1) UPS is an American shipping and supply chain management company that intends to use digital tools to synchronize its operations and logistics strategy to better meet customer needs. They ran interviews with a portion of their customers and concluded that there are two major customer experience challenges UPS need to deal with: 1) fast delivery and 2) real-time package tracking. As a chief innovation officer (CIO) at UPS:

a) **Can you propose a solution that can significantly improve the customer and stakeholder experiences and enhance efficiencies of the company operations?**

A solution to significantly improve to improve efficiency and customer experience is to make the tracking interface as simple and clean as possible for the user. While its interface is simple the tracking system will use digital scanning from every hub and update in real time. We will also use machine learning to forecast customer consumption trends that can be used to trigger planned work resources. The delivery vehicles will have sensors that sends their locations via cellular connection to cloud servers. The customer can then see the delivery vehicle in real time and be used by a forecasting algorithm about delivery time. This will also reduce the amount of overwork because the system will be more efficient.

b) **Describe what emerging technology you will use to implement that solution?**

The emerging technology that we will use is machine learning to predict delivery time and demand of certain items, holidays etc.

c) **Define your role as a CIO within UPS?**

My role will be to increase efficiency and cut expenses to change the profitability of the company using emerging technologies.

d) **If your business has a gap in the skills required to implement your innovative solution, how would you help your business to bridge that gap?**

One solution to the problem would be to have training programs to bring the skills required up to date. This could be in-house training courses, online training, conferences and courses, and university degree programs to deliver customized training to each employee. Another solution would be special hiring authorities that would allow the company to hire limited term employees using streamlined process.

e) **The Sustainable Development Goals (SDGs) are a collection of 17 interlinked global goals designed to be a blueprint to achieve a better and more sustainable future for all. The SDGs were setup in 2015 by the United Nations and are intended to be achieved by 2030. Which SDGs your digital transformation solution will positively impact and how?**

The digital transformation that will positively impact the SDGs are goal 9 Industry, innovation, and infrastructure, goal 12 responsible consumption and production.

Goal 9 Industry, innovation, and infrastructure:
We will use cutting edge technology which will make the business highly efficient. This technology will be copied by others or make even more efficient systems. This will boost the overall innovation in the industry

Goal 12 responsible consumption and production:
By having the system highly efficient the consumption would be more efficient and resourced would not be wasted. This will make the system have the responsible consumption of resources.

2) The COVID-19 pandemic has affected the education industry and nearly all institutions have been adopted to digital education approaches that make it safer for both students and teachers to meet social distancing constraints while keeping the academic standard unaffected. Major problems with remote learning are the limited access to labs and lab equipment and inability to monitor suspicious activities such as opening tabs, chat boxing in the background, picture exchange and more while students are taking home exams.

a) **Propose a digital solution to help students to collaboratively run lab experiments from their own locations while enhancing the real feeling of objects and their learning experience?**

One solution to the problem could be VR combined with a simulation program. It would enhance the real feeling while being at home, and it would be running simulations of that given lab. For example, you could have a chemistry lab in VR running on a simulator program that would simulate what would happen if you mixed certain chemicals.

b) **Propose a solution that can monitor students' activities during home exams such that it can provide real-time feedback to prohibit suspicious actions and enhance credibility and fairness of such exams in the future?**

You could make a program that would lock your pc so that you could not exit the program. This is often used in physical exams if you must use a computer, but it would also have a program that monitors you network traffic for that given period. This will make sure that you don't use a second computer or smartphone to get around the program, because it will detect if you are googling questions or are typing in a group chat.

c) **Describe the emerging technologies you will use to develop these solutions?**

Emerging technologies I would use are VR and algorithms. VR would help the user to be more immersed in what they are doing in labs. VR is also cutting edge when it comes to immersing the user. The technology has a lot of room to be more developed.

Algorithms would be used to detect suspicious activities under the home exam. This could be certain web traffic on the network during the exam. For example, Facebook traffic.

d) **What are the challenges that might impact online learning?**

The challenges that might impact online learning would be access to internet in low-income neighborhoods, and the lack of instant communication. When a student has a question or a problem, it might take some time to get an answer when if it was in a physical classroom the feedback would almost be instant.

e) **Refer to 1e), which SDGs your digital transformation solution will positively impact and how?**

The digital transformation that will positively impact the SDGs are goal 4 Quality education By having a VR the immersion of the user would be much higher than looking at a computer screen. Use user would interact with the objects as it would in real life. This will enhance the learning experience.

3) As hospitals strive to provide the right care to the right patient at the right time, healthcare providers need to do two things: evaluate patients' needs accurately and manage hospital resources effectively. Shortage in healthcare staff can lead to overworking, crowding and hence more medical errors, and patients feel neglected.

a) **Propose a digital transformation strategy to mitigate healthcare personnel staffing shortages in hospitals to lower operating costs and enhance services?**

One way to do it would be to digitalize the worker list and use algorithms to see the working hours, given times and dates and use machine learning to try and detect accidents patterns so that the staff has the correct number of workers at any given time. This will lower the cost since it requires less overtime payments and would enhance service since the staff would be less overworked and spread out.

b) **What emerging technologies you will use to accelerate the proposed transformation?**

I would use cutting edge algorithms and machine learning to the proposed transformation.

c) **State advantages and disadvantages of implementing this solution on the cloud. State the four different cloud models?**

The advantage of putting the system on the cloud is that it is easily accessible, and changes would be efficient. The disadvantage would be that the system completely shuts down if there is an outage, internet is down, or a cyber-attack is used.

The four different cloud models are: Public cloud, Private cloud, Hybrid cloud and Mulitcloud.

d) **Hospitals and healthcare providers as non-profit/public organizations does not have the skills and resources to finance, develop and run such projects. Can you propose a way to accelerate and complete this solution so expected services are delivered to the public on the right time?**

One way would be to streamline the process to reduce cost and implement standardization so the project would become less complex.

e**) Refer to 1e), which SDGs your digital transformation solution will positively impact and how?**

The digital transformation that will positively impact the SDGs are goal 3 Good health and well-being. By digitally transforming the solution will benefit the peoples health and well-being by giving them the most efficient solution to their problem. It would also be less

waiting for doctors/nurses and the staff would be less overworked so the human errors would be less.

4) Industrial digital transformation can be defined as the minimum effort to stay in business.

a) **In the commercial sector, industrial digital transformation is driven by two kinds of strategies: defensive and offensive strategies. Define and compare between the two strategies with examples?**

[1]The defensive strategy of information refers to protecting the business from competitors and disruptors, while the offensive strategy refers to trying to disrupt the rest of the industry. For example, the automobile industry uses defensive strategy by continue to invest in electric vehicles because the marked is expected to grow and the cost of batteries are expected to go down. Tesla on the other hand uses an offensive strategy. The company was not a profitable company in 2020, but by aggressively reducing losses because of lifestyle status and innovation tesla can charge a premium price on their cars.

b) **Crisis has always helped industries to identify an opportunity for transformation. A new survey finds that responses to COVID-19 have speeded up the adoption of digital technologies by several years ahead. Explain that with examples?**

Two examples of that are contactless payments with cards and automated payments on ferries. The contactless payments were starting to be implemented in certain stores, but it was a slow process. When Covid-19 hit every store implemented the technology. When you drive on to a ferry by car the workers scan your license plate and sends you an invoice for the ride. Before the workers had to physically cover the whole ferry to make sure that everyone paid and hire people to do ticket checks.

c) **Define technical debit?** (Mean technical debt?)

[2]"Technical debt refers to the implied cost of additional rework caused by choosing an easy limited solution now instead of using a better approach that would take longer. If technical debt is not repaid, it can accumulate "interest", making it harder to implement changes."

d) **What are some of the leading indicators of failure in an industrial digital transformation?**

[3]"Failure occurs when individual projects do not achieve expected business value or never reach completion and must be restarted. Critical indicators of the health of transformation such as the lack of IDT strategy, lack of top-down support, inward focus rather than industry sector trends and customer's perspective, mismatch of planning versus doing, too much focus on technology rather than cultural shift – causes are due to misaligned vision, economic and technological factors."

e) **What is lights-out manufacturing? How is industrial digital transformation driving lights-out manufacturing?**

[3]Lights-out manufacturing refers to a situation where the entire production line is fully automated and the only role of people in the factory is for maintenance or repair purposes. Industrial digital transformation is driving lights-out manufacturing by Moore's law. The numbers of transistors would double every 2 years. The industry has done whatever it takes to stay on this trajectory. The reason they did this was because the associated increase in design complexity by following Moore's law.

Sources:

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