their own ways for many years, it can cause *social challenge resistance*. They find it too difficult and uncomfortable to adapt to a completely new way of working. A critical point of *social challenge* is that a generic E.M.R.S. does not fit all of a hospital's operation and the local requirements of current hospitals, which

need to be addressed before it is implemented at hospitals. In addition, generic E.M.R.S. does not address the legal patient consent requirements that all hospitals must follow. When patients are admitted into hospitals, signatures are often required on printed forms while most of patient's information is typed into E.M.R.S. Even though patients are treated at hospitals with E.M.R.S., the medical staff still carries printed consent forms for treatments and medical procedures in folders to protect patient privacy.

For large hospitals with good resources such as manpower and financial support, implementing E.M.R.S. may not be difficult. Despite the electronic medical record implement act recently mandated by the Government, removing printed forms for hospitals is not an easy task because patients' signatures are often required on original printed form documents and too many printed forms and procedures may not fit into a generic E.M.R.S. For small to mid size hospitals, on the other hand, *the high cost of implementing* E.M.R.S. is a huge financial burden.[1] Therefore, many small to mid size hospitals and doctor's offices still depend heavily on printed forms and their offices are filled with stack of patients' records. Beside the cost barriers, [1] implementing E.M.R.S. at hospitals requires far better human interface between doctors and E.M.R.S. because too many different printed medical forms are modified at each hospital constantly.

Introduction of H.I.D. Product Helps to Implement E.M.R.S.

Human Interface Device (H.I.D.) meets the social resistance challenge gap between medical staff and E.M.R.S. The H.I.D. works as a lubricant device between old ways at a hospital and new E.M.R.S. Filling such a gap can create a *transformational result* in electronic medical record industries because the H.I.D. can collect patient's information from a patient's admittance through all the way to discharge. Also, patient information would be instantly updated to any current patient database computers, if any exist, while the patient is being treated. The H.I.D. also has an open data structure as Steve Lohr[1], who is New York staff writer, wrote.

GMS has developed a document transfer technology using global wireless signals, which is patented in many countries. We are using this technology for our current customer, Dominion Enterprises Inc, based in Norfolk VA. We will transfer the most current technology to *support and meet this challenge*. The *path to achieve this project* is to develop the H.I.D. and make it available to all hospitals and doctors offices as well as federal, state, and local governments' offices in the nation, so that all printed forms are digitized and managed by their back office computers.

Our goal is to reduce printed form consumption entirely by converting printed forms into electronic forms. The size and thickness of the H.I.D. is similar to paper or slightly larger

and its thickness may be much thinner than any other currently available notebook computers. Also, the H.I.D. would have flexible electronic circuitry and have a flexible display screen, which have characteristics of *paper like materials*. Unlike LCD display screens, this display can be bent like paper. Hence, users would use the H.I.D. without *societal resistance challenge* because it can provide the touch and feel of printed forms for doctors and nurses as they write treatment information on the H.I.D. Also, doctors at patient bedsides can use the voice recognition function on the H.I.D. to record all treatment procedures. Each doctor and nurses' voice characteristics can be trained and stored in the H.I.D. using voice recognition software for 100% accuracy.

Creating National Patient Care Database (N.P.C.D.)

As we all know that creating N.P.C.D. for treating patients is a *critical national need*. Luckily, many hospitals use printed forms that are required by regulatory agencies. Collection of data on these printed forms using the H.I.D. can be utilized to create N.P.C.D. very easily. Making common N.P.C.D. available for all doctors means that they can treat patients with more accurate diagnostics. In today's economy, people are global travelers and move around now. Hence, we are more susceptible getting disease than ever. Providing N.P.C.D. can certainly increase the chances of finding correct information for diagnosing unknown diseases for busy doctors, thus reducing the cost of health care system for US citizens. This can result in improvements in the n*ation's well being* and should be discussed at the national level.

The following examples drawn from real people's experiences reflect the issues that millions of people face. And these examples also clearly indicate the need for a N.P.C.D. to help U.S. doctors provide their patients with better treatment.

When a patient visits a family physician, the physician needs to review the patient's profile each time, by pulling the patient's file out of thousands of other patient's record files from file cabinets. The physician may be able to remember the patient's past care and condition because the physician wrote his/her notes. But it is not only the physician who needs to read the case file, but nurses must also read the file in order to write prescriptions. Also if the doctor's handwriting is not clear, it is possible for the nurse to write the wrong prescription. In addition, when a patient changes doctors, it may be difficult for their new doctor to understand the notes in the patient's file.

A typical sickness that may require a doctor's attention and often occurs during International travel is food poisoning. But relatively unknown for most American doctors is a condition called Dengue fever, which has the same symptoms as food poisoning. Dengue fever is common in Asian countries and many Americans traveling in Asian countries can get sick during their travels. Local doctors in the United States may not be familiar with Dengue

fever and misdiagnose a patient who has traveled to Asia with food poisoning.

The previous examples of mistakes that can result from a lack of information and the reliance on printed forms did not result in life threatening errors but it is easy to see how bad handwriting or a lack of information might result in fatal errors. Such simple but life threatening mistakes should be prevented at any cost. And the H.I.D. can help to prevent these errors. Since the H.I.D. can collect a patient's information in real time while a patient is being treated, its information is continually updated into a current patient computer system used at the hospital. The patient data structure of the H.I.D. could be configured to any legacy systems since input forms are based on medical printed forms used at hospitals for many years. Furthermore, the data structure is an open platform[1] and transportable, so a national patient care database (N.P.C.D.) can be created very easily.

Additional Applications for H.I.D.

Filing electronic forms using the H.I.D. will reduce operating cost for many business and government entities because electronic forms do not have the waste of paper that needs to be printed each time its contents are changed and signatures are signed on the H.I.D. Often times, many printed forms are wasted completely due to sudden change of specifications. This applies to all industries in the nation. However, providing such powerful device such as the H.I.D. can cause *social challenges* for many industries because printed forms are used everywhere at very low cost and people are used to filling in information in printed forms everyday. Our goal is to keep such daily habits and transfer it onto the H.I.D. so that there is no social change in transferring from printed forms to electronic forms. As the example of the hospital case described before shows, that by not addressing for such narrow path between doctors and nurses, costly investment such as E.M.R.S. may prove to be wasted because *social challenges* exist.

Digital electronic forms designed by businesses and government agencies can be broadcasted into the H.I.D. over-the-air using global wireless infrastructure from any computers using wireless signals such as CDMA, GSM and WiMAX globally. The H.I.D. can process any custom designed forms without any restrictions and this powerful user graphic interface eliminates *societal challenging resistance* easily, since all printed forms used in hospitals, private companies, and any government are uniquely designed. In order to match such needs, many individual graphic user interface software have to be developed, which is time consuming and costly. The H.I.D. is operated totally independently not requiring any LAN or WAN connection. The H.I.D. is well secured to make sure that personal information is well protected. The H.I.D. technology can cause disruptive changes in the traditional way of sending and receiving printed documents in many industries.

Also, mainstream use in the nation may stimulate the electronic book, newspaper, and magazine industry because H.I.D. has ability to combat social resistance challenges in using electronic devices. Hence the trend for reading books on electronic tablet also can be upward without any societal challenge. Eventually, all students would be able read books on electronic book tablets and not have to carry heavy textbooks. Further more, this *success* will result to reduce cost of expensive textbooks, which would help all students in secondary and higher education. GMS's patented technology would be used to transfer electronic textbooks to any electronic tablets for readers at once. Therefore publishers can use GMS's technology to publish electronic books into electronic tablets. Currently, there are several companies that sell electronic tablets. The method of obtaining electronic books for the current tablets is based on pull method over the Internet technology whereas GMS's technology is based on push method over-the-air broadcasting globally. The pull method works well when an individual person wants to purchase electronic books for his/her selections. In order to publish electronic books into market, as million of books are printed and distributed, publishers must be able to push electronic books into market massively at once. For public school education, instead of having all textbooks printed and used at all schools in the nation, students can use the H.I.D. since education textbook publishers can distribute electronic textbooks into any schools at once. This would save tremendous cost for everyone and our trees. Technology and business model in electronic publication scheme developed by GMS clearly separate us from the similar businesses and enables us to be the true leader in electronic publication business. The cost of the H.I.D. should be low enough so that everyone can own it to remove *societal resistance challenge*.

Global Warming Issue & US Government Involvement

Direct efforts to reduce carbon dioxide emitted by automobiles are on-going processes, but more efforts need to be made to reduce global warming in other areas. Publications, newspaper, general documents, and printed forms are made out of paper, which is made from trees. Reduction of paper use would reduce the cutting of trees, which would decrease the green house effect since carbon dioxide is absorbed into the ground by trees. Furthermore, the large amount of trees processed and treated with chemicals to make paper is a *national critical problem* and it is also the global issue.

Electronic industries and the Internet technology are contributing solutions by converting books, newspapers and many documents into electronic format. However, printed forms are not considered because of the unique nature of the form once a person puts their information onto it and the inexpensive cost of printing forms. But if we add up the use of paper forms in the entire nation, then significant amount of paper is consumed. As a result of

the cheap cost and lack of standardization, there is no easy way to convert printed forms into electronic format. But by not acting, our environment is *affected adversely*.

Since only 9% of nearly 3,000 hospitals[1] in the nation use E.M.R.S., it is very obvious that the consumption of printed forms is very high. If *challenges were not met* to reduce paper consumption, then our environment would get worse and worse. And someday we may pass a point where climate change may be irreversible. Delaying efforts to reduce all printed forms would save costs for the government and private companies. It would also have major impact in our environment since the green house effect is already apparent everywhere on earth. The *cost of this project* compared to the damages to our environment cannot be calculated. As *evidence of commitments,* large electronic hardware and medical software development companies are in competition with GMS for funding because these industries can benefit by selling such products in the nationwide hospital market. For example, there are over 955,768 beds[2] in the nation. Hence, electronic manufactures can produce 955,768 H.I.D. units in years. Consequently, there is no chance for small entities like GMS to produce and market such a *critical national need* product without having the US Government Funding Programs. The cost of the H.I.D. should be low enough so that everyone can own it.

C. Essential for TIP Funding

Funding for GMS's current the H.I.D. technology and products from private and public sources was not easy to get in the past three years. Therefore, the founder of the company put up majority of its capital. There were no investors in the beginning because no one believed GMS's product and technology would work for this disruptive technology because it had very simplified products. Additionally, with the recent sub-prime financial problem created by financial institutions, obtaining funding became impossible and *no other alternative funding sources are available.* This trend of belt tightening in venture funding and bank lending practice will continue until the current world economic disaster recovers.

The extreme difficulties in the uses of the technology are being understood by investors and not having a sufficient timely response by investors would result in leading these transformational technologies and products being buried under water. Hence, *the US Government assistance* and funding from TIP program would be certainly beneficial for such *high-risk, high reward research and disruptive technology*.

Returning back to the example of how the H.I.D. can transform E.M.R.S. Current E.M.R.S. are state of art systems in medical industry, though most of the E.M.R.S. has wedded to proprietary technology standards[1]. Implementing it for well-financed hospitals has no major obstacle but the cost of digital record systems was cited as the single largest obstacle to adoption for all hospitals[1]. Even when the E.M.R.S. is implemented at a hospital,

method of operation and its complexity may cause *societal challenges* since users in general do not like to adapt to changes. To have expensive systems implemented successfully, long time training must be done, which is very costly in terms of its budget and employee productivity drops because their work hours are taken away while being trained. If technological advanced system is not utilized properly, there is no benefit for human kind. Thereby, simply replacing printed forms with the H.I.D. to interface in between doctors and E.M.R.S. can eliminate such losses for hospitals. Hence, this project can *stimulate both the nation's capability and financial health*.

When *success* is achieved in the healthcare industry of the United States, technological leverage can be echoed and applied to other parts of the world. The same product and technology can be exported to other countries where countries may be facing economical disadvantages to implement the E.M.R.S. In reality, taking one-step backward, implementing E.M.R.S. in such economical disadvantaged countries may not be needed currently. Having the H.I.D. and small electronic patient database with securely controlled computers may be sufficient for doctors to be able to treat local patients faster and more efficiently in small local communities in such economical disadvantaged countries instead of spending thousands of dollars[1]. This may create a true *transformational result* with relatively small investment. Also, the U.S. Government can provide the benefit created by this project to other parts of the world and can lead the world health care industry and publication industry.

Notes:

1. However, according to the most recent article written about "Doctors Raise Doubts on Digital Health Data" on March 26, 2009, by Steve Lohr, who is a New York Times staff writer, points out following issues for implementing E.M.R.S.:

- 9 percent of the nation's hospitals have electronic health records, based on a survey of nearly 3,000 hospitals;
- The current health record suppliers as offering pre-Internet era software — costly and wedded to proprietary technology standards that make it difficult for customers to switch vendors and for outside programmers to make upgrades and improvements;
- Expanding digital records beyond routine tasks like billing to focus on "how the technology will be used to improve clinical performance"; and
- In the new survey of hospitals, the cost of digital record systems was cited as the single largest obstacle to adoption.

2. According to American Hospital Association, there are 955,768 staffed beds in all U.S. registered Hospitals.

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