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Abstract:

Over the past decade, the world has been swimming in an ocean of technology, which has opened the doors for many opportunities as industrial boundaries continue to change. "Blue oceans" have opened their waters for new industries such as social networking, smart technology, mobility, and big data. Looking forward, new trends such as the Internet of things (IoT) and technology advancements towards 5G mobile technology are paving the way for new markets and industries along with further advancements in big data. A panel discussion consisting of industry leaders and researchers addressed these topics and the emerging technologies that are changing the world.

Keywords: Internet of Things, IoT, 5G technology, Big Data, Blue Oceans.

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1 Introduction

Researchers and practitioners today are the metaphorical Christopher Columbus set out to prove the world is no longer analog. The digital revolution has created many new technologies but none with a more widespread impact than mobile technology and the Internet. These technologies individually have changed our lives and the way we interact with each other, but, together, they have changed the world that we live in by creating a "blue ocean" of new opportunities.

In simple terms, a blue ocean refers to the rise of a completely new industry or advances in an existing industry that alter the boundaries of competition that results in a market free of competition (Kim & Mauborgne, 2004). Historically, blue oceans have been industry specific and resulted from innovations by a single company, such as FedEx, Starbucks, Napster, Netflix, Apple (iPhone), Uber, Airbnb, and so on. However, the combination of mobile technology and the Internet has turned the blue ocean into a sea of the Internet of things (IoT). The combination of these technologies affects all industries simultaneously as opportunities appear.

The Internet of things refers to things (i.e., objects) connected to the Internet that one can access through ubiquitous technologies (Atzori, Iera, Morabito, & Nitti, 2012). The IoT has resulted in many new technologies referred to as "smart" technologies (i.e., Internet enabled). We now live amid a smart revolution in which many objects in our everyday lives connect to each other through Internet technology. Table 1 lists a few examples of smart technologies resulting from mobile computing and IoT technologies.

Table 1. Internet of Things Examples

Home	Appliances	Health	Clothing
• Smart home security • Smart sprinkler control • Hydroponic system • Smart propane tank • Smart door lock	• Smart refrigerator • Smart washing machine • Smart air conditioner • Smart stove • Smart dishwasher	• Blood pressure monitor • Cholesterol monitoring • Smart sleep system • Smart cardio • Glucose monitoring	• Smart shirt • Smart socks • Bluetooth-enabled insoles • Technology glasses • Smart watch

As we progress towards 5G capabilities, the ease and speed at which IoT connections take place will become more simplified and, thus, allow for further advancements in technology. However, the effects of mobile technology and IoT extend beyond the creation of new technological capabilities. As we add digital components to every object we interact with in our daily lives, we also contribute to the amount of data being generated. As a result, big data is no longer big—it's enormous, and it will continue to grow as industries start moving towards increased connectivity among people and objects. The ramifications for data analysts is astronomical as we continue to create solutions for analyzing the data. With younger generations (i.e., digital natives) growing up with these technologies, it's not really a question of if we should respond to the need of more connectivity but rather how. Companies across all industries need to address user needs for increased connectivity among people, devices, and objects.

This paper results from a panel discussion on these emerging topics that took place at AMCIS 2015 in Puerto Rico. The panel comprised practitioner experts and researchers who discussed the different technologies from both a practitioner and theoretical perspective. The panelists took a proactive approach by evaluating the current direction of technology and providing recommendations that can benefit academics and practitioners alike. The panelists presented cases from the Central Intelligence Agency and Via Studios, a technology development company creating IoT solutions, to demonstrate some of the capabilities and challenges of disruptive technologies, which we discuss here. Subsequently, we summarize the discussion and provide recommendations for future research as we continue to explore the future of ubiquitous computing and IoT technologies.

2 5G and Ubiquitous Computing

In today's ubiquitous computing era, individuals and organizations have widely adopted the Internet of things and big data analytics with the next generation of mobile technology, 5G networks, on the forefront. Numerous leading industry magazines and academic journals, such as *Deloitte Review*, *MIS Quarterly*, *Communications of the ACM*, and *Information Systems Research*, have devoted special issues on IoT, big data analytics, and 5G. Impressively, a recent Bain & Company's report showed that Europe and the United States will contribute an additional US$8 trillion to global GDP by 2020 (Harris, Kim, & Schwedel, 2011). In this section, we describe IoT and 5G. In Section 3, we discuss their impacts on Big Data.

2.1 The Internet of Things

British entrepreneur and innovator Kevin Ashton coined the term “Internet of things” in 1999 (Ashton, 2009). IoT offers advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications. One can use two fundamental tenets to define IoT: objects and the Internet. To be IoT enabled, an object must be able to pass information or commands to another through a network. Human interactions or sensors can trigger actions performed by IoT-enabled objects, which creates an interconnected network of objects with ubiquitous control. The network may be a personal, private, or public network, though the most common conceptualized framework for IoT technology is the Internet. Some often confuse IoT with smart technology, which refers to any technology that has Internet connectivity. Smart technology refers to objects that can connect to the Internet, whereas IoT extends this model to include objects that one can control ubiquitously through Internet technology. For example, a smart phone can connect to the Internet, but one must be physically present to use the technology. However, one can access an IoT-enabled object and control it from anywhere at any time.

If all objects and people in daily life had identifiers, computers could manage and inventory them. Our smartphones, smart watches, smart cars, shipping containers, and things of all kinds are being connected faster than ever. The most popular applications to date are the smart home, the wearable device, smart city, smart grid, connected car, and connected health. The IoT can allow one to “track and count, observe and identify, evaluate and act in circumstances” (Raynor & Cotteleer, 2015).As Figure 1 shows, the information value loop illustrates the value capture stages (i.e., create, communicate, aggregate, analyze, and act) that one needs to go through to create value. Each stage has technologies, such as sensors, network, standards, augmented intelligence, and augmented behavior. Besides using RFID, one may tag things with technologies as near field communication, barcodes, QR codes, and digital watermarking.

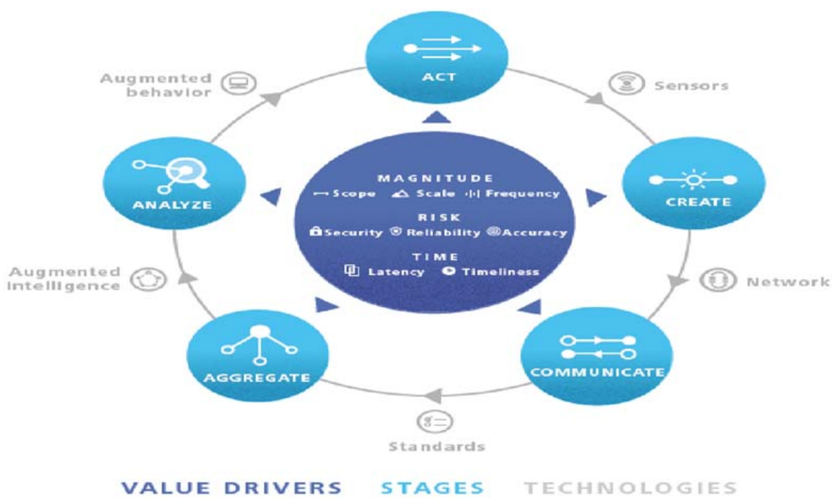

Figure 1. Information Value Loop (Raynor & Cotteleer, 2015)

Gartner (2014) has predicted a 30 percent growth in IoT enabled objects from 2014 to 2015 with over 25 billion IoT enable things by 2020. Gartner has said that IoT products and service suppliers will generate incremental revenues exceeding US$263 billion, mostly in services, in 2020. It will result in US$1.9 trillion in global economic value-add through sales into diverse end markets (Gartner, 2013). These trends are creating many opportunities for development companies as we continue to move towards the future and create a digitally connected world.

Via Studios is one example of a development company providing services that help businesses transition to IoT. They describe their services as more than just developing objects but rather developing a user experience. Via Studios is working in conjunction with General Electric’s (GE) microfactory to produce innovative home appliance products to create an integrated app ecosystem where everything is connected. From this electronic ecosystem, users can get updates and reports from all appliances in the home (e.g., a coffee roaster) and control the objects as needed.

Continuing the coffee roaster example, the president of Via Studios, Jason Clark, describes roasting coffee as a complicated process that requires significant time and attention to detail. Via Studios reports that home roasting and brewing coffee have grown in popularity. The roasting process includes both heating and cooling. The initial process is endothermic, which means that the coffee beans absorb heat. Once the beans are heated to a certain temperature, they become exothermic and start giving off heat. Heating the beans requires careful attention because the exothermic beans will start cooking themselves if the roaster does not lower the temperature to cool them. This process may sometimes require one to raise and lower the heat multiple times. The IoT-enabled coffee roaster enables the consumer to enjoy home-roasted coffee without having to spend the time watching the beans throughout the process. With a mobile app, the user can monitor and control the temperature from anywhere to ensure the beans are high quality and ready for grinding and brewing once the user gets home or have the beans ready to be started on a timer for morning brewing when they wake up.

Other IoT capabilities for the kitchen include a refrigerator inventory system. Using an IoT-enabled scale used to weigh milk inside the refrigerator, the user can get a report on how much milk they have based on the weight. Egg trays can report on the number of eggs remaining. Combining these technologies with other ideas currently under development, the user can get an accurate estimate of what they need to purchase when at the grocery store through a mobile app by connecting to their IoT-enabled refrigerator.

Not only are people connected to their objects through IoT but also objects are connected to other objects, and, in recent cases, users' objects are connected to businesses that provide products and services they need. Amazon's Dash replenishing service connects the user's device to Amazon and allows the object to order supplies when they start to run low (Amazon, 2015). This takes the "just-in-time" concept used in the automobile industry and applies it to everyday life. The user no longer needs to order washing detergent or fabric softener—the IoT enabled objects can place the order for the user to ensure the user always has what the user needs. Other replenishment services that Amazon provides include batteries, water, printer ink, toner, paper, pet food, and so on. One can directly install the replenishment device into the object as a physical button the user controls or as an automated system using sensors that orders products for the user as supplies get low. This example is just the beginning of what is possible. As telecommunications and networks continue to grow, the speed at which data travels and the ability of IoT-enabled objects will continue to grow. This explosion in connectivity continues to increase as we reach 4G networks and start moving towards 5G.

2.2 Fifth-generation (5G) Network

5G is the next frontier for the entire mobile industry. With fourth-generation (4G) deployments, the United States recaptured the leadership role in the mobile world. In the 2000s, Europe, Japan, and Korea led the third-generation (3G) world. Each region is eager to lead the world in 5G technology. Although 5G is in its early research stages, the International Telecommunication Union (ITU) has begun working on the International Mobile Telecommunications (IMT) spectrum requirements for 2020 and later (Huawei Technologies, 2013). As Figure 2 shows a possible roadmap for 5G technology evolution (i.e., 5G research, prototype, trial until 2016; 5G standard until mid-2018; 5G product until 2020 before 5G deployment in 2021). This 5G technology evolution shows LTE-A, LTE-B, and LTE-C under the 3rd-Generation Partnership Project (3GPP).

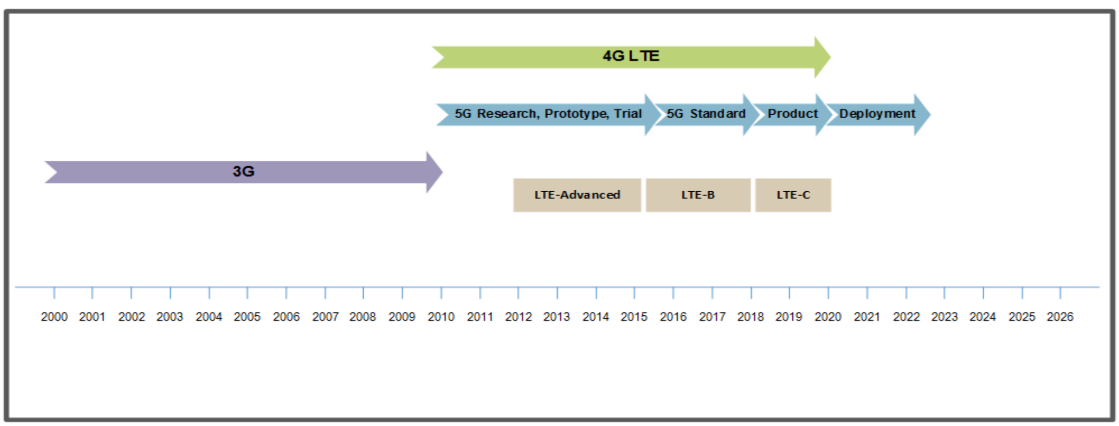

Figure 2. Mobile Evolution (Huawei Technologies, 2013)

Even though no consensus about 5G exists, many industry leaders agree on the types of performance criteria (e.g., latency, network coverage, energy efficiency, massive multiple-in multiple-out (MIMO), power consumption, connected devices, coverage, and higher security requirements). Looper (2015) shows that Verizon aims to be the first United States carrier to offer a 5G network for deployment in 2017. Several other countries, such as South Korea and Japan, are making strides to offer the 5G field trial in the next several years. As we mention earlier, 5G's growth and success will be built on the success of the entire information communication and technology (ICT) ecosystem. The entire ICT ecosystem will be a key driver in value creation and value capture.

3 Impacts on Big Data

Advancements in mobile technology and the introduction of IoT have significant effects on big data and analytics. Due to the dramatic increase in objects producing data, the speed and size of big data has grown exponentially, which can have both positive and negative effects on big data (Shim, French, Guo, & Jablonski, 2015). To better understand the impacts these emerging technologies have on big data, the director of data analytics for the Central Intelligence Agency (CIA) discussed a case involving the CIA and their data-analytics challenges.

With data analytics, the CIA aims to provide timely, accurate, and objective intelligence and analysis on all sources of data to report the full range of national security and foreign policy issues to U.S. Government officials. Having access to data in integral part of the mission at the CIA that integrates external data sources from various agencies that the organization analyzes through their centralized control network. One source of big data that the CIA often uses is the Integrated Crisis Early Warning System (ICEWS). The ICEWS data repository contains nearly 30 million worldwide news stories (in English, Spanish, and Portuguese) from January 2001 and by over 6000 international, regional, national, and local news publishers. The CIA obtains these unclassified stories through both Factiva and the government Open Source Center (OSC). The CIA processes these stories through innovative deep (BBN Serif) and shallow-parsing (JabariNLP) technologies to produce a set of over 19 million unique geolocated events with an accuracy greater than 80 percent. This event data comprises date-stamped and geolocated event ripples that recount "who did what to whom". The CIA conducts exploratory analyses on the ICEWS data set to identify observable ripple effects in the international system to gain a better understanding of international politics and international relations. By analyzing this data, they can gain information through spikes of news frequency and chatter on topics such as the Russo-Georgian war, the SARS epidemic, the Fukushima disaster, London bombings, and other international events.

While additional data sources and information produced through continued connectivity and IoT intuitively seems to be useful, more data does not always result in better information. When the amount of data increases without its quality also increasing, the effects can impede a project's success from a data analytics perspective. As our CIA respondent describes, finding a needle in a haystack is always a challenge, but, when the haystack continues to increase in size with no additional needles, the task at hand grows significantly in complexity. These are problems that the CIA is contending with as the production of data continues to increase. Most datasets are largely white noise, which makes successfully analyzing it and identifying relevant information increasingly challenging. Evaluating published news stories is no longer sufficient because the CIA needs timely information. Social media and alternative forms of communication have become important sources of information for the CIA. With an increasing number of data sources, data analytics has begun shifting from a centralized control model to a mesh model as a result of a hyper-connected world. This shift towards hyper-connectivity requires a high level of technical and analytical skills to work with big data sets as they continue to grow with no end in sight.

4 Unification of Technologies

Technology is continually advancing towards unification. When the Internet was commercialized in the 1990s, this created new capabilities emerged that would start a ripple effect of technology growth. In the 1990s, objects did not possess Internet capabilities. All technologies of this era operated independently of other technologies. The 2000s saw a new trend of smart objects as phones and TVs came equipped with Internet connectivity. In this era, technologies began to grow by including functions that required the Internet. As the networks continued to advance, data rates increased and the capabilities of smart objects also began to increase, which gave rise to the Internet of things as we progressed from a theoretical perspective to implementing these capabilities in the 2010s. Now, objects not only come equipped with

Internet capabilities but also have the ability to connect to each other and exchange data. Using sensors and smart devices, objects can connect to each other exchanging information and providing new services to users ubiquitously. As more objects continue to become IoT enabled, we continue moving towards an interconnected world where all objects will be able to communicate with all objects accessed by users anytime from anywhere. This shift towards IoT introduces new possibilities such as social networks of intelligent objects that are ubiquitously connected to each other (Atzori et al., 2012). Figure 3 displays the evolution of smart technology as we progressed from independent objects to social networks of the IoT.

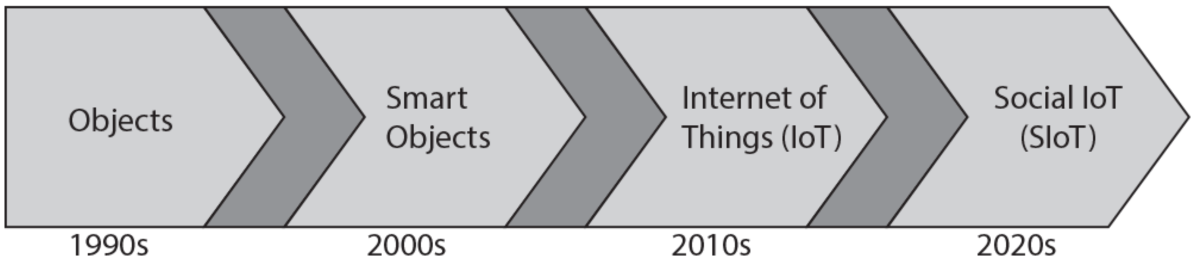

Figure 3. Evolution of Smart Technology

Many researchers view social IoT (SIoT) as the next evolution of smart technology (Atzori, Iera, & Morabito, 2014). SIoT encompasses a network of intelligent, interrelated objects that work together to share information and provide services to the user. Currently, SIoT is a theoretical concept under development with no clear definition. Following human social networking, we can obtain a sense of how one could implement SIoT. Just as one may describe telecommunications based on personal networks, local areas networks and wide area networks, one can describe SIoT as various levels such as personal, group, or public access to objects accessed through Internet technology. Personal SIoT might comprise several objects that (only) a single individual accesses and controls. One possible implementation of a personal SIoT network could be related to health and fitness. Having IoT objects that monitor workouts, sleeping habits, and vitals that share information with each other could create many benefits for users concerned about their well-being. IoT monitoring may also be linked to nutrition information and an IoT inventory system of grocery items in the home to make sure the user has what they need for a balanced and healthy lifestyle.

The group SIoT might have intelligent objects that individuals could access based on a controller's providing permission. In this scenario, one permits or does not permit objects to communicate with each other and users to access the objects. Each user interacts with the objects as these objects exchange information with each other to understand the group usage, habits, or gather other information that would be beneficial to the group. One could expand the previous of health and fitness example to a group of individuals that are part of a fitness club. Each user could have their own IoT-enabled objects that monitor their progress and performance as they exercise. They could share this information with other users and objects in the group to create more effective workouts based on performance increases made based on other users' efficiency. As more users obtain permission to join the network, the network collects and analyzes more data to benefit all users involved.

The third SIoT network might include publically available networks where users and their objects connect publically to other users or objects to share information. One would consider such a network as open access in that anybody could join just by opting into the network. One possible implementation of a public SIoT network would be public transportation systems. As cars continues to increase in Internet connectivity and GPS becomes standardized, one could link the objects to public networks that give real-time updates on traffic conditions. Connected cars could have their speed and location transmitted to the network, which could provide information to other drivers on the flow of traffic. If a road that a person commonly takes to work shows that cars driving on that road are either stopped or driving slower than normal speeds, the user's GPS could recognize this disruption and update the directions to help the user avoid these conditions. Such a system would allow drivers to avoid construction zones and accidents, which would not only help individual drivers but also help emergency vehicles get to the incident scene much faster.

As we can see, unifying technologies provides many capabilities and several benefits that one can realize from the individual, group, or societal perspectives. While we need to do much work to continue integrating these technologies, the possibilities present many exciting opportunities and challenges for both practitioners and researchers alike.

5 Opportunities and Challenge

As technology continues to advance, challenges and opportunities that affect both academics and practitioners arise. Many digital natives, who have grown up with technology and come to rely on it, fuel the desire for continued connectivity. While some digital immigrants view these new technologies as disruptive technologies, many digital natives view them as everyday tools. In other words, the younger generation is leading the way in adopting and using new technologies, which has further fueled the development of technologies such as IoT. A more appropriate term for the generation of youth known as digital natives would be generation “I” or “iGeneration”. The panel moderator, Dr. Aaron French , concluded the discussion by describing opportunities and challenges as they pertain to characteristics among various demographics and how different generations view and use technology. All presenters then contributed to a discussion that included questions and answers about the theoretical and practical implications of the topics discussed.

Table 2 depicts generational differences of people over the past half century. Many of the characteristics identified for baby boomers, generation X, and generation Y come from reports that experts on generational differences have conducted (Cheyney, 2014; Lancaster & Stillman, 2002). While most resources group individuals born between 1981 and 2006 as Generation Y or Millennials, the commercialization of the Internet in the mid-1990s subdivided this group between those born before 1990 and those born after. Those born after 1990 have grown up with the Internet and never known life without it. One could classify this group could as the *true* Internet generation. This generation wants instantaneous information and are resourceful when it comes to finding it using Internet technology. The primary communication methods include texting and social networking, and many generation I individuals focus on exposure, which refers to the number of people that read, repost, like, or comment on their social networking content. Lines between work and home are increasingly blurring as organizations continue to implement bring-your-own-device (BYOD) policies to cater to generation I’s desires. Just going to work and earning a living is no longer the priority as the younger generation seeks more meaningful work with a purpose. This generation acquires news and information through Internet technology and social media rather than traditional sources. One can summarize generation I as requiring instant connectivity and having resourcefulness.

Organizations and universities alike must be equipped to respond to the changing environment with constant connectivity and instantly available information. With generation I living their lives through the Internet, big data will continuously grow with large amounts of information about consumers being available that organizations never imagined having access to in the past. The combination of IoT, ubiquitous technologies, and big data mixed with generation I’s characteristics has resulted in an unlimited amount of answers waiting for one to ask the right questions. Due to the growth of ubiquitous technologies, we have shifted from a digital divide to a generational divide. While previous generations see these technologies as a luxury and some view it as unnecessary or disruptive, younger generations are growing up with the view that increased connectivity is a requirement. Overcoming the challenges of the generational divide will undoubtedly create unlimited opportunities for innovations in IoT as we progress towards 5G technology.

Table 2. Generational Differences

	Baby boomers	**Gen X**	**Gen Y**	**Gen I**
Born	1946-1964	1965-1980	1981-1989	< 1990
Work ethic/style	Hard work Respect authority Effectiveness	Self-reliant Desire structure Skeptical	Multitasking Goal oriented Efficiency	Internet search Resourceful Immediate
Communication methods	In person	Direct Immediate	Memo Email	Texting Social networking
Work and Home	Separate Work to live	Structure 9-5	Balance Flexible	Integrated Meaningful work
Values	Success	Time	Individuality	Exposure
News source	News Newspaper	Newspaper Gossip	Gossip Internet	Internet Social Media

The most obvious opportunities from an organizational perspective is the continued development of an all-inclusive digital dossier for each individual customer. To put it another way, someone, somewhere has a full understanding of how we live (i.e., through predictive analytics). One can view individuals as data generators because digital devices continuously collect data on them (Newell & Marabelli, 2015). Next, predictive analytics will transition to preordained analytics. Since firms can figure out consumers' past behaviors, proactive firms can offer goods and services to individuals based on behaviors and then reinforce those same behaviors. In this situation, firms no longer predict but reinforce and preordain consumers' behavior patterns. While there are unlimited possibilities over the horizon, various issues will likely arise.

The continued development of IoT-enabled objects poses various challenges in regards to privacy and security. IoT will become an integral part of individuals' lives by connecting them to everything in various ways. The data would record everything we write, what we see, things we do, and places we visit. Anyone who connects to the Internet via device(s) would be identifiable and pinpointed inside a massive cloud of data. This point raises issues associated with privacy and security with ethical concerns related to the use of this data (Newell & Marabelli, 2015).

5.1 Academic Implications

The IoT, mobile technology's growth, and big data all have significant implications for academia. The past several years have seen a growth of research on big data but much remains. Emerging research areas will continue revolve around IoT and ubiquitous computing. These technologies continue to create new sources of data that one can collect and analyze at the individual level. We need to develop artifacts and methodologies to understand and analyze this data. We need to revisit theories that researchers once studied at an aggregate level and generalized for groups and understand them at an individual level to create a strong understanding of their generalizability.

Another area of research that will become increasingly important is the need for qualitative research to evaluate the unstructured nature of the data being generated. Due to the limitations of quantitative methods when evaluating unstructured data, mixed-methods research will become vital to research when evaluating future trends of technology and the produced data. These limitations will require researchers with a higher level of methodological skills and skill in various methods. New technologies and the need for new methodologies not only affects the research we conduct but also how we train future researchers in doctoral programs. We will need to bridge the methodological divide between qualitative and quantitative research through statistical courses that focus on how to combine multiple methods for theoretical development. As the sophistication of methodological implementation in research increases, the need for collaborative efforts will also increase. As such, we will need to revisit many pre-existing theories using these mixed methods.

For instance, historically, technology adoption has included constructs that evaluate voluntariness and usefulness. However, the lines between hedonic and utilitarian use of technology becomes blurred as people adopt these new devices that replace traditional utilitarian objects because of their hedonic value and convenience. Using many technologies has become a status symbol for some; others use or adopt technologies due to (potentially negative) social influence. The increased connectivity of all objects in our life also leads to a multitude of security and privacy concerns that will warrant a tremendous amount of research in this area. Topics concerning research on privacy and security may include awareness, information privacy, security risks, and ethics when handling personal information and how it should be used.

While the changing technologies have many academic implications in terms of research, they also have teaching implications. These innovative technologies provide new platforms for enhanced and interactive education with increased personalization. With the IS field revolving around technology, we should also revisit our teaching methods to create new ways of implementing these technologies to provide additional value to our students and institutions. The IS field should be pioneers and leaders in terms of technology use and application. As leaders, researchers can provide an applied learning environment preparing students for successful careers and making IS professors leaders in academia.

5.2 Practitioner Implications

Innovative technologies have many implications for practitioners in terms of operating a business, creating new ventures, providing customer service, and more. As we move towards 5G service, the possibilities of creating truly ubiquitous organizations becomes much more of a reality. The technology already exists for creating paperless offices that are ubiquitous, but having mobile technology using data rates that exceed broadband speeds would provide constant and instant connectivity and increase the flow of data. Real-time operations could exist ubiquitously because all processes and business objects become Internet enabled. Companies could easily expand globally without significant capital investments. IoT technology's implementation in everyday objects provides unlimited possibilities to create new industries for products and services and expand existing industries. While some organizations view 5G service and IoT as disruptive technologies, others view them as innovative technologies that they can use to gain a competitive advantage. Companies such as Boeing have begun to extend their use of technology to create an IT ecosystem for constructing and operating commercial airplanes (Nolan, 2012).

While practitioners have many opportunities due to these innovative technologies, they should be aware of and learn how to overcome the many associated challenges. The most obvious challenge revolves around big data. Having Internet-enabled objects will significantly increase the amount of data that users generate, which will require expertise in data management and analytics to capture, store, organize, disseminate, and analyze. Data analytics will be a highly sought-after skill needed to manage and analyze the growing amounts of data. More data collection will also raise ethical issues about the types of information collected about users and how that data is used. While few legal issues have arose directly from the *amount* of data that organizations now collect, various ethical issues concerning how organizations use data have arose. One recommendation to handle both the legal and ethical issues would be to create an information recourses (IR) department responsible for information in the same vein human resources departments look after employees. The IR department would set the policies and manage how the organization collects, stores, and uses data. Organizations that learn to manage these emerging technologies and develop the skills to analyze the data will be the organizations that lead the path towards the future. While we discuss the academic and practitioner implications separately, both the research community and business are working towards common goals to increase our understanding of emerging technologies and further develop our capabilities with them.

6 Conclusion

As researchers, we need to continue working with industry leaders to understand the world's technological changes and lead the charge rather than report on what has happened and why. As we continue to grow towards 5G and increased connectivity, we are moving toward a ubiquitous world in which we are all connected to everybody and everything. The IoT provides unlimited possibilities and opportunities for academics and practitioners alike. Indeed, new technologies continually arise, and big data continues to create answers to questions that haven't been asked yet. As a result, we need an increased number of analysts to generate knowledge and theories from the data being produced. Although the future is uncertain, the path is being set as these various technologies converge providing the promise of exciting things to come.

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