IBE505 22V Industriell digitalisering
Molde University College
Industrial digital transformation IBE505
Max marks: 100
Date: 13.05.22
Duration: 9:00 – 13:00 (4 hours)

This exam paper consists of 4 questions, each is 25% of the total grade. Please answer the following questions:

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?
      - One way to increase efficient is to have happy workers. It is very important to have works that like their job. If they like their job they will also do a more efficient job. So that is step one, make a god environment. One way to be more efficient is to be able to use an application that gives driver the opportunity to bring packages that are nearby. By doing this they don't have to drive back and forth in the same are. To get more real-time package tracking, you can use a sensor. When the driver received a package to deliver, this package has been scanned by an automated machine, it increase the efficiency as well, and because of this the packet has come to the right driver. Once you have scanned the packet, it can connect the code that has been scanned to the car. So, the customer can follow where the driver is, which number you are in the queue and when you expect to arrive at the destination point.

   b) Describe what emerging technology you will use to implement that solution?
      - Sensors
      - Bluetooh

   c) Define your role as a CIO within UPS?
      - The main role of a CIO is to distribute and maintain the technology. They do this so they can support the companies' operations. CIO is delegating the part about the technology to others. As a CIO within UPS I have to see the opportunities to make the company better. Make it possible to give the customer a real-time package tracking I must make an strategy that are good in the long run not just what is the best right now. As I mentioned, it is important to have employees who likes their job. One of my jobs as a CIO at UPS is to make the team feel like a team, and that I do changes also to improve their work environment.
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   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?

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?
   - My solution will have a positively impact on climate actions. By using sensors that lead to collecting packages that are to be in the same area, you reduce the driving time and thus there is less CO2 emissions.

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?
      - It is possible for the students to use a digital twin, so it is possible to run lab experiments. This makes defines the virtual representation of an entity. This is both how its behavior and the qualities. A digital twin gives the opportunity to make an understating of a complex physical thing. (Dunkin, 2022,Page119)

   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?
      - One solution is to use a camera, so that the teacher/examiner can see that the student is not doing something that is abnormal. Or have a system that when there is a large movement or looking the same direction some time it alerts the teacher/examiner so they can see what this movement is for example walking around in the room. Another option is to create exam modus on the computer, for example an application you must download. So, you must log in with a username and password, and then you only have access to the pages on the internet you are allowed to and the various applications you are allowed to use. And if you try to use something you are not allowed to the system catches this and if it happens several times the machine notifies the superior. If it is an exam, you cannot use aids and specially internet you can send your IP address so that they can monitor the traffic that happens during this time. It can be used if there a small class. Another solution is to have a program so a system can see how long you have been inactive on the page for example in a word document. In this way you can see if it is possible that the person has used time to search up the answer. This can be combined with monitoring of IP address.

   c) Describe the emerging technologies you will use to develop these solutions?
      - Bluetooth
      - Internet of things
      -

   d) What are the challenges that might impact online learning?
      - When you have that type of learning, you must have a stable network. If you don't have it, the teaching can cause irritation and you only get part of the lecture. For the teachers it

can be monotonous to talk to a black screen every day. This means that the student should have a webcam and at least a microphone so that you can participate in the class. By having this type of learning, students and teachers must also learn to use new digital tools which for some can be very difficult and take some time. Another important think to keep in mind is whether the various digital tools are safe to use. For example, have many started to use Zoom. Can others enter in the meetings, can someone share something inappropriate, is this recorded, can someone take sneak photos of me etc. When you have online learning, everyone must have access to a computer and internet. When you have physical school, you get access to free Wi-Fi and most schools have a computer you can borrow if you do not have your own. In this way online learning can make a difference for those who do not have afford to this. In addition to this, you must have a place to have this online class and not everyone has a place that is suitable for this.

e) Refer to 1e), which SDGs your digital transformation solution will positively impact and how?
   - Goal 4 quality education. By the solution how not do cheat it helps to make it fair so that you get the grade you actually deserve. The solution with the lab it also makes a quality education because it makes it possible to have a good lesson even though you are not physical at school. So, you as a student get the same utilize and learning goals. All in all this makes a quality education.

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?
   - A strategy is to use s SWOT analysis. Here you write down what the strength, weaknesses, opportunities, and threats are in the competitive landscape. It is possible to give help though the phone/computer. If you use this type of help you don't use the space at the hospital if you don't need it. It makes it possible to find a quicklier solution if the person needs to go to the hospital and how serious it is. This makes it more efficient since they get information about the patient before entering the hospital. And the patient gets faster help, and this is good if you for example need prescription for allergy tablets. Make a strategy to go though a stage if something that maybe urgent or if it is something that can wait until a doctor is available.

b) What emerging technologies you will use to accelerate the proposed transformation?
   - By using VR glassed in the healthcare it is possible to see inside the human body. This is useful both for the patients and doctor. The doctor uses less time to explain, and the patient get a getter understanding of what is going on in his/her body. When doctors and nurses give medicines, they often must double check that it is right. Many healthcare places they must have to different persons to sign. If you have much to do and short time to do it, it can be tempting to fake a signature, so the patient gets the medicine faster and they don't have to do more work. But it they use facial recognition technology to sign it is almost impossible to fake a signature. In this way it makes it safer for the patient. You can also use medical robots, and this uses AI. These have many different functions such as a medical arm that are connected to a camera controlled by a surgeon. In this way you do not need as many people in the operating room, and they can do some other work instead.

In addition to this, this gives more control and gives patient more safety. By using Internet of things is makes it possible to for example take heart-rate monitoring. By using IoT it makes the measurement more specific. And the increase both the security for the patient and the nurse saves a few minutes of work so they can other things like talk with the patient and actually hear how it goes. (Dunkin, 2022,Page113)(Order,2022)

c) State advantages and disadvantages of implementing this solution on the cloud. State the four different cloud models?
   - By implanting this solution to the cloud the it is possible to transfer data quickly. The security is better. Downtime can be a problem
   - The four different cloud models are public cloud, private cloud, hybrid cloud and multicloud. (Dunkin, 2022,Page 106/107)

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?
   - Partnerships with a firm that have a common goal. PPP so they can run projects and the financial help.
   -

e) Refer to 1e), which SDGs your digital transformation solution will positively impact and how?
   - This makes a positively impact on goal 3 good health and well-being. By following this strategy, the patient security are taken good care of. Both because technology is used to double check, but also because nurses and doctors have more time to take care of each individual patient. (Dunkin,2022)

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?
   - The defensive strategy is about to protect the business from competitors and disrupters. An example of this is cars that become electric.
   - The offensive strategi is about trying to disrupt the rest of the industry.

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?
   - General Electric healthcare has deployed IoT-based, remote patient data monitoring technology that allows the clinicians to fight the battle against Covid19. They use more telemedicine. So they give more virtual doctors visits including specialist consultations. (Dunkin 2022, page 238)
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c) Define technical debit?
   In software development is technical debt is the implied cost of additional rework caused by choosing an easy (limited) solution now instead of using a better approach that would take longer. So this is very short-term. And is not profitable in the long run. For example you save money this year but when It leads you not having the technology you need to keep up with the other competitor you don't save money in the long run when you no longer are in the race. (Wikipedia 2022)

d) What are some of the leading indicators of failure in an industrial digital transformation?
There are thee major groups: a misalignment between the vison and expectations. Economic failure and technical failure.

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

- - 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 purpose. Digital transformation uses more and more technology. For example, at the airport you usally check in at a machine and deliver your luggage yourself. This way you do not need as many employees. (Dunkin 2022, page 178)

Reference:

Dunkin Ann, Chowdhary Mahesh, Nath Varan Shyam and Nital Patel. 2020. *Industrial Digital Transformation Accelerate digital transformation with business optimization, AI and Indusrty 4.0.* Packt Publishing Ltd. *https://subscription.packtpub.com/book/cloud-and-networking/9781800207677/2/ch02lvl1sec03/exploring-industrial-digital-transformation*

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Wikipedia 2022, "*Technical debt*", 13.05.2022