IBE505

Course: Industrial digital transformation
Candidate: 10
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Task 1

a)

The first problem is a logistics question where every step of the process leads to an increased amount of time taken before the goods are delivered. We can improve the delivery time by focusing on one of these steps, and in this task this student will focus on the delivery driving. By implementing technologies such as AI and heuristics to assist in finding an optimal delivery route, which would lead to the drivers having to drive less, would lead to not only a reduced delivery time, but also reduced greenhouse gas emissions.

The second problem can be solved by implementing IoT technologies to track packages in real time and communicate with the user through an API. The system would work by sticking a gadget to each package, scanning the code of the package to link it to the gadget, which would allow it to communicate with UPS's databases. As a sidenote, this student would like to mention that these IoT gadgets should be small and easy to handle, to avoid reducing the time spent handling the products as well as to not reduce the overall load factor per vehicle.

Furthermore, this student would suggest the implementation of blockchain technology to track the major steps in the delivery process, which could help increase customer trust as the blockchain is publicly available and immutable.

b)

As mentioned earlier, the solutions would utilise AI with heuristics, IoT, API and Blockchain technologies.

c)

As the CIO of UPS, my job would be the take responsibility for the digital transformation. With answer 1a as basis, this student's job would be to define exactly how the emerging technologies should be used and developing a strategy around the new technologies.

This student would supervise the development of a minimum viable product (MVP) as per planned in the strategy. For UPS's problems around live delivery tracking, this student would supervise the development of the tool which would be used by delivery drivers, making sure that this new tool helps streamline the process of delivery.

This student would also take charge of the information technology service management (ITSM), leading the organisation to create new solutions and maintaining the services we already offer to our customers.

Lastly, this student would have the responsibility of leading the implementation of new digital transformation efforts.

d)

The first step to take would of course be to ensure that the new technologies are as easy as possible to use. After that, if the skill gap still exists, the organisation would have to change its culture and adapt to the new technologies. This change in culture could be a long process, requiring specialised training, and constant evaluation whether the skills of the employees are sufficient to utilise the new technologies.

As a four-step process, we would first define the future skill requirements. Secondly, we would assess whether the skill gap exists. Thirdly, we would implement training routines to bridge the skill gap. Lastly, we would evaluate the progress and iterate.

e)

The solution this student wishes to implement would go towards contributing to goals 8 - Decent work and economic growth, 9 – Industry, innovation and infrastructure and 13 – Climate action.

By implementing new technologies, we will achieve higher levels of economic productivity, which conforms with the targets set in goal 8 of the UN SDG.

By actively utilising new technologies, we are innovating and encouraging innovation among not only ourselves, but also our competitors. This conforms with the targets set in goal 9 of the UN SDG.

Lastly, by reducing our emissions by optimising the delivery routes we will make a more positive impact on our emissions than if we were not to use these technologies. This conforms with the targets set in goal 13 of the UN SDG.

Task 2

a)

To implement a realistic learning environment for lab practice, this student believes that developing simulator software which can affordably run with VR equipment would help in giving the students the necessary training to complete their degrees. VR technology is practically tailor made for performing simulations, and there exists precedence for this to be a success.

Through the use of gamification, we can use VR technology to improve the efficiency and motivation to learn, which could help increase the learning experience.

b)

People will cheat, no matter whether they are present at the exam locale or not, but the largest problem outside of the exam locale, is direct communication with other exam participants.

First we define the ways participants can communicate. A student can communicate with other participants vocally and through text, this can be through mainly one of three possible communication channels, namely computer, mobile and directly.

Vocal communication can be caught by recording audio and using speech-to-text AI to check for any potential communication. This could help the investigation of any suspected cheating.

Written communication, can be caught by using machine learning and screen capture technologies, we can create an automated process that checks whether any communication software is open on any of the students' screens. This would help us catch any direct communication and help the investigation of any suspected cheating.

Lastly, the communication through phones can be caught by developing exam software that the student opens on their mobile device. This naturally assumes that all students have a mobile device, but if they do not have one, they will have to communicate with the exam office about this.

The tracking of students while they perform their exams is, to be perfectly honest, a legal grey zone due to privacy issues. As such, we would need the explicit approval from the students before implementing this solution, and this student believes that there would be much resistance towards these solutions.

c)

In answer 2a, we utilise VR technology together with simulator technology.
In answer 2b, we utilise AI technology and Machine learning technology.

d)

One of the major issues with online learning, is that it requires a stable internet connection. This digital divide means that some students may end up being unable to effectively focus on their education, which reduces the academic equality.

e)

By ensuring that all students follow the same rules and enforcing these rules using new emerging technologies, we will reduce the academic inequality. In addition, through the implementation of these new technologies, everyone will have the same opportunities, as well as being given a fair judgement of their academic ability. This conforms with goal 4 of the UN SDG.

Task 3

a)

One way to increase the efficiency of any organisation and lower the strain on the workers, is to find what processes we can remove from the workers' list of responsibilities. For healthcare staff, they have the crucial role of performing treatment on patients, with our current technology, this is still a task that requires human attention, as such this student will focus on the other responsibilities of healthcare workers.

One such responsibility would be the delivery of medications to patients. This is a responsibility that, through the development of robotics and AI, we will be able to delegate to delivery robots.

Another such responsibility would be the documentation of the medical procedures. Using IoT and AI, we can track the process by which the patient was treated, and automatically create documentation that details the time place and occasion, treatment method, diagnosis and other relevant information. This would help reduce the strain on healthcare workers.

b)

As mentioned in 3a, we would be using robotics, AI and IoT technologies

c)

The advantage of cloud applications is their portability and scalability, which is a great benefit to the healthcare services.

The disadvantage of cloud application, is that there are stringent requirements for how the application needs to be developed, which could lead to higher development costs. In addition, if aaS clouds are used, there will be additional costs to pay for the service.

The four cloud different cloud models are On-site, Infrastructure as a service (IaaS), Platform as a service (PaaS) and Software as a service (SaaS)

d)

As a non-profit organisation, they have no way to effectively finance the projects independently, as such the best way to finance the projects is to enter a public-private partnership with a willing organisation with the technology and techniques required to make the project a success.

From the beginning, the terms for the funding and repayment should be clearly defined to avoid issues later in the production process.

e)

In the solution suggested in 3a, we are using innovation to directly improve the capacity of hospitals. This conforms with the targets of goal 3 – Good health and well-being, as well as the targets of goal 9 – Industry innovation and infrastructure.

Task 4

a)

The defensive strategy focuses on responding to change and protecting the business from its competitors. This takes the company's current capabilities into consideration, as well as its considerations for how the industry is going to develop in the future.

The offensive strategy focuses on using new technology and innovation to create disruptions to the current market situation, and by being one of the first to implement this disruption, the company can gain a greater percentage of the market.

The difference between the offensive and defensive strategy can be defined as the difference between acting and reacting. By being offensive, you are creating change in the market, whereas by being defensive, you react to another company's action. Per this definition, one would easily think that being offensive is obviously better, however, being offensive does not mean that one will succeed, and one needs to create a disruption that matters in the market one targets for it to have a significant effect. Otherwise, the strategy would not matter as there would be nothing to gain other than development expenses.

Which strategy to use can be decided by performing a strength-weakness-opportunity-threat analysis (SWOT analysis), which takes the company into consideration when considering which opportunities and threats that the company should focus on.

d)

There are many indicators that a transformation has failed or is in the process of failing. These are as follows: Lack of strategy, lack of support, narrow mindedness and improper use of MVP.

Lack of strategy entails that the project has been failing from the planning stages, and that the strategy has holes and does not cover the steps required to make the transformation a success. To give an example, Health and Human Services didn't provide specifications and requirements to the developers in time and failed to take into consideration their co-operators when working on HealthCare.gov.

Lack of support implies that the board is resisting the change, because they are not convinced that the transformation will bring value to the company. One such example is Blockbuster failing to implement online technology and the board deciding to cancel the development, which eventually lead to bankruptcy few years after.

Narrow-mindedness entails that the company couldn't recognise or refused to recognise industry-disrupting technology. One such example is when Apple disrupted the mobile market back in 2007 with their touchscreen technology. Because of this development in the mobile market, many competitors lost their share of the market.

Lastly, improper use of MVP entails that the company does not understand what the MVP needs to be, either through their lack of understanding of the technologies required, or from lacking specifications. An example of this would be California DMV, where the agency staff simply didn't

understand the technology, as well as stakeholders providing requirements without understanding the technology.

e)

Lights-out manufacturing is a term for manufacturing processes that requires neither human interaction nor human presence.

Industrial digital transformation is driving lights-out manufacturing as a disruptor to the manufacturing industry, using robotics to create consistent and rapid products without the risk of human failure.