



Technology impact model: a transition from the technology acceptance model

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Received: 30 December 2023 / Accepted: 12 February 2024
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I make an attempt to build a model that is relevant for a technologically sophisticated world and show that the impact of technology on users depends on how technology is used and users' expectations about the impact of technology. It is important for anyone interested in the impact of technology to have an understanding of the need to transition from technology acceptance model (TAM) to the technology impact model.

I state concisely the technology impact model and indicate briefly why it is better suited to our modern digital economy. Before proceeding to the statement of the technology impact perspective, a brief argument is made which shows how an interpretation of the TAM leads to the development of a new model which is the technology impact model. My curiosity arose from my attempt to understand the TAM in the light of the beneficial and unpleasant impact of technology in both the past decades and in recent times. Even though technology had unpleasant impacts at the time when Fred Davis developed the TAM, the model did not emphasize the impact of technology on users. As a result, the academic literature which grew up based on the TAM has ignored the impact of technology on users, at least, in principle. Another reason for linking the proposed technology impact model with the TAM is that many theorists and scholars in the discipline will give a new theory a hearing only if it is shown to arise from an interpretation of an existing well-acknowledged theory which, in this case, is the technology acceptance model.

Davis (1989) proposed the technology acceptance model (TAM), which explains how an individual accept and use a technology. TAM starts with the introduction of a new technology and ends with the user accepting and using the technology. TAM shows that users prioritize *perceived usefulness* and *perceived ease-of-use* when deciding to use a

technology, and their decision to use a technology may also be influenced by social influence or behavior intention which determines user attitude toward the technology (Davis 1989, 2023). The most fundamental element of Davis' TAM is the emphasis on the perceptions of the potential user. The TAM has been widely criticized for emphasizing the usage of technology and diverting attention away from other important aspects of technology such as cost and the structural factors that compel users to adopt the technology.

I have critically evaluated the technology acceptance model and I think Davis did a good job in explaining why people may be willing to use a particular technology. The major area where I have a few reservations is in what happens next after a person decides to use a particular technology. The TAM did not offer any insight on this, and no insights were offered on whether the accepted technology has a positive, negative, or no impact on users. This leads to the need to postulate a hypothesis or model that emphasize the impact of technology on users. The proposed model, which goes far beyond the TAM, is the "technology impact model".

The proposed technology impact model states that technology may have a positive, negative or no impact on users, and the nature of the impact depends on how technology is used and people's expectation of what 'impact' is. The technology impact model is an attempt to build a model that is relevant for the sophisticated digital world in which we now live and to show why the modern digital world may become stable or unstable depending on how technology is used and our expectations of what 'impact' is.

Several events which have occurred in the past, as well as recent events, give legitimacy to the technology impact model. For instance, in the last two decades, there was a dotcom bubble in the early 2000s which was fueled by the excitement around the discovery of internet technology. The growth of the Internet created a buzz among investors who quickly invested lots of money into startup internet companies because the Internet was the next big thing at the

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time. When the dotcom bubble burst, it led to a rapid crash in the stocks of internet-based (or technology) companies and led to the failure of many technology firms. One lesson learnt from the dotcom burst is that the internet technology which emerged during that time was not the cause of the burst; rather, it was the actions of users and speculators around internet technology that led to the burst. As a result, the anticipated positive impact of internet technology was eroded just after the crash. Another notable event in recent history is the global financial crisis. In 2008, computer software technology played a huge role in the global financial crisis. Prior to the crisis, computer software technology led to the automation of financial markets. Financial institutions recruited analysts, mostly physics and mathematics graduates, to develop software and algorithms to aid the pricing of financial derivatives. Several analysts began to use the built computer software technology in ways that helped their companies to make huge profits. This led to a boom in derivatives markets which later imploded and led to the 2008 global financial crisis. The computer software technology that was used by financial institutions in 2008 was not the cause of the crisis. Rather, the way analysts used computer software technology to create a derivatives boom, which later imploded, was a contributory factor that led to the global financial crisis. These two destabilizing events are partly attributed to how technology was used at the time, and it gives strong legitimacy to the claim made by the technology impact model that the impact of technology depends partly on how technology is used. In today's digital world where the manner in which technology is used is constantly leading to positive innovations, technological breakthrough, negative consequences, and hardship, there is no need to present detailed data to show that a technology impact model which takes the impact of technology as an important attribute of the modern digital world is needed and relevant.

Moving on to technology impact determination, what determines the impact of technology on users is the user's comparison of the new state (or outcome) that is achieved using the technology with the previous state (outcome) without using the technology. This is important because only the users of technology can determine whether the technology is having an impact on them. The technology designer cannot determine if the technology is having a positive or negative impact on users because the technology designer, at his best, can only install the functions which a technology should have. Only users are in the best position to determine whether a technology is having an impact on them, and the impact of technology on users may be positive, negative, or neutral.

Users will acknowledge that a technology has a positive impact on them if the technology solves a known problem and yield an outcome that is better than the previous state without the technology. Similarly, users will acknowledge

that a technology has a negative impact on them if the technology does not solve a known problem but yield an outcome that is worse than the previous state. Users will also acknowledge that a technology has a neutral impact on them, if it yield an outcome that is the same as the previous state without the technology. Users generally compare the new state with the previous state to determine whether technology has an impact on them and their decision will be influenced by two factors: (i) how the technology is used and (ii) impact expectations. I now turn to discuss how the technology is used.

In terms of how technology is used, recall that Davis' TAM begins with the introduction of a new technology and ends with users' acceptance and use of the technology. In the new model which I propose, I begin from the user endpoint of the TAM proposition and argue that the use of a technology is a necessary condition but not a sufficient condition to achieve impact because people may use a technology in a manner that diminish the desired impact. If a technology is used in the wrong way or is not used in accordance with the guidelines linked to the technology, the technology will not achieve the desired impact on users. Some mechanisms exist that allow prospective users of technology to have a say in determining impact before a technology is designed or launched, such as conducting a technology pre-design or pre-launch survey, that allows technology designers to reach out to prospective users to obtain responses on whether a proposed technology design, or its prototype, will be impactful or not. While this is helpful, it must also be acknowledged that the impact expectation of a technology before launching it may be very different from the impact expectation of the technology after launching it due to differences in expectations about 'impact' by prospective users. Therefore, when thinking about the impact of technology, one should be mindful of the different expectations about the impact of technology. A term I use to describe this is the technology impact expectation gap.

The technology impact expectation gap is the difference between what users want or need from a technology and what the technology actually provides to users. It is the difference in the impact of technology as envisioned by the technology designer and the user. The gap exists when there are differences in beliefs or expectations between users and the technology designer about what the technology should do. For example, consider a self-driving Tesla car. The self-driving Tesla car is designed to drive itself using digital maps that are connected to an internet-linked GPS or satellite system, but users may expect the self-driving car to fly rather than to only self-drive. Reflect on this example for a moment! A problem that arises in the example is that the users who use the self-driving feature of the car may not consider the Tesla car to have a positive impact on them even when the car does exactly what it is designed to do

because the user expect more than the technology offers. Rather, they will acknowledge that the Tesla car is having a positive impact if it offers additional functions, such as the ability to fly, which the Tesla car is not designed to do, for now. This situation is caused by the presence of a technology impact expectation gap. The common causes of a technology impact expectation gap are (i) users' poor understanding of the function which a technology is designed to do; (ii) the changing nature of technology which lead users to expect more from technology than they should; and (iii) lack of education to users on what to expect from technology and what not to expect from technology. The technology impact expectation gap can be reduced through education that increases users' knowledge of what they can get and cannot get from technology. This will ensure that users have reasonable expectations about what technology can do for them.

If society is able to close the technology impact expectation gap, then we will be able to build a good technological society—a society where people learn and use technology in a manner that contributes to the good of society and the world. Technology remains one of the most powerful tools for solving many common problems in the world today and to improve our wellbeing. We need more technology, not less; but we must collectively decide on the ways in which technology should be used to help society achieve its goals. This calls for collective effort by the public sector and the private sector to rethink the way technology is used and its role in society to create a good technological society.

In conclusion, it is hoped that theorists and innovators would pay more attention to the proposed technology impact model and consider its potential in predicting the

past, present, and future impact of technology in our digital world. The model calls for greater emphasis on technology impact and not just technology usefulness. Emphasis on technology impact should flow from paying a close attention to how people use technology and people's expectation of what 'impact' is.

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Declarations

Conflict of interest There is no conflict of interest associated with this work.

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