Automation

Transcript: A presentation about the largest trend in the next five years

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Introduction

Welcome everyone to my presentation where I talk about automation, the trend that in my opinion, will have the greatest impact over the next five years. The aim of the presentation is to elaborate why I think it will have the greatest impact, how it will affect the individuals, companies as well as the industry and society. Furthermore, I will show a deep reflection about my thought process which has developed and matured over the course of this module.

First and foremost, I would like to introduce myself. My name is Toby, I am 35 years old and I am based in Zurich, Switzerland. After the nine years of compulsory schooling, I took the traditional Swiss route and completed a four-year apprenticeship as an IT systems engineer. I continued to work as a system engineer in the public sector. However, after a while I changed to the banking industry. In 2020, I completed further training at a higher Technical College with an advanced federal diploma in Business Informatics. This is a slightly lower level compared to a bachelors degree. Shortly afterwards I was promoted to team leader and today I lead two different DevOps teams. One is responsible for all basic trading services and the second one develops and operates the security lending and borrowing IT systems.

Robotics and Automation

Now the trend with the most impact in the next five years that I have identified is automation. It needs to be mentioned that automation is often named together with robotics. Most people probably have the first picture in mind when they think about robotics. Some might might have the second one in mind, and the third one, when they think about automation.

Now Ken Goldberg summarised in his paper, "What is Automation?" published in 2012 in the IEEE transaction on Automation, Science and Engineering the following: "…Robotics focuses on systems incorporating sensors and actuators that operate autonomously or semi-autonomously in cooperation with humans. Robotics research emphasizes intelligence and adaptability to cope with unstructured environments.

Automation research emphasizes efficiency, productivity, quality, and reliability, focusing on systems that operate autonomously, often in structured environments over extended periods, and on the explicit structuring of such environments."

Automation - Efficiency

I want to build 2 theses why I think automation will have the biggest impact in the next five years. My first thesis discusses the effect of automation on productivity. This table shows the increasing number of robots which countries are using. Kromann et al. concluded that most countries see an increase in robots which are used in the manufacturing industry. This is measured by the total number of robots per million euros in non-ICT capital, a market standard. They found that especially industries which are facing competition from low wage countries, mainly China, are using robots to stay competitive.

On the other hand, Herm et al. released a paper in 2022 with the framework for implementing robotic process automation projects. According to them, 50% of RPA projects fail due to complexity.

In my own experience, collected from working in an enterprise with over 5000 employees, I found that currently the groundwork for automation is not always there. In some cases, such as tax statements, there are still physical papers involved in some processes. Clearly this has been and will be worked on, to create a fully digitalised process. In other cases, such as software development, there is a heavy focus on automation, especially test and deployment automation. It can be frustrating for all participants when a new feature for an application has been programmed, but then it needs a long time to be tested before it can be deployed. I strongly believe that all industries will be forced to think about and invest in automation in order to stay competitive.

Automation – Skill Shift

My second thesis reflects the impact of automation on the labour market. I think it is fair to say that we often read newspaper articles or website blogs which discuss the impact of automation on the labour market. Recently this could also be said for AI and its impact. Let us dig a little deeper and see what academia has on this topic.

Last year, Hideki Nakamura and Joseph Zeira published a paper about automation and unemployment, which concludes that fears of mass unemployment are not valid. In their task-based model, they ran a mathematical simulation which results that unemployment caused by automation will converge to zero in the long run. They observed that automation and the creation of new tasks are intertwined. Hence the faster automation is growing, the more new tasks are being created. Moreover, they state, that from a government and company perspective, a world with a high degree of automation and a high unemployment rate, is not attractive since that would mean that consume would go down.

In another paper released in 2019 in the Journal of Economics Perspectives, Daron Acemoglu and Pascual Restrepo highlight the importance of the balance between automation and introduction of new tasks, which is crucial for productivity growth and labour demand. If automation outpaces the creation of new tasks, it can lead to job displacements and slower productivity growth. Policy interventions might be necessary to rebalance this direction of technological change. This could be, first: removing incentives for excessive automation, such as preferential treatment of capital equipment, and second: implementing policies to encourage the creation of new tasks and sectors where human labour has a comparative advantage.

A third paper that I want to mention which was published this year in the IEEE transaction on Technology and society written by Arvid Upreti and Varadharajan Sridhar addresses the importance of training due to skill shifts. The graph on the right side of this slide shows two lines. The red line shows the development of the unemployment rate when occupation mobility is absent. That means there is no training for workers affected by automation. The blue dotted line shows the development when there is frictionless occupation mobility, which means retraining of displaced workers with no costs for training incurred by workers along one of the occupation mobility pathways with subsequent jobs search and redeployment in target occupations.

As we can see, there are different views and mathematical simulations about the impact of automation on the labour market. I can find valid arguments in all the papers that I mentioned. However, I see a challenge which none of them is addressing. Automation will first and foremost affect low- and middle-skilled

workers. In some cases, people working in these sectors did not have the privilege of higher education. Hence it is difficult for them to find jobs in the high-skilled sector. In other cases, people are working in this sector because of their abilities. Even if we are sometimes told otherwise, I strongly believe that every human has its limits. Not everyone has the cognitive capacity to become a programmer working on automation. Even if there are new tasks being created, it will be crucial to find occupations for workers in the low- and middle-skilled sectors. I would like to finish this slide with a personal story. There was a person in my team, responsible for administrative tasks around IT change management. Besides making sure that software deployments were always performed within our own governance. This job included a lot of red tape. After the integration of a standard deployment tool, many of these previously manual tasks were being automated, which meant there was no more work left for the mentioned person. There were new tasks created such as integrating deployment tool with the change management tool however, the skills gap for this person was far too great.

Reflection

I would like to go on with a reflection of the first module that I am about to complete. As we started this module, I was not entirely sure what I can expect from it, since enterprise IT or EIT is something that I was not familiar with, even though I have worked my whole life in this industry. The first few units gave me insights about the importance of architectural frameworks and governance. Until now, I have generally regarded IT architects as impediments to progress. However, I now have a broader understanding about the importance of clear structure, policies and guidelines. Since my team sometimes must deal with shadow IT, for example complex Excel spreadsheets with VBA code built by IT hobbyists, I support our IT architects even more now.

We went on with a programming exercise where we had to code a Python program which would use different algorithms to sort a file with hundreds of thousands of values. This exercise had me frustrated in the beginning, since I thought to myself, why do we have to do this exercise when our degree is in Enterprise IT Management? I do not want to become a coder. Many of my fellow students had a similar view and shared their stories about failed coding attempts from the past. After further reflection, I concluded that although this task challenged me, I started to view it like a Riddle. There was a concrete problem to be solved and I began to try different

algorithms and started to understand how they work and how they differ from each other. I started to talk with senior coders at our company about my assignment, but all they had was a weary laugh for me, since for them it was a fairly easy task. In hindsight, I am glad that we had the opportunity to have this assignment since it showed me how crucial it is to understand how powerful automation can be. Obviously this was just a simple sorting algorithm, however, it gave me an idea what can be done with a few lines of code and how fast the runtime can be. Furthermore, it is a relatively simple language to learn and it is fairly easy to understand as the formatting gives a clear structure. Since I was previously working as a systems engineer, I am familiar with PowerShell which is also quite powerful when it comes to automation for Windows systems.

This assignment showed me once more that even if a task looks fairly complicated in the beginning, it is always best to just start with it instead of letting frustration overcome you. There are so many ways nowadays to find help with such an assignment. There are tonnes of websites, books, YouTube tutorials, in my case colleagues, and surely new tools such as ChatGPT. Using one or several of these tools will certainly help anyone to understand a topic or a specific problem even better.

Conclusion

I would like to wrap up with the conclusion. As I have already mentioned, I am very certain that automation will affect all businesses and industries. During my research I have read some articles which showed that countries with low birth rates are adopting faster to automation. This makes sense since they probably want to allocate their workforce to higher skilled jobs and hence automate low skilled repetitive jobs.

For governments, I suggest to crucially observe the development between automation and the creation of new tasks. I strongly agree with the idea to create incentives for low- and middle-skilled workers to keep them competitive and give them a chance for upskilling. Such programs need to be created in partnership between governments and large companies.

From an individual perspective, I strongly see rising expectations for processes to be automated with fast throughput time. When I as a customer order something online, I do not want to wait several weeks until my item arrives. When I open a bank

account, I do not want to take time off from work to go to a branch and sign a contract there. I want such processes to be flexible and fast. Therefore businesses will need to adapt to these customer demands. On the other hand, as an employee, I need to make sure to stay competitive. This means I have to familiarise myself with the developments regarding new technologies, keep an open mind, learn new skills and reflect on the future of the industry I am in. This is exactly the reason why I personally chose to study this master's degree. I want to get a broader understanding about the industry I work in, I want to train my critical thinking, and I view these as aspects as supporter on my career path.

As a plan to action. I challenge myself to repeatedly reflect on the future of the industry in which I am employed. Furthermore, since I work as a team lead, I will challenge my team members to stay up to date regarding the developments in their respective fields. And finally, I will also make this a reoccurring discussion point in our management meetings. This is to make sure that we do as much as possible to keep our employees competitive for the case they become redundant due to automation.

With this, I would like to close my presentation. I wish you a wonderful afternoon and thank you.

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