# A conceptual framework for technology-enabled and technology-dependent user behavior toward device mesh and mesh app

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A B S T R A C T

The device mesh and mesh app revealed by Gartner as the future strategic technology trend are able to predict people's need from their historic data, then provides the needed services or service innovation to support their activity engagement. However, many theories have identified that it is the motivation, rather than technology, that drives people to engage in activities or tasks. For this reason, this study builds a conceptual framework by integrating the extant logic and theories to explore how future technology would generate benefits for people. It integrates task-technology fit (TTF) model and motivation theory (mainly expectancy-value theory) to explain such technology user behavior. It also points out the difference between technology-enabled and technology-dependent user behavior and concludes that too much emphasis on the role of technology with too little attention on motivation would distort technology user behavior, and the role of technology as well.

## 1. Introduction

Technology is constantly evolving and maturing. In the article introducing Gartner's top 10 strategic technology trends for 2017, Panetta (2016) notes that intelligent, digital, and mesh are the three themes that form the basis for these technologies which will have substantial disruptive potential across industries. The mesh, referring to the dynamic connection of people, processes, things and services supporting intelligent digital ecosystems (Panetta, 2016), are especially connected to people's daily life. For example, conversational systems enable people and machines to use multiple modalities (e.g., sight, sound, tactile, etc.) to communicate across the digital device mesh (e.g., sensors, appliances, IoT systems) (Cearley, 2016).

The world is becoming an intelligent, digitally enabled mesh of people, devices, content and services (Cearley, 2016). New devices can learn and adapt to people's needs based on specific situations, location and context of use (Smyk, 2016), and become context-aware so that they can predict users' needs in different contexts, always staying a step ahead of them and eventually making user interfaces superfluous (Pscheid, 2016). These technologies are expected to create the foundation for ambient user experience in the background where new devices respond to the data they collects automatically to shape users' environment and experience. People can accomplish each tasks of their daily activities in such a nature way that they do not need to consciously interact with the technology and will even not notice the technology surrounding them. Google Now is a typical example of such an application in creating ambient user experience. It can discover patterns in users' life by detecting historic data, their search history for example, from their mobile phone. Google Now knows when people typically leave work to drive home and can automatically alert them to unusual traffic based on where they are (Pscheid, 2016).

Such new devices and mesh will surely lead people to a different life in the future. However, it is still in doubt whether such a life

is what people really want or not. Specifically, the future technology such as device mesh and mesh app predicts people's need from their historic data, then provides the needed services or service innovation to support their activity engagement without considering the motivation behind it. Many theories; e.g., intrinsic motivation theory, attribution theory, and expectancy-value theory, however, have pointed out that it is the beliefs, values, and goals that motivate people to have need for activities and thus produces actual behavior. If we neglect the motivation behind, then such technology trends will possibly lead human life to a more technology-dependent lifestyle which may abate the actual benefits generated from their activity engagement.

Gardner and Davis (2013) use 'app-enabled' and 'app-dependent' to describe two different types of digital technology use behavior of the 'app generation' users. App-enabled users know how to make use of apps to pursue new possibilities and to lead a richer life. In contrast, app-dependent users allow apps to restrict or determine their procedures, choices, and goals and hence possibly limit their potential. Now that the mesh age is coming, it is also worth exploring whether such a future technology enables users to accomplish tasks and have a better life by gaining more benefits from their activity engagement, or drive people to be more dependent on it instead.

Past studies have made great effort to investigate the values, benefits or performance information technology generates for users, especially in the context of mobile technology and mobile services; e.g., Chen (2017), Hsu and Lin (2015), Ozturk, Bilgihan, Nusair, and Okumus (2016), and Xu, Peak, and Prybutok (2015). Many models such as technology acceptance model (TAM), task-technology fit (TTF), and information system (IS) success model, have also been developed for this. However, the device mesh and mesh app are very different from the technology that was ever used before. Such future technology is so smart that it tends to lead people to a more IT-dependent life. If so, it is worth exploring how and to what extent they can bring benefits for users.

The purpose of this study, therefore, is to investigate how the future technology such as device mesh and mesh app can be used to generate benefits for users. This study tries to build a conceptual framework by applying some extant theories and models to discuss the role of the future technology. The remainder of this paper is organized as follows. In the next section, it discusses the device mesh and mesh app which was revealed as one of Gartner's top 10 strategic technology trends for 2017. In section three, it discusses the role of technology as a form of service innovation. In section four, it conducts a brief review about motivation theory and TTF model. In section five, it proposes a conceptual framework for future validation by combining motivation theory and TTF model. Finally, it gives a summary and draws the conclusion in section six.

## 2. A strategic technology trend: Device mesh and mesh app

The device mesh refers to an expanding set of endpoints with broader connectivity in services and the digital mesh, enabling people to access applications and information. Simply put, the device mesh is a combination of devices, including mobile devices, wearable devices, consumer and home electronic devices, automotive devices and environmental devices, which are connected with each other through network, the Internet of Things (IoT) in particular. People expose themselves to this mesh with instantaneous connection and response through time and space and obtain seamless user experience. As Fig. 1 shows, all devices such as cars, cameras, appliances, and more are connected in an expanding set of endpoints wherever people are at home, working in the office, with a customer, shopping in a retail store, eating at a restaurant, watching the game or driving in the car.

The IoT has played an instrumental role in providing seamless connectivity between users and devices. The rise of IoT is making the devices go from the mesh connections to fully connected network in which every device is connected to every other device. Before IoT, apps operate on command only; that is, users need to open the app whenever they want to use it. In the new device mesh environment, all the apps, possibly on different devices, would work together and run as a service in the background, even without users noticing, to create ambient user experience. The device mesh provides the foundations for such a new continuous and ambient user experience.
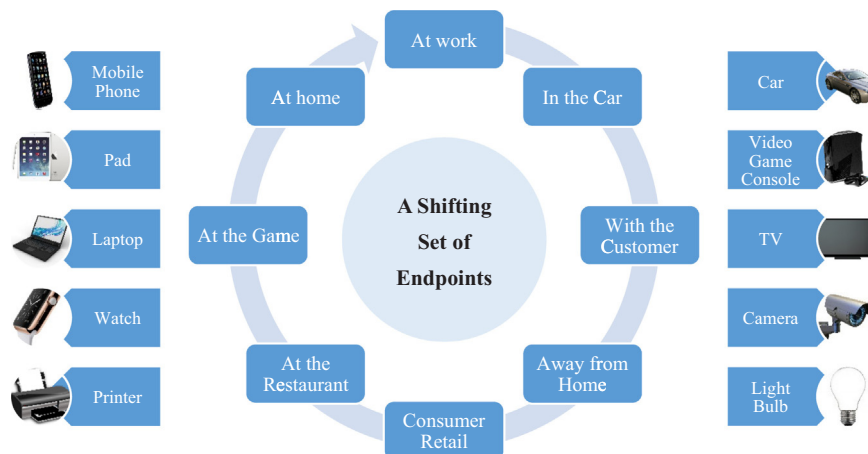


**Fig. 1.** The device mesh connected in an expanding set of endpoints.
Source: Gartner, 2015.