

**Future Trends Report**

**Based on Analysis of the Team's Chosen Community / Organisation in Mid-Term and Final Evaluation**

**Community / Organisation Studied:**

**STEP 1. Identify Challenges**

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 5 most important challenges and write them in the space provided. Include applicable research with appropriate in-text citations.

**Challenge #1:**

In an article published in 2018 in the Journal of Diabetes, it was said that the estimated lifetime medical cost of treatment for diabetes is \$132,506 for someone diagnosed at the age of 40. As the price of resources used for treatment of diabetes increases, the price of treatment would also increase. A recent paper in the Journal of the American Medical Association found that insulin nearly tripled in cost from 2002 to 2013. The implementation of technology would hence increase the price of treatment.

Not everyone would be able to afford the cost of diabetes treatment.

**Challenge #2:**

Based on our research online, elderly and some Singaporeans shun technology and are afraid to use them. MP Zaqq Mohamad mentioned: "As Singapore progresses towards the vision of a Smart Nation, it is important that we address the 'silver' digital divide, where our elderly may not be able to access new products and services due to information inaccessibility." While we move towards our vision of a smart nation, the elderly still lag behind. They do not trust technology as we do due to their lack of exposure. As such, they shun technology and do not trust it. Seniors whom TODAY spoke to said they tend to steer well clear of mobile banking and online shopping. Likewise, they are strangers to ride-hailing apps such as Uber and Grab. Most of them mainly use public transport as it is cheaper and they are so used to it. These are only a few examples of how elderly shun technology. With majority of the diabetic patients in Singapore being the elderly, senior citizens may refuse to be treated by AI. This would become a big problem as the money invested in the technology would be wasted and the technology implemented would be wasted.

**Challenge #3:**

Based on a research that we have done online, Professor Moshe Vardi, director of the Institute of Information Technology at Rice University in Texas said, "We are approaching a time when machines will be able to outperform humans at almost any task." As Artificial Intelligence becomes more effective than humans, AI will definitely be chosen for many jobs, rather than humans. At the American Association for the Advancement of Science meeting in Washington, senior computer scientists said that intelligent machines will soon replace human workers in all sectors of the economy. Those working in the healthcare industry may get replaced by AI which performs better.

**Challenge #4:**

An investigation of roughly 300 executives done by McKinsey Global Institute showed that 66 percent see "addressing potential skills gaps related to automation/digitization" within their workforces as at least a "top-ten priority." With the implementation of AI, the workers need to learn new skills to adapt to the new technology being used. According to the 2018 Future Of Jobs Report, released earlier this month by the World Economic Forum, the change requires workers to not only accept the evolving job landscape, but also to adjust to this new world accordingly. Even healthcare workers need to have basic knowledge of how to operate the machinery.

**Challenge #5:** “Bugs lurking in popular machine-learning tools could provide another way to get them.” This is an extract from an article written by the MIT Technology Review. Technology used in the hospital can be hacked and the patient’s private information may get hacked. This can become a big problem. Furthermore, there might be faults when the AI assesses the patient’s condition, and AI may make mistakes during robotic surgery as well. AI increases the accuracy, but no one is able to assure that there will be no mistakes.



## STEP 2. Craft the Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the chosen community / organization in the future. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Incorporating Challenge(s) #     All

**Underlying Problem:**

Given that the implementation of AI will **cause major changes in the treatment of diabetes which may affect the number of people willing to go for treatment**, how might we **better prepare our citizens for the changes** so that **the implementation of AI** would be a success from now on in Singapore?

**STEP 3. Produce Solution Ideas**

Generate solution ideas to the Underlying Problem in Step 2. Choose the 5 most effective solutions and write the elaborated ideas in the space provided. Include applicable research with appropriate in-text citations.

### **Solution #1: Using AI to assist and not replace doctors**

Using AI as an assistant rather than replacing them is a good way to reduce job loss. While many people assumed that implementation of AI meant AI would take over the medical industry and replace all jobs of doctors, this is not necessarily true. As our interviewer, Doctor Gregory Cai has mentioned, AI can “co-exist” with doctors. Doctors can use them as a tool for more efficiency and for a higher chance of a successful treatment. There is a tool which enables doctors to “see through” the patient’s body through computer vision with greater accuracy and detect the type of insulin to inject, instead of the current method of having the doctor to physically checking and trial-and-error, according to endocrineweb.

Another good tool is the giving out of smart watches to the general public. This will allow for early detection of diabetes for higher chance of treatment. This is proven to be possible according to a research done which shows that smart watches can detect diabetes now and in the future have an accuracy of 85% or even higher. This is something that cannot be done with AI. In conclusion, AI can be used as a major assistance for a higher rate of success and higher efficiency, and this method will not significantly replace the jobs of many workers.

### **Solution #2:**

#### **Interactive VR to simulate treatment to educate public**

Interactive VR could be a possible solution to gain the public’s trust in AI. Interactive VR is an interesting and high-technology way to educate the public on the harmlessness of AI and to bring forward the point of the other solutions. The public especially the old normally assumes that AI is bad. With education from the government like the interactive AI to simulate treatment, the public may be more relieved and understand the benefits and the harmlessness of AI. The Infocomm Media Development Authority (IMDA) is teaming up with some of the world’s best environment creators at Side Effects Asia Pacific Pte Ltd (SEAP) to work on VR technology systems for advanced clinical training, stated in the Silver Infocomm. This shows that VR has already been used in healthcare to train doctors for surgeries and other medical procedures. The concept could be swapped over to the patient and let them experience the treatments instead. Therefore, VR is a good method of education to the public to let them have the doctor’s view and even touch of how AI play a part in the treatment.



**Solution #3:** More government subsidy for the public would allow citizens to be better prepared for the implementation of AI in the medical industry. AI will have a significant economic impact for people in the year 2030. The cost of AI is tremendous, and in order for companies to compensate for the amount used on AI, there would be a spike in the cost of medical bills. The general public would then see AI as a cause of the high treatment and go against it without realising the benefits of AI. The result of this would be less innovation and less progress for the people. The Ministry of Health (MOH) has reviewed the income criteria for means-tested healthcare subsidy and assistance schemes. More than 365,000 Singapore Residents will benefit from higher subsidies when the revised means-test income criteria are implemented by October 2019. MOH provides means-tested subsidies to support Singapore Residents with healthcare cost, with higher subsidies extended to lower-income groups. Taking into consideration changes in household incomes and healthcare expenditure, MOH will be revising the income criteria for all schemes and services that are means-tested using the monthly per-capita household income criteria. Therefore, government subsidy is a way to reduce the economic impacts of AI on the general public so as to reduce the unhappiness of the people on AI and being reluctant to support the government.

**Solution #4:**

### Smart watch to monitor health

A smart watch to monitor health is a good solution to let the public gain trust on AI for the following reasons. Other than the smartwatch being a useful tool for early detection and treatment of diabetes, the smart watch also helps gain the public's trust on AI. It is a small but non harmful representation of AI, and it serves as a reminder to the public that AI does not only refer to robots. By starting out small, it mentally prepares the public for the future with bigger robots. Smart watches of the future can even inject insulin into the human body.

A watch called K'Watch™ Glucose is a CGM (Continuous Glucose Monitor) device that will track your glucose level continuously throughout the day and night. Researchers at North Carolina State University and the University of North Carolina at Chapel Hill, who have created the first "smart insulin patch" capable of injecting insulin when it detects that the sugar levels are too low. Therefore, using a smart watch to monitor health has many uses such as assisting in the treatment of diabetes and convincing the public to believe in AI.

**Solution #5:**

**Higher funding from government to allow more education for more skill.**

Higher funding from government and more education on futuristic skills is another way to reduce job loss. With more courses on futuristic skills like infocomm, more people can be trained in that sector. Current doctors can also change their jobs to infocomm as it has a higher demand. This will reduce the number of jobless people and reduce the economic impact the 4th industrial revolution has on the healthcare industry. A 2015 study found there were as many as seven million job openings in the US that required coding skills and that coding jobs are growing in number around 12% faster than the market average and it isn't a trend that's going away. Therefore, more money given to the infocomm skillset will reduce the number of people being jobless and prepare the people for the future.

**STEP 4a. Select Criteria**

Generate criteria to determine which solution idea does the best job of solving your Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

Criterion #1: **Fastest to implement (1)**

Criterion #2: **Public Acceptance (2)**

Criterion #3: **Easier to maintain (3)**

Criterion #4: **Cost (4)**

Criterion #5: **Effectiveness of solution (5)**

**STEP 4b. Apply Criteria**

List the solution ideas from Step 3 on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 5 (best). The weighting for one important criterion may be doubled if necessary.

Solutions	Fastest to implement (1)	Cost (4)	Public Acceptance (2)	Effectiveness of solution (5)	Easier to maintain (3)	Total
Only using AI to determine suitable medication for patients.	1	1	1	2	3	26
More government subsidy	2	2	3	1	2	27
Interactive VR to simulate treatment	4	3	4	3	4	51
Smart watch to monitor health	2	2	2	4	1	37
New education course to train employees and prepare them for new changes	3	2	3	2	2	33

### **STEP 5. Develop an Action Plan and Evaluate its Feasibility**

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the community / organisation will be affected. Explain how this Action Plan is feasible with secondary research consulted, preferably also with primary research (feedback from chosen community / organization)

### Action Plan derived from Solution # 2 :

#### Objectives of Action Plan

- To educate the public on the how AI will assist in diabetes treatment.
- To show the public the changes that will take place with the implementation of AI and what we will do to help them adapt
- To allow the public to have trust that AI would be able to help them

#### Changes

- Cost
- Number of needed healthcare personnel
- Job scope
- How treatment is done ( affects the mindset of patients )

#### Who will resist?

MP Zaqy Mohamad mentioned: "As Singapore progresses towards the vision of a Smart Nation, it is important that we address the 'silver' digital divide, where our elderly may not be able to access new products and services due to information inaccessibility."

Elderly may be afraid to try the VR experience as it may be something that is new to them  
This may be a problem as our action plan might not work

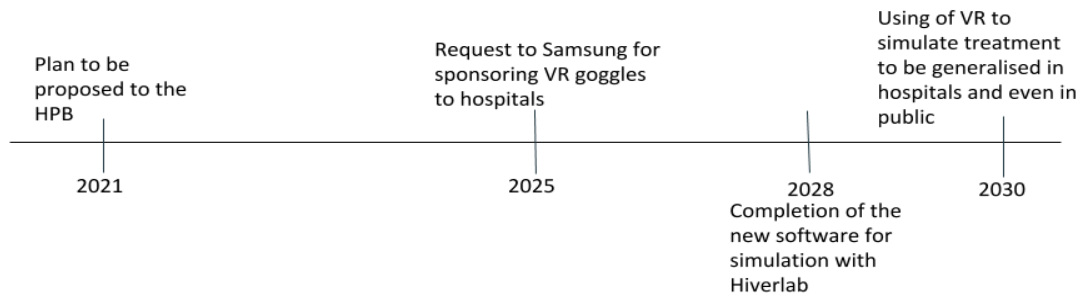
#### Who will assist?

##### Companies that can assist us

- Samsung
- Health Promotion Board
- Hiverlab

**(Action Plan Continued)**

Here's the timeline for our action plan.



Timeline

**Possible locations:**

- Suntec City
- Hospitals
- Technology centres
- Link halls

## **Bibliography**

Cite the resources you consulted using the APA format.



**List of References:**