Molde University College
Industrial digital transformation IBE505

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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?

    The use of IOT on the delivery vehicles used by UPS, combined with the GPS technology can offer real time tracking. As for the improvement of the delivery time I would propose automation in the sorting process where in my opinion, the process of the livery takes more time. Having an automated system that manages sorts the packages and place them quicker in the right place shortens time and eliminates human mistakes.

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

    As mentioned, implementing IOT technology in the delivery vehicles allows to track the location of packages in real time, by having access to the geographical positioning system.

    Using barcodes to automate the processes in the sorting process, speeds up the process and avoids mistakes such as sending packages to the wrong destination.

    c) Define your role as a CIO within UPS?

    My role as CIO is to develop, implement and maintain solutions that support business operations using technology. A CIO is responsible for analyzing different technologies and target the one that benefits and improves for the current business process.

    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?

    I would retrain the staff, so they are able to use the new technology. In house training classes for example can introduce the technology and provide the instructions to use it. I would also ensure that employees develop some soft skills such as effective feedback and coaching and employee development, which allows to enhance effectiveness.

    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?

    - Goal number 11, sustainable cities and communities: by making package delivery faster and more efficient, the company avoids wrong deliveries, this means that unnecessary trips are eliminated and with this less pollution and traffic.

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?

    VR and AR can be the solution for a better learning experience. These 2 technologies allow to implement simulations that are very near reality. It can even be better than real Labs, since the mistakes done during this virtual lab are cost free and risk free. For example, in chemistry labs there are no risk for getting burns or spilling dangerous substances as well as no need to buy this equipment, experiments can be repeated several times improving learning as well.

    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?

    Proctoring software is a technology that can use to avoid cheating during home exams.

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

    "Online proctoring is a technology to ensure exam integrity in virtual setups when the students or candidates attend an exam virtually. Online invigilating could consist of several measures to keep the assessment fraud-proof."

    With a kind of software allows to monitor students through webcam and microphone, it also blocks certain websites from the exam device.

    Source: https://geekflare.com/exam-proctoring-software/

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

    As there is no direct contact with peers and teacher the lack of motivation and distractions may arise. Instructions can be uncleared, and some technical issues can happen.

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

    Goal number 4: Quality education. Making sure that exams are performed in a fair and proper way ensures the quality of the 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?

Automating certain tasks that free up time for hospital employees can be a solution. Introducing technology that performs processes such as managing patient data that allows to manage appointments, rescheduling, and bill payments. Robotics can also perform many of the tasks from a nurse. And lastly remote monitoring also allows to keep supervision of patients remotely.

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

The implementation of a software that manage patient appointments and schedules automatically, makes processes more efficient.

The use of medica robots. “Hospital robots can perform a wide variety of functions, including distribution of medicines, laboratory specimens, and other sensitive materials, such as hospital patient data.”

Source: Industrial Digital Transformation - Accelerate digital transformation with business optimization, AI, and Industry 4.0 -Shyam Varan Nath, Ann Dunkin, Mahesh Chowdhary, Nital Patel.

IoT devices and cameras can be used to supervise patients remotely and act quickly when needed, this way nurses can prioritize emergencies or stay where most needed.

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

The pros of implementing a digital solution in the cloud are cutting off costs, since there is no need to invest in hardware. Cloud computing has also the advantage of being fast, any data required can be fetched quickly from the cloud. Another advantage is that all data is backed up and stored safe in the cloud, there is no risk for data loss.

The cons are sometimes technical issues may arise, such as down time. Data availability depends on a good internet connection, without this the efficiency is gone. Lastly, privacy is threatened, since using the cloud means that a third party has access to any sensitive data uploaded to it, not to mention the possibility of a hacker gaining access to it.

According to the literature Industrial Digital Transformation - Accelerate digital transformation with business optimization, AI, and Industry 4.0 -Shyam Varan Nath, Ann Dunkin, Mahesh Chowdhary, Nital Patel. The 4 different Cloud models are:

1. Public cloud: the cloud providers offer access to cloud hardware and software services though the internet. Users are charged based on metered usage of this infrastructure. Public cloud service providers offer access to IaaS computing and storage resources, SaaS software applications, and PaaS for application development, testing and deployment.
2. Private cloud: an implementation of cloud infrastructure that is operated exclusively for one company. May be managed by the company or a third party (or both) and is most often hosted primarily on a company´s location. Allows a company to maintain greater control over different cloud resources, data security, and regulatory compliance.
3. Hybrid cloud: integrates private and public clouds, using technology and management tools that allow workloads to move seamlessly between the two as needed for optimum performance, security, compliance, and cost effectiveness. Allows a company to store sensitive data and mission critical legacy applications at their premises. Allow the use of the public cloud access SaaS applications,

PaaS for rapid deployment of new applications, and IaaS for additional real time storage or computing capacity as required.

4. Multicloud: uses infrastructure and components from different public clouds and uses services from two or more major cloud providers, or services from a major cloud provider and at least one SaaS software vendor. Allows maximum flexibility while fulfilling their requirements for security and regulatory compliance as they move toward regulatory their systems with legacy applications.

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?

To accelerate and complete the solution, it is important to communicate with the end users to understand and target the problem. This way the most effective solution can be implemented and extra costs from restructuring or course change are avoided. The key for achieving this is a user-centered design, which focus on the needs of the end user by allowing them to interact with the system. This way public organizations can efficiently develop solutions that match specific needs.

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

Goal number 3: good health and well-being. By ensuring that the processes in a hospital will be fulfilled with the aid of digital solutions in the face of shortage of healthcare staff, the health and well-being are being of the population is warranted.

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?

Defensive strategy refers to protecting the business from competitors and disrupters. Example after Netflix disrupted television, HBO Disney and other companies started to digitalize their concept as a defensive strategy

An offensive strategy is the one that is trying to disrupt the rest of the industry, an example of it is the strategy taken by Skype which came off with a new communication concept, people could get in contact with each other for free and this disrupted the telecommunication companies.

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?

A crisis of dimensions such as that of Covid-19 revealed the need to modernize many of the systems, not only in the public sector, but also in the private sector. The urgency of solving a sudden problem like this accelerated the development of digital solutions and gave rise to many of the existing technologies increasing their demand and also to being used in new ways to cover this need. An example of this is that with the need of online education and work from home or home office, the use of software such as zoom and teams increased rapidly, collaboration software and cloud computing gained use as well.

c) Define technical debit?

A technical debt includes poorly designed code and obsolete software and hardware. It is also known as design debt and it refers to extra costs generated from the need of redesigning a bad solution, this debt accumulates interests and adds difficulty when trying to implement changes.

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

According to the literature Industrial Digital Transformation - Accelerate digital transformation with business optimization, AI, and Industry 4.0 -Shyam Varan Nath, Ann Dunkin, Mahesh Chowdhary, Nital Patel. Some of the indicators are the lack of an industrial digital transformation strategy, digital transformation is left in hands of management preventing top-down support, there is inward focus and costumer needs are ignored, improper use of the minimum viable product ignoring lessons learned from fail-fast and lastly having too much emphasis on technology ignoring cultural shifts which is one of the biggest challenges in a digital transformation.

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

Acording to the literature Industrial Digital Transformation - Accelerate digital transformation with business optimization, AI, and Industry 4.0 -Shyam Varan Nath, Ann Dunkin, Mahesh Chowdhary, Nital Patel. Lights-out manufacturing refers to a situation where the entire production line is fully automated and the any role of people on the factory is for maintenance or repair. Key drivers and enablers that moved the industry toward lights out automation are the steady march of the industry to keep Moore´s law. The need to follow Moore´s law and the associated increase in design complexity and cost led the industry to contemplate the transition from 200mm silicon wafers to 300 mm ones.

Moore's Law refers to Gordon Moore's perception that the number of transistors on a microchip doubles every two years, though the cost of computers is halved. Moore's Law states that we can expect the speed and capability of our computers to increase every couple of years, and we will pay less for them. Another tenet of Moore's Law asserts that this growth is exponential.

Source https://www.investopedia.com/terms/m/mooreslaw.asp