Exam IBE505 Fredrik w r v Kristiansen 201063 13/05/2022 Kandidat nr: 32

Question 1:

A)

This question is two pronged in order to increase both speed and package tracking we could implement several solutions in order to create a model that satisfies both the company and the consumer market.

Implementing blockchain technology to increase the accuracy of the tracking process combined with IoT solutions such as in transport GPS systems would allow packages to be tracked in near real time by customers with a higher degree of accuracy. Increasing the level of possible logistical oversight in the company would also help increase overall ifficiency.

IoT systems coupled with AI technology will allow the company to rely on self driving cars for use in transportation that would cut costs and increase vehicle efficiency, uptime and route selection to further increase time and reduce overall traffic when it reaches mass adoption.

Finally implementing a fleet of drone for express shipping would allow UPS to skip traffic completly and possibly increase their revenue as a premium alternative for customers willing to pay for speed.

With time and the correct implementation of technology the entire process can be largely automated taking advantage of the progress in AI and IoT technology aswell as the increased visibility from using the blockchain.

B)

Blockchain technology for tracking.

AI for self driving cars and drones would need to rely on multiple subsets of machine learning and neural networks to process the vast sensory data required to operate both safe and efficiently.

IoT would be needed for all every step of the journey in order to collect and upload images and all sensory data required by the self driving systems along with the GPS data for the real time tracking. In essence IoT is the main driver behind every part of the solution and is what enables the other technology to function and increase automation overall.

C)

As UPS chief innovation officer while possibly being in charge of originating and recognizing the ideas used for innovation the main responsibility lies within facilitating and optimizing the process of digital tranformation.

Making sure the company has the capacity for change and potentially finding new partners or builing an ecosystem that allows for a successful transformation.

D)

A company as expenasive as UPS would have the ability to recruit and integrate new teams or departments in order to access the neccessary skillsets to implement the new solutions.

But a more effective and less time consuming option exists in aquiring strategic business partners and outside consultation from marketleaders in respective fields such in order to quickly make use of the required skilsets and avoid stalling.

Down the line the optimal solution is to either aquire or build an ecosystem of the needed expertise to maintain and innovate within the fields that the new model makes use off.

E)

The main UN sustainability goals within this solution is 9(industry, inovation and infrastructure) this is contained in the new model itself with the increased efficiency and innovation aswell as a more

optimized infrastructure.
The second one would be 11 (sustainable cities and local communities) by increasing efficiency of routing the overall traffic levels would decrease and assuming(with certainty) that the domestic short route transportation would be electrified the levels of emmisions would decrease massively partnered with optimized routing away from certain areas would make for a better «city climate».
Honorable mentions to 13 with the decrease in pollution.

Question 2:

A)

A digital solution for labs for students could be to take advantage of Virtual Rreality technology. Developing simulation software to run labs for instances coding in a shared real time environment is a possibility, Student A codes a change to the enviroment for instance adding a model with a basic animation and as soon as it's run everyone in the shared enviroment would be able to see the change. Increasing cooperation paired with the ability to see exactly how something affects the program would possibly open up a new and interactive way to learn both alone and in groups.
Allowing each student and teacher/TA to inhabit and avatar and use of voice communication would also allow them to better explain how and why something works and what it is doing.

Augmented Reality could also be used in certain fields to simulate objects in real enviroments like a field trip at home while studying building arcitecture.

The sharp reduction in price for functioning VR headsets coupled with things like Google cardboard would also make this a cost efficient tool for schools to take advantage off.

B)

There are some solutions here but nothing truly bulletproofs.
First off i would have to point out the legality here atleast in norway. Monitoring a students computer/data/network traffic would most likely be illegal and need law ammendments to maybe be exercised during exams(highly unlikely) Also taking into account shared networks would make it essentially impossible to safeguard.
The most basic solution would be a lockdown browser for exams limiting accessible sites and possibly software while running. But you would have to enforce all students to stay on it the entire time and could create issues with students with connectivity issues.
Another problematic part is that students with secondary computers and phones using hot spot connections would be able to bypass any browser regulations creating an enviroment where well off students would be able to skirt the rules while poorer students might not.
Having a second person in the room or using phones to call others would also be impossible to monitor and even with an extreme measure like forcing webcameras and microphones to be on durng the exam and having people monitor them would still get avoided with «bathroom breaks».
This would also increase costs as the school would have to supply equipment if they wanted to enforce their usage.
Again legal issues would arise at every turn when it comes to monitoring students in their homes and there is just no way around the fact that students would always be a step ahead making the measures ineffective.

The best solution is not truly a digital one and it comes with using the tools inspera can provide and the teachers own savyness .
The basic lockdown browser would reduce the efficiency with increased time to use third party sites.

Using the randomized selection further increases the time used and ease of cooperation.
Creating multiple exam sets makes it less likely that students could help each other and tailoring questions to be more spesific further increases the difficulty o fusing approved help like google and third party programs.
The other option would as mentioned be increased levels of tracking using tracking and monitoring software that would be enforced during an exam like monitoring location to avoid outsourcing aswell as enforcing cameras and microphone usage again this is just on a technical solution as legally it would never be allowed and students would still find ways to get ahead one way or another.

C)
Virtual reality technology possibly accompanied by Augumented reality for certain fields.

Software to monitor locations, browser usage and enforcing equipment usage essentially forcing IoT functionality from students during exams. This is only a theoretical solution as mentioned above.

D)
The main challenges that would be encountered is skill deficiencies when it comes to usage and availability of equipment.

In terms of skills alot of teachers and students already struggle with the basics of using Zoom,
Taking advantage of more sophisticated software and systems would require more time spent learning how to use them and initial design challenges could hamper adoption and usefulleness.
In essence learning curves could create bottlenecks or even cause a fail of adoption due to being too advanced.

Creating equal avenues could also be challenging as they would rely on students own finances or available equipment and could if not done correcly create a «second class citizen» problem where some students due to external factors or prior experience benefits alot while being detrimental to others.

E)
4)The goals that could be positively impacted would be 4 (Good education) if the solutions work and are implemented well they could increase learning and make it more available for everyone.

10) if implemented correctly it could reduce differences and equalize results for instance in terms of geography allowing the districts to learn on equal footing as as the cities.

11) it could reduce the preassure on cities to house students and reduce overall population when students are allowed to live outside the cities and still access the same level of education.

16/17(minor impact) increasing the educational institution and cooperation between teachers/students trough shared learning environments.

Question 3:

A)
Taking todays monitoring solutions coupled with IoT solutions would allow hospitals to upload data and process it at a central hub and react to abnormalities and in turn notify healthcare personel.

Abnormalities could also be classified with different degrees of severity in order to most effectively prioritize patient care.
Coupled with digital surveys of patients trough an app that submits the data to the same data centre would allow for a more effective profil eon patient and easier access for authorized personel to access all the neccesarry data on a patient.
Test results would also be added to the profile allowing doctors to be immidiatly notified and access comprehensive profiles on each patient on the spot would reduce the need for tracking back and forth and also reduce the overall need for nurses to monitor patients further reducing need for traffic and increasing the «rest» patients in shared rooms can enjoy.
Further having all the information readily available would increase the patients feeling of safety and that they are well taken care off by the doctors.
Further doctors could increase their correct diagnostic assements with an increased ammount of up to date information aswell as possible usage of machine learning algorithms to help draw conclusions.
While the solution would incur significant costs initially the cost saving down the line would be high with reduced need for personel, but politically easy to implement due to the overall cost saving and ease of implementation after a successful pilot project.
The overall patient treatment would be better with a much more personalised treatment regiment that overall could offer better treatment than the current solution.
Overall safety both in terms of safekeeping information aswell as keeping track of it would also likely be increased with cloud storage and less risk of losing data.

B)
IoT monitoring of patients for sensing, using the connectivity to upload the data to a central processor and then computing/analyzing the data received.

edge computing for quick processing of information coupled with a cloud based service for patient data aggregation and history for future visits.

Training machine learning algorithms on the data coupled with real life diagnostics could allow for more rapidity and accuracy during a doctors diagnosis.

A journal application that would allow authorized staff to access up to date / real time information about patients and grade them by urgency would allow for less foot traffic overall and more specialized care without the need for extra personel.

C)
The main advantage of implementing this solution on the cloud is the ease of storage and future access to history.
Another advantage is that as data aggregation increases over time it’s quick and easy to scale up as needed.
It is cost effective and saves hospital floor space not having to have on site servers and service personel.
It is energy efficient for the hospital specially in a crisis situation or during a power outage the emergency generators will last longer while staff could still access data using battery driven devices to access the cloud.
In case of fire or other catastrophies the patient data would still be accesible and safe as the risk is diverted trough not having every egg in the same basket.

Disatvantages:
Connectivity issues could cause issues and it's therefor advices to have the most recent data stored in a secondary on site location in order to make it accessible.

Processing the data in real time and accessing it would be slower, even if miniscule it could affect a patients health and slow down decision making.

While dedicated cloud service providers can offer the ability to run AI algorithms they would still benefit more from being accessed in house prior to uploading in terms of speed.

the learning curve for untrained personel to make use of any new system would require time and training to be properly utilized.

The 4 cloud models:
1) Private cloud
2) Public cloud
3) Hybrid cloud
4) Multi cloud
source: **Industrial Digital Transformation : Accelerate digital transformation with business optimization, AI, and Industry 4.0 (chapter 3)(Varan, Shyam Nath, Ann Dunkin, Mahesh Chowdhary and Nital Patel)**

D)
As a public entity a hospital would rarely have the budget or on site personel to develop and implement such a solution and would likely make use of one of two solutions or a hybrid of the two. It is also important to keep in mind that the healthcare personel must be consulted and be onboard to tailor a solution they would be willing and capable of implementing.

The first solution is the take advantage of the state/commune experience and lending other departments expertice in order to develop the solutions, while this still inquire a cost it would be deemed as accessible even if there are hurdles and politics to take into account.

The second option would be to hire outside consultants and engineers to implement a solution. While a hospitals budget can be increased trough politics this solution still suffers from the public offer principal meaning the best offer might not be the best solution.

Third the Hybrid solution hiring outside consultants and experts coupled with state resources while keeping the hospital staff in the loop to streamline the process using the best solutions while being in line with what the healtcare personel wants/can operate.
This solution would be the most time consuming but also be most likely of being adopted and used successfully while running optimally and being maintained from a technical perspective.

While the solution is the most time consuming it would once implemented and tested in a trial project become alot easier for mass adoption if it turns out successfully.

E)
3) Increased health and life quality trough faster and more accurate treatment that in turn would lead to

better quality of life for most people due to ease of access to healthcare.
6) Increased sanitary situations trough less hospital traffic leading to less contamination aswell as ease of tracking and treating diseases in society.
9) increases and advanceents in healthcare innovation and infrastructure.
10) reduced inequality in patient treatment allowing lower cost solutions to offer better care for more people in society.

Question 4:

A)
Offensive and defensive strategies are somewhat covered by the names but to do into a bit more detail.
An offensive strategy is is as it's name suggests a strategy that involves doing something new to challenge competitors trough innovation, you can disrupt a market our outcompete your competitors trough inovative solutions and thus gain part of their market share or develop a future market by being first making it more easy to hold on to a sizeable share even after the competition starts adapting to your disruption.

An example of this would be when apple combined the traditional cell phone with serious computational power and created the smartphone and corresponding market. It's worth noting that they were not the first to marked with a smartphone but they were first with an acceptable and affordable solution.
The result was that competitors that failed to react and follow suit were disrupted to the point of extinction, and while many competitors followed suit and made their own versions apple is still the single largest marketholder in the smartphone market.
In essence the offensive strategy involves actively seeking industry changes in order to get ahead or aquire smaller competitors that can't afford to keep up.

The defensive strategy is also largely explained by the name and follows the principles of defending against market disruption either by proactive solutions like adapting technology that is either unafordable or not ready for the market with the assumtion that it will one day be the direction the market will move or by reacting to disruptions as they happen in order to minimize the damage/disruption done and potentially recover losses down the line by following suit.

An example of a defensive strategy could be a large company that is not first to market but that manges to follow suit and then decides to use its existing resources to wage a price war and undercut their competition. Either to steal a share of the market or to simply deplete a smaller competitors resources, running them out of business or forcing them to sell.
For a smaller business a a defensive would be to follow suit with competitors and create a superior product that warrants its price and thus keeping hold of all or parts of their marketshare.

Its important to note that this is general information about strategies and there are many subsets within each strategy tailored to different industries and different sized companies etc.

B)
There are plenty of examples of digital transformation happening as a cause of covid 19.
A clearcut and familiar example would be the growth and development of digital meeting places like Zoom or Teams while the concept is not new the adaptation and development of features and capacity has skyrocketed as a result of societal changes due to covid-19.

From small scale adoption by healthcare providers offereing video consultations to the more impactful large businesses usages of video conferences.
While it was an option previously used perhaps for internal company meetings between branches it now features in all aspects of business.
From all the employees partaking in meetings from their home offices to the multibillion dollar business deals that used to be done by sending representatives across the world for long layovers in order to make a handshake deal.
Due to the decline in airtravel and quarantines when crossing country borders this is all now facilitated by online meeting rooms.
While we are now closing in on normalisation the market has been created and both small and large businesses have been made aware of both the efficiency of home offices being on par with physical space.
And the reduced cost of paying for frequent airfare and hotels for employees can now be largely reduced due to the adoption of this tecnology.
While it might have happened at some point either way it is unlikely it would have been anytime soon and with such a high rate of adoption if not for all the restrictions following covid.
While some companies have large realestate invesments tied to offices down the line home offices is much more likely to becoem the norm as a result of covid 19 saving future and new business alot of money both from floor space and the need for middle managment to keep up workplace effectiveness.

In conclusion the digital meetingplace has gotten a huge array of new features aswell as increased capacity while also increasing it's marked massively.

C)
Technical debt is incurred when a speedy solution is prioritized to keep on track during software development, but that later will have to be re developed, tailored or organized in order to keep up with the changing needs or specializations of an organization.
A way to avoid technical debt is to spend more time on development aswell as planning ahead to make sure the program is as future proof as possible or easy to modify if needs arise.

D)
Failing to reach the expectations of the change**.**
Failing to adopt to the intended changes**.**
Failing to reach the technical spesifications of a change.
Economic failure as in going above budget and having to scrap the intended change.

E)
Lights out manufactering is somewhat what the name implies.
While closely linked with the fourth industrial revolution it mainly entails that with the increase in automation trough robotics, iot solutions and ai the resulting decrease in human labour will allow for more efficient manufactering while decreasing the need for power since robots don't need light or heat and other human things to function optimally.
In essence the removal or reduction of human operators allows for the factory to run with their lights off.

general information and Sources used:
leganto book: **Industrial Digital Transformation : Accelerate digital transformation with business**

optimization, AI, and Industry 4.0 (Varan, Shyam Nath, Ann Dunkin, Mahesh Chowdhary and Nital Patel)

https://www.fn.no/om-fn/fns-baerekraftsmaal