ADOPTION OF GENERAL-PURPOSE TECHNOLOGIES (GPT) IN AUSTRALIA: THE ROLE OF SKILLS PODCAST – TRANSCRIPT

Amanda (00:05)

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I'm Amanda and today I'm chatting with research economist Kim Nguyen about her article in our September Bulletin. Kim and her co-author Jonathan Hambur studied the adoption of cloud computing, and artificial intelligence and machine learning by Australian-listed firms. General-purpose technologies, or GPT, have the potential to transform how we work, to change the skills we need and to drive productivity growth. It is therefore important to understand the conditions that lead to the successful adoption of GPT.

So Kim, to start, could you perhaps give me a bit of a summary of your research? What did you study and what did you hope to learn?

Kim (01:26)

Yeah, sure. So our research has a three-fold objective. So first of all we want to use the research to inform us about the state of adoption of emerging general-purpose technologies in Australia and how it has evolved over time. And we also want to understand what determines whether or not a firm adopts these technologies and whether they can do so profitably. And finally, we want to explore the role of skills in technology adoption and as well as for profitable adoption. So those are the objectives of our research.

Our key findings include, in terms of statistics, we find a surge in cloud computing adoption during the COVID-19 pandemic. However, the rate of adoption quickly reverted to that prior to the pandemic, which means that it was only a temporary boost in adoption and it's not necessarily a change in the trend of adoption.

So that's the first finding.

Now, in terms of artificial intelligence and machine learning, the rate of adoption is still quite low; however, with the recent developments in generative AI, for example with ChatGPT, there may be a future uptick in adoption of artificial intelligence and machine learning.

The second key finding is that skills of the board of directors appear to play a significant role in the decision to adopt GPT because we have board members having prior experience in the IT industry or with some experience in GPT to be much more likely to adopt GPTs. And we also find that board members with GPT experience also facilitate profitable GPT adoption.

And finally we find that GPT adoption is linked to a higher demand for skilled workers with the same skillsets, and that can play an important role in profitable adoption as well.

Amanda (03:26)

Why is this kind of research important?

Kim (03:28)

It is very important because we know that productivity growth is a key driver of economic prosperity and long-term living standards, so it's very important that we understand what drives productivity growth. And the discovery of technologies, new technologies, will help drive productivity growth by revealing better ways to do businesses. And the key step in this whole process is when the technology moves beyond the inventor and other firms begin to adopt these technologies for themselves. This step is particularly important for Australia because Australia tends to be an importer of technologies and not necessarily a creator of technologies. And we also know that Australian firms have fallen behind the global productivity frontier, which means that there is some evidence of a slowdown in adoption of technologies by Australian firms. However, we don't have any direct evidence on that observation just yet, so this research aims to fill the gap in our knowledge about the true state of adoption of technologies in Australia.

Amanda (04:39)

What exactly are general-purpose technologies and how prolific are they? You mentioned ChatGPT, which we've all heard of but to be honest I've never personally used it and I don't really understand what it is or how it works or even what the potential is here. So can you tell me a little bit more about that?

Kim (05:00)

First of all I'd like to stress that the GPT that we refer to in our research stands for 'general-purpose technologies', which is different from and more general than the GPT in ChatGPT. So the GPT in ChatGPT stands for 'Generative Pre-trained Transformer'.

Now in simple terms we could think of general-purpose technologies as technological innovations that can affect the entire economy in the sense that they have a wide range of applications across different industries and across different sectors. Some examples throughout history include steam engines, electricity, automobiles and information technology. And more recently we have seen emerging GPTs such as cloud computing and artificial intelligence and machine learning, which is the focus of our research.

Now, so let's circle back to ChatGPT. ChatGPT is basically an application of generative artificial intelligence. So you could think of it as under the umbrella of general-purpose technologies. So, it is an application of general-purpose technologies. It can have the potential to become a general-purpose technology. To give you some examples of recent applications of cloud computing and artificial intelligence – some of them you already use, you probably not aware that you are using them. For example, cloud storage such as a Google Drive or Dropbox, they are examples of cloud computing for the purpose of storage, data storage. Applications such as Amazon Web, Microsoft Azure, Cloud Google Office Suite or Microsoft Office 365 are some of the examples of applications using artificial intelligence and cloud computing platforms.

Amanda (06:56)

So, they're pretty prolific?

Kim (06:58)

We use them all the time but we are probably not putting a label on them at the back of our mind.

Amanda (07:04)

Do you use these kind of technologies? I mean, you're obviously researching about the technologies you're using, but do you use the technologies to conduct that research as well?

Kim (07:14)

So on one hand we have done a lot of in-house research and analytical work employing AI and machine learning and research about general-purpose technologies in general, but we have also used cloud computing services for example to facilitate some of our more technically-involved research projects. So for example this work that we do has made use of textual analysis and natural language processing and we do that on the cloud computing platform. Another recently published paper by our Data Science Hub uses an AI algorithm to train a massive amount of textual data. So those are some of the examples of the work that we do that that makes use of these GPTs.

Amanda (08:03)

Productivity growth is something you mentioned before as the reason why this research is important. And it's obviously a bit of a hot topic at the moment and there's a lot of discussion about the fact that productivity in Australia has being flatlining to several years now. Is the adoption of new technologies like these part of the answer?

Kim (08:22)

First of all there are quite a few factors that may be contributing to the recent productivity slowdown, both in Australia and overseas, and they include, for example, labour market turnover, weakness in investment and declining economic dynamism and competition. And of course technology adoption and innovation in adoption may be part of that as well. Since there are a lot of drivers at play, while adoption of technologies is very important it may not be the sole answer for the productivity slowdown. ~~So I would urge on the earth on the quotient side for that answer.~~

Amanda (09:03)

In your article you mentioned that your analysis is a first step in understanding what drives or hinders the adoption of new technologies. What's next for this research? Do you have plans to explore it further?

Kim (09:17)

There are a couple of directions in which we'd like to take this research further. So, the first step is to potentially integrate our data with a more comprehensive dataset on workers and really try to tease out the effects of adoption on skills and on labour market outcomes. So that's the first thing that we'd try to do. And the second potential direction for research is to do a cross-country analysis by applying the same techniques on data from other countries.

Amanda (09:51)

What do you think that might teach us? What else is there to learn here?

Kim (09:55)

Besides the fact that we have more observations just from a larger dataset, we also want to potentially understand how different financial landscapes, different institutional contexts and potentially policy settings in different countries may affect the effectiveness of adoption of technologies or the outcomes of technology adoption.

Amanda (10:22)

Fantastic. Kim, thanks for talking to me about your research. The potential value of general-purpose technologies is really interesting and it explains why we need to better understand what leads firms to adopt them. If you want to learn more about Kim's work, head over to our website to read her article in the September edition of our Bulletin. Thank you for listening.