

## DISRUPTIVE TECHNOLOGIES

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### INTRODUCTION

Approximately 20 years ago, Harvard Business School Professor Clayton M. Christensen introduced the term *disruptive technology* in an article, [Disruptive Technologies: Catching the Wave](#), co-authored with Joseph Bower. The article targets management directors who make funding resolutions in business, as opposed to the research community. As in stakeholder management, *disruption* suggests significant changes to a business model, such as moving into a new market. Disruption can cause major changes to the evolution of business processes, as new technologies and ways of thinking become available to “stay ahead of the curve” and maintain a competitive edge. In this Tech Insight, we provide an overview of disruption of technologies, explore these various technologies, and discuss their impact on the Department of Veterans Affairs (VA).

### DISRUPTION OF TECHNOLOGIES

“When the technology that has the potential for revolutionizing an industry emerges, established companies typically see it as unattractive: it’s not something their mainstream customers want, and its projected profit margins aren’t sufficient to cover big-company cost structure. As a result, the new technology tends to get ignored in favor of what’s currently popular with the best customers. But then another company steps in to bring the innovation to a new market,” explains Bowser.

Once a disruptive technology becomes established in a new market, it is a smaller-scale innovation that raises the technology’s performance on the features that are valued by mainstream customers, rapidly altering the industry. Examples of mainstream [disruptive technologies](#) are personal computers replacing typewriters, emails disrupting postal and greeting card companies, and swapping cell phones for smartphones. The term, disruptive technology, can apply to products, concepts, and services, such as Global Positioning System (GPS) devices, crowdfunding, online shopping, micro-lending, and subscription video services.

## **ARTIFICIAL INTELLIGENCE AS A DISRUPTIVE TECHNOLOGY**

Artificial Intelligence (AI) is the science and engineering of making intelligent machines, especially intelligent computer programs. It refers to the usage of computer networks to execute tasks that require human knowledge. For example, the ability to embed human brain-like elements into computers has given rise to voice and pattern recognition, natural language learning, and machine learning. Machine learning is a shared service for advanced analytics capabilities that needs to be included in VA's analytics technology. To learn more about the integration of machine learning in VA's technology, read the full [Enterprise Design Pattern \(EDP\)](#) on [Enterprise Data Analytics](#).

Paul Sallomi, Vice Chairman, *U.S. and Global Technology Sector leader* for Deloitte LLP, illustrates in his article, "[Artificial Intelligence Goes Mainstream](#)," a clear example of AI as a disruptive innovation. "Process applications incorporate AI into an organization's workflow to either automate processes or improve them by augmenting worker effectiveness. Automated voice response systems have been used for some years now to replace human customer service agents for first-tier customer support." Globally, AI is expected to become the [most disruptive technology](#) in coming years. Google, Facebook, and Amazon.com are using AI in a way that demonstrates its worth.

An [analysis](#) completed by Bloomberg Intelligence analysts suggests that, "cloud computing and machine-learning algorithms have fueled the jump in AI, keeping costs in check while helping applications interpret an ever-growing mountain of data." The tools are used to process big data, extremely large data sets, and run self-learning algorithms. Analysts suggest ways that organizations can better connect with customers and boost return on investment (ROI). The ability to process large amounts of data is crucial in an era of mass data.

## **BLOCKCHAIN AS A DISRUPTIVE TECHNOLOGY**

A [blockchain](#) is a decentralized, digital transaction record verified by a network of users. A blockchain record features an immutable (permanent) publicly distributed ledger and a dispersed network that is cryptographically secured. Organizations across a wide spectrum of sectors are experimenting with this technology to establish trust networks and better transparency, and to decrease friction and costs.

Cryptocurrencies that are triggered by blockchain records remain in a powerful position. Commercial businesses are accepting cryptocurrency payments, such as [Bitcoin](#) and [Ethereum](#). Harvard Business Review [states](#), "The 'killer app' for the early internet was email; it's what drove adoption and strengthened the network. Bitcoin is the killer app for the blockchain." This is because blockchain technology helps manage the database or ledger that records Bitcoin or

other cryptocurrency transactions. Bitcoin is a digital asset and payment open-source software system that helps users transact directly without an intermediary. Blockchain is disruptive because it has the ability to “digitize, decentralize, secure, and incentivize the validation of transactions.” Industries that have not yet adopted blockchain will attempt to determine if its use can enable them to meet their strategic objectives.

## **IMPACT ON VA**

The prevalence of telehealth at VA is discussed in a previous [Tech Insight](#), where telehealth is the use of electronic information and telecommunications technologies to deliver healthcare, health information, or health education at a distance. This includes video conferences, store-and-forward imaging, streaming media, and wireless communications. Electronic consultations (e-consults) enable primary care physicians (PCPs) to obtain the inputs of specialist physicians, without requiring the patient to go to a face-to-face visit. In 2011, the implementation of e-consults began at VA Boston Healthcare System (VABHS), and by 2013, e-consults were fully available for all clinical services.

The process begins with the PCP choosing the appropriate consultation within the electronic health record (EHR) ordering menu. However, any healthcare provider is able to request an e-consult. This menu forms an electronic document that is already pre-filled with the patient history and the purpose for the consult. This forms a message that is sent to the specialist physician, requesting the information desired and enabling a two way physician-to-physician communication.

Telehealth is quickly becoming a disruptive innovation that is driving technical changes that efficiently assists physician and patient communication. VA uses telehealth when a Veteran walks into a facility and interacts digitally with a physician on a VA desktop across the wide area network (WAN) to another location. Transporting a Veteran from the VA facility to their home using a laptop or mobile device has major implications on how that service will be rendered within the technical architecture. This includes authentication, bandwidth considerations, support for non-VA devices, and confidentiality, integrity, and availability (CIA) connections moving from internal to public networks. For more information, read the [EDPs on User Identity Authentication](#), [Secure Messaging](#), and [Mobile Veteran-Facing Application Security](#).

## **CONCLUSION**

Disruptive technologies can alter the mechanics for business, inventing completely original products and services, as well as changing pools of value between manufacturers and clients. There is a probable chance that organizations will need to utilize business-model inventions to obtain some of that value. Furthermore, organizations will face the obstacle of ensuring that

their employees' skillset is up-to-date and able to balance the potential advantages of upcoming technologies with the uncertainties they occasionally pose. Government agencies, particularly VA, may want to consider new metrics to create a more refined and beneficial perspective of the influence of the technology. As new innovations reform economies and lives, new metrics can aid policy makers balance the need to promote growth with their responsibility to attend to the public welfare.

If you would like to read more about other related IT topics, please check out our recent [Tech Insights](#) on [Artificial Intelligence](#), [Blockchain](#) and [Machine Learning](#).

### **TECH INSIGHT SERIES**

*The monthly Tech Insight series aims to help readers make better decisions and be more informed customers of OIT products and services by providing them with high-level overviews of technology issues that impact or will impact VA's IT environment. Tech Insights introduce topics in an easily digestible fashion by presenting background information on the topic, clearly explaining its importance within VA, and providing recommendations for success from OIT. All Tech Insights are available [here](#).*

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