BYOD and its Application in the Healthcare Environment

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Abstract

In recent years, the number of people who use mobile devices for business and organizational purposes has increased. This phenomenon is now known as "bring your own device" (BYOD), and it is rapidly entering the health industry, which makes clear the necessity of studying its various dimensions for its implementation and application.

Recently, the use of mobile devices is increasing due to the social tendencies of people. Rapid changes in modern gadgets and smartphones have also encouraged organizations to use their mobile devices in the workplace for business purposes, creating related opportunities and challenges. These cases have made the expansion of BYOD inevitable so that the only way to control BYOD's threats is to accept its process and finally formulate related strategies and policies before using it.

Keywords: BYOD, Mobile, Healthcare, Information technology

People's social tendencies in today's world have increased smart mobile devices' growth as one of the most popular information technologies in recent years (1, 2, 3). In 2018, the number of people using mobile devices worldwide had increased by about 100 million. This number has grown to more than 5.1 billion users in 2019, and its penetration throughout the world has reached 67% (more than two-thirds of the world's population) (4). These show that the world is moving towards using mobile devices more and more, and along with this trend, the number of people who use their devices for business purposes is increasing. The study shows that about 95% of employees use their own devices for business purposes (2).

In the past decades, the use of dual computer devices, the devices used both at home and work was sometimes common among employees. Now, this trend is called "bring your own device (BYOD)" (5).

"BYOD" is a new phenomenon that allows users to engage in more work-related activities using their own devices, which are independent of time and geographical locations (6). Like any other technology, this phenomenon has its advantages and disadvantages. By emerging personal digital assistants (PDAs) in the 1990s, mobile devices empowered healthcare providers to access, collect, retrieve, share, and store information virtually (7).

In the health industry, due to the importance of patient information and managers' and employees' desire to use BYOD, this study was conducted to describe BYOD's concept and its benefit and challenges, especially in healthcare.

Definition

The term BYOD was first used by Ballagas et al. in 2004 in their paper, which was in connection with the interaction of camera-based personal mobile devices with large public screens (8, 9). The Oxford English-American Dictionary added BYOD as a new term to its vocabulary in August 2013 and defining it as: "the process of permitting the organization's employees to use a computer, smartphone, or other personal mobile devices to accomplish business goals" (10).

BYOD is an information technology policy in which employees are allowed or even encouraged to use their mobile phone devices and personal computers to access data, resources, and enterprise systems (10, 11).

BYOD benefits

The availability and low cost of communication through mobile phone networks have led to using them more extensively. The use of personal devices in the workplace helps users to perform their daily activities faster and more efficiently, in any place and in any way possible. It also has some benefits for business, such as greater independence and better user experience for employees, leading to deciding to use personal mobile devices in the workplace (3).

One of the main effects of using BYOD for organizations is cost savings (2, 10, 6, 11, 12) because using this approach reduces the cost of maintenance of devices and tools (11). The comfort and portability of the instruments used in the performance of employees' work tasks are one of the BYOD organizational goals (6),

The most significant benefit of BYOD is the increase of mobility in the workplace (3, 6, 13, 11, 12, 14), which as a result, brings improved efficiency and effectiveness for the employees (3, 5, 6, 11, 13, 15). Employees who are allowed to use mobile devices for both work and personal purposes are efficient because they can perform small work tasks in their time (15). Besides, they create better coordination between home and work resources (5). Other benefits of using BYOD include increased employee participation (11, 12), more flexibility (3, 6, 11, 14), and improved employee satisfaction (2, 3, 6, 13, 14).

In healthcare, these benefits lead to provide the right information for the right patient at the right time and right place. It is because traditional work systems, such as desktop computers, are dependent on one place and cannot be presented in different patient situations (7).

The possibility of immediate access to information ensures that physicians have the most accurate patient-related information needed to make effective decisions (12). According to the studies, mobile health improves patient outcomes due to the possibility of rapid responses at the patient's bedside, prevention of medication errors, data management, and increased accessibility. Using mobile devices at the patient's bedside can save time in retrieving and documenting information significantly (7).

BYOD challenges

As shown in Table 1, concerning all benefits mentioned before, using BYOD is faced with challenges. The most critical challenges are related to data privacy, confidentiality and security, technical and legal aspects, governance low, policies and procedures setting, how to control, and organizational culture (2, 3, 7, 10-12, 15).

There are also challenges for employees, such as increase workload, increased stress, the blurring of the line between private and professional life, and the financial risks due to their participation (3, 14).

According to the studies, the threats of BYOD for organizations refer to reducing information technology security of the organization, lack of control over employees' mobile devices, and the complexities of its setup (11, 15). As a result, the lack of executive strategies when implementing the BYOD program can cause many organizational problems (15). Personal mobile devices in organizational environments increase the chances of viruses entering the corporate network for corruption or breaking organizational policies (3).

Since 'employees tend to use one device for both work-related activities and personal affairs, and organizations cannot easily control them, it is possible to access and store organizational and personal data on the same device (13).

This section encounters various security challenges such as judicial cases, computer viruses, uninformed users, leakage of confidential data, and other cases (11).

For all these reasons, organizations must prepare a BYOD policy that includes the type of authorized devices, their registration, and evaluation of licenses, security policies, standards observation, and security training (6).

These challenges are in healthcare organizations since patient information, confidentiality, privacy, and security are very important (12). In particular, there is no clear solution that can synchronize the necessary security measures to ensure patient data exchange following rules such as HIPPA (7).

Develop a strategic plan to use BYOD

Recently, for most people, access to information at any time, and any place is of great importance (15). Therefore, if organizations do not allow their employees to access information outside the workplace, they will probably try to find a way to do so, leading to many security problems (15).

BYOD is a process that organizations have to compete with (6). Given that future employees seek to improve and increase mobility in their work environment (3) and also by increasing the number of smart devices consumers (e.g., smartphones, tablets, and other gadgets), organizations have to find solutions to use these personal devices in the workplace (6).

BYOD enables organizations to compete in a global environment to attract the best talent worldwide (6). Managers' expectations in using BYOD include increasing productivity, employee flexibility in time and place, and increasing user satisfaction, which is generally consistent with the features of mobile devices (5).

When employees use their smartphones, laptops, or tablets, they no longer need to carry multiple devices for their work and learn different technologies (12). The BYOD policy is a way to achieve social participation in an organization (11).

BYOD is a comprehensive system for many organizations, and healthcare that can follow BYOD solutions if their privacy and security measures comply with industry standards (17).

As demand for using mobile devices is expected to increase, hospitals and other HIPAA rules-affiliated organizations need to make policies to protect their privacy and security and prevent data corruption, theft, and other risks (7). In particular, physicians and nurses have access to specific medical applications designed for their specialized needs (10). The findings showed that all hospitals need to have mobile device policies in the workplace, as many healthcare professionals now bring their own devices for work purposes in the hospital (7).

Still, many organizations do not have constant strategies to use mobile devices, and these devices have caused many problems in the work environment, including unwanted data disclosure and a new level of cyber-attacks. These strategies can include policies and guidelines inconsistent with the organization's goal and culture (15). It should be referred that the only real way to control BYOD threats is to accept the trend (18).

The report by Harris et al. indicated that 36% of employees ignore organizational policies and choose to use their devices to perform tasks, which emphasizes this issue (5). Some organizations are also trying to take advantage of this phenomenon to increase their efficiency, improve job productivity, control costs, increase employee satisfaction, and benefit BYOD (10). Accordingly, researchers have provided executive frameworks for BYOD (1, 9).

Table 1: Benefits and Challenges of BYOD

Benefits	Challenges
Cost savings for organizations (2,10,6,12)	Data protection & confidentiality issues (3)
Improve productivity and staffs morale (2,3,5,6,10,11,13)	Security (2,3,7,10-12,15) & Control of personal devices (11,15)
increase productivity for employers (5)	Technical and legal challenges (10)
increase flexibility and mobility (3,6, 11-14)	Governance (12)
Improve staff efficiency and effectiveness (3,5,6, ,11,13,15)	Policy Challenges (2,10)
increase employee participation (11,12)	Loss of control (3)
Improve job satisfaction (2,3,6,13,14)	Organizational Culture (12)
offering a competitive advantage (11,13)	Increased workload & Blurring the boundaries between private and professional life (3,14)
Attract and retain the future talents of organizations (3)	reduce standardization and increase complexity (3,5)
	Financial risks for employees (14)
	Challenges for the organization's IT professionals (3)
In Healthcare settings	
delivering the right information about the right patient at the right time in the right place (7)	Legislation (12)
Real-time access to information (12)	device type (12)
Improve patient outcomes (7)	Internet dependencies (12)
Saving time in retrieving and documenting information (7)	

Conclusion

Various researches have mentioned several advantages and disadvantages of using BYOD for employees and organizations; therefore, applying this approach will increase employee satisfaction, flexibility, mobility, and efficiency and reduce costs and enhance competitive advantage for organizations. However, it should be noted that the popularity and widespread use of mobile devices in recent years and the tendency of new generations to use these devices for various purposes have made the expansion of BYOD inevitable. Thus, the only definitive way to control BYOD threats is to accept its process and formulate related strategies and policies before using it correctly and safely.

Disclaimer Statements

- **Protection of Human and Animal Subjects:** These subjects were not included in this study.
- **Authors' contributions:** All of the authors have contributed to writing the article. The corresponding author made the final proofreading.

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