1 Introduction

This Element deals with high velocity business strategies to accomplish high efficiency, accelerated, real-time, and faster-than-real-time business processes in order to achieve higher productivity to out-perform competition. It is important to note that high velocity business operations necessary for these strategies can only take place when a company's inputs from its suppliers and its outputs of products and services are fully digitized and exposed to wireless networks and access devices like handheld mobile smartphones and iPads. Real-time data acquisition and processing with high-speed communications with fast processors is essential.

High velocity business operations are accomplished by the combination of three fundamental technologies: 1. high-speed computing; 2. high-velocity and high-bandwidth networks such as fiber landline and 5G wireless with high connectivity between concerned objects (as by IoT); and 3. innovative formulation of business tasks. While items 1 and 2 are confined to computing and networking companies, item 3 is generic to several businesses. Therefore, we have emphasized item 3 more here.

High velocity business processes play a pivotal role for competitive advantage as a first mover and to radically transform a business for new opportunities (Spear, 2009; Steinberg, 2016). High velocity only assures initial instantaneous competitive advantage, but its second-and higher-order derivatives, such as higher accelerations, are more relevant for accomplishing dominant position in the business field. A deer's initial high speed can be easily surpassed by a tiger with lower initial velocity but higher later acceleration. Therefore, higher-order derivatives of velocity, like acceleration, are more important than original high velocity.

It is important to note that a single business operation or transaction will trigger many multiples of suboperations, transactions and tasks that also must be performed at high velocities with relevant coordination and context. A simple operation of addressing a customer order will trigger customer payment processes, inventory lookup, shipping and the like, which involve many internal and external organizational suboperations. Similarly, a business industrial operation can trigger several suboperations of manufacturing and assembling processes and events that require coordination with multiple parties of supplier chains and internal departments.

The current way of conducting many business operations is based on PCs as workhorses and back-end servers of large computer groups. They are expensive, tedious and location dependent. A high velocity business enterprise migrates such operations to simple mobile smartphone devices and cloud computing, as

we will discuss further in this Element. The emerging standards and technologies of Internet of Things (IoT), 5G, AI (Kapoor, 2019; Pathak and Bhandari, 2018) and data analytics are stimulating numerous applications, like autonomous vehicles, remote factory control with robots, sensors and actuators, and increasing the velocity of business operations by several orders of magnitude.

High velocity operations depend on wireless mobility and mobile moment's interactions with stakeholders. This is an exciting field and this Element deals with how to transform any business through high-speed mobility with wireless devices and platforms to a new level currently not achieved. It provides new vision and insights based on the fundamental concepts of mobility and platforms in order to achieve improvements in cost reductions, higher speeds of conducting business through real-time business processes and many faster-than-real-time business processes. It deals with all aspects of enterprise mobility and associated mobile platforms as applicable to modern enterprises and businesses wishing to exploit the new digital world.

1.1 Importance of Mobile Devices

Today's greatest challenge is to attain more value, efficiency and speed in conducting a business with inexpensive and commoditized devices like smartphones rather than the current PC-based business processes. Electronic mobility is the essential enabler to accomplish it. This Element addresses this challenge and provides several examples.

Business success and prosperity depends on the ability to formulate and incorporate many high velocity business operations throughout the physical and networked working space of the enterprise. Our material relationships to the current world are through our senses and knowledge acquired by probing our surroundings with vital networks of knowledge generated, transacted and exchanged instantaneously, anywhere and at any time. Smartphone wireless networks are effective ways to utilize a variety of sensors and their associated activators. They enable us to provide actionable cyber spaces with sensor swarms and sensor-actuator networks, where we can work and allow us to manipulate objects at remote places on the globe with high speed and velocity.

Far more important is our ability to collect and use pertinent data from a variety of sources that must be universally distributed and instantly accessible for everyday business operations by our human senses as well as with superhuman smartphone sensors. Therefore, smartphones play a vital role in many businesses, augmenting our real world with measured observations, information and knowledge.

We are now at the turning point in our human development where we are migrating from the mere cyberspace of knowledge to an action-based, sensor-networked world with the aid of smartphones. Our individual and business success depends on our ability to navigate the digital world's knowledge space and, more importantly, using appropriate sensors and manipulating the physical world with the help of the knowledge space, to desired outcomes. We have just conquered the knowledge space of the physical world with the aid of the Internet and Web-browsing processes. The unfinished task before us is now to autonomously sense and manipulate the physical world through the knowledge space we have already acquired. Smartphones with their sensors and processing elements are the powerful tools to accomplish this mission through their precise measurements and observations.

1.2 New Nomads: Global Itinerant Immigrants

We have now become new nomads to seek and perform work at any place on earth. The more we can easily and remote-autonomously manipulate the physical world through intelligent spaces of embedded and external smartphone sensors with their rapid response, the more we will be assured success in today's hypercompetitive environment. It is also important that our material relationships to the physical world are maintained through a well-connected and logical infrastructure of institutions and organizations like business corporations, governmental, semi-governmental, welfare, educational and training institutions, and social networks for which smartphones provide ample applications and services. These well-connected resources play a vital role in performing high velocity business operations.

The interconnection of smartphones and sensors with computers and storage systems over the Internet will continue to expand the digitized cyberworld with the sensor-digitized physical world for action-oriented remote and autonomous manipulation of our surroundings and the globe at large. Virtualization and contextualization play a vital role in such a sensor-actualized physical world. The fusion of sensed information, communications, informatics, the Internet and cloud computing are the inevitable consequences of the commercialization and monetization of advanced high velocity operations of smartphone apps. New patterns of remote and autonomous manipulation of our physical world through the cyberspace world have important consequences on our civilization and they must be regulated and performed in cooperation with many persons and organizations with vested interests. Governments, corporations and individuals are soon facing socio-economic and cultural choices in this endeavor. The

future is predicated on our willingness to shape the sensor-actuated digital world with the knowledge-based world and develop them both for mutual advantages to all of us.

1.3 Disembodied Devices: Disrupting Established Industries

A smartphone can create multiple virtual devices (Somayaji et al., 2014) through mobile virtualization schemes within itself, like personal computers, television, tablets, multiple smartphone device configurations and the like. These virtual devices can act as actual physical devices, although they are disembodied and exist in a virtual space of a smartphone screen. The smartphone is thus a multiple virtual device capable of replacing actual physical devices as envisioned. It thus has power to disrupt established industries like PC, TV, laptop and wireless handset manufacturers with major economic and business impacts. Although such disruption is beneficial to consumers, it will have negative effects on the established incumbents.

We are now at the beginning of constructing actionable cyberspaces where we can measure any pertinent attributes of corresponding physical spaces on this planet by sensor swarms and webs and act autonomously to manipulate these physical spaces as per our desires. We are essentially de-territorializing the physical space through actionable cyberspace where actions in cyberspace are conveyed to corresponding physical space actions. This actionable cyberspace is making all of us as immigrants in this world where we can work and act in any place we choose, with no territorial jurisdictions and geographic boundaries. We can catalog people, process delocalized streams of data and anonymously exercise power over people and their surroundings with incalculable consequences. We can use that power for the benefit of our businesses to offer many people high velocity services such as providing health and welfare services, emergency services, precision agricultural services, and many other internal and external business services. How will we build and implement such actionable cyberspace? We must consider its de-territorialization effects by considering protection of proprietary property rights, personal rights and privacy considerations with the following attributes:

- It must be an instrument to promote the development of human services to accommodate health and welfare, emergency and danger prevention with alerts and proper physical actions, education and training, leisure and entertainment services, shopping transactions and banking services, and the like.
- It must accommodate diversity and integrate various services geared towards individuals rather than to masses of people as in mass media.

- It must be able to make use of the large streams of data flowing across networks, and their accumulated knowledge and messages to exploit the collective knowledge of humans.
- It must be able to operate remotely, autonomously and in real-time to manipulate physical spaces as well as personal spaces like human bodies, animal bodies, and various industrial and agricultural machinery and associated processes.

Implementation and use of such a actionable cyberspace system will have two major effects on our work and culture:

1. It will blur the differences between designers, producers, implementers, creators, authors and users, each helping to sustain the activity of others by dissolving their identities.
2. Information, messages, sensor observation of things and places, sensor data and action-oriented commands are all geared toward individual businesses. Representation is now subject to sampling, combining, reusing and modifying actionable messages as per the context, either programmatically and autonomously or manually, which will greatly diminish human efforts to attain high velocity specified results.

Wireless mobility is essentially electronic mobility at the speed of light. It offers enormous benefits to businesses and enterprises. It compresses time several fold, resulting in high velocity business operations and at the same time expanding the geographical reach of business enormously all over the world. Importantly, it enables real-time business processes and many proactive faster-than-real-time business processes. Faster-than-real-time business operations and processes require predictive analytics with prescriptive analytics requiring real-time data and frequently high-speed streaming data inputs. Even simple anticipatory process models with high-speed-streaming data provide powerful faster-than real-time operations to provide significant competitive advantages and new business opportunities that are not known in the current state of the art.

Furthermore, wireless mobility provides attractive new ways of offering business services like mobile control of machinery, mobile banking, mobile insurance services, mobile healthcare services and the like by employing rich sensors available on mobile smartphone devices. The fundamental building blocks of such a mobile business enterprise are mobile platforms, wireless devices like smartphones and mobile apps.

Wireless business constituents are wireless devices like smartphones, wireless and wired networks, smartphone apps and their associated platforms.

Smartphone platforms and enterprise mobile forms are the essential pillars on which wireless mobile enterprise stands.

Speed is essential to survive and thrive for any business. In nature, a fast-acting predator can get its meal and similarly, fast-acting prey can escape the danger. In business, speed also wins. Fast-acting businesses have enormous advantages over their competitors.

High velocity business processes significantly increase the value of any business. Business success depends on quick response to changing customer desires, the rapidly changing marketplace and competition. Electronic mobility offers such fast response to the needs of all stakeholders of the business.

The DNA of mobile business is **D**evices, **N**etwork and **A**pps. The technologies of Devices of smartphones and tablets, Networks of 4G, 5G and other advanced mobile networks and Apps of the smartphones have advanced by leaps and bounds, and they offer huge opportunities to any business to take advantage of high-speed electronic mobility.

Electronic mobility with smartphones and other wireless devices provides a business with not only high-speed but also rich-sensor capabilities to contextualize many business processes through predictive modeling and anticipatory actions to conduct many business processes faster than real-time. It provides not only high efficiency, but also intelligent business processes to conduct new effective and faster ways to out-compete and out-do the established incumbents. Several new businesses have already blossomed – Instagram, Pinterest, Facebook, Airbnb and Uber – based on smartphones and electronic mobility.

Electronic mobility has already captured every aspect of our life from how we transact with businesses to how we communicate with each other to how we educate and entertain. Electronic mobility enables high-speed business processes and transactions with extended reach and with more efficiency to all stakeholders, such as workers, customers, partners and suppliers. It offers high compression of time and space, resulting in orders-of-magnitude business efficiencies.

Electronic mobility provides deeper insights into all business operations with contextual sensor data analysis and fusion, as provided by smartphones. It enables the business to realize the following examples through deeper insights and big data analytics for better decisions:

- Faster-than-real-time business operations by making use of predictive modeling and anticipatory determination of business tasks with contextual situation analysis based on processing of high-speed streaming data in real-time and from other data sources.

- Perpetual customer engagement at a fraction of the cost for superior customer relations.
- 24-hour, 365-day monitoring and acting on many mission-critical tasks; for example, when attending patients with critical illnesses and taking care of other patients with insignificant costs and expenditures due to wearable wireless sensors.

Current mobile platforms are primarily built upon smartphone operating systems. These mobile platforms are well matured for individual consumer applications, but their applications to business and enterprise are still evolving. Businesses that have mastered best utilizing the electronic high mobility – like Uber, WhatsApp, Facebook, Amazon, Google and some others – have radically transformed the traditional industry landscape. Thus, this Element focuses on business and enterprise applications based on mobile platforms.

Just as the Internet and the Web changed our world and business, electronic mobility is changing our lives and work. Mobility at electronic speeds plays a crucial role in every aspect of business and in all categories of businesses. It invariably brings immense business transformations that are often disruptive, as in the case of recent entrants like Uber, Airbnb, Facebook, Twitter, Instagram, Waze, Pinterest, Foursquare, Zynga and several more. For established enterprises and businesses, it offers unprecedented efficiencies, expansions and new ways of conducting business with superior competitive advantage.

The value of electronic mobility in any business increases exponentially by using multiple business applications and multiple sources of data, some in real-time and some in databases such as those available from government databases like census, weather, satellite, GPS and business stats and from several private sources like Google, Facebook, Twitter and Waze.

1.4 Disruptive Industry Changes with Multiple Apps and Multiple Databases

Many of the data sources referred to are not only free but they also provide real-time content. Because of the importance of such digital disruptive changes, we will deal these topics in detail later in the Element.

Even a single mobile business application is useful, but single application is very common and trivial. Businesses that quickly make use of mobility combined with myriad different data sources interacting with each other in on-line and off-line modes with smartphone users are truly disruptive and they reap benefits over others. Wireless sensor data, social networks, superior analytics, algorithms and cloud computing complement electronic mobility and, as such, they pave the way for radical breakthroughs in the marketplace. Such

applications result in nonlinear effects at many levels that are hard to understand. Thus, one of the objectives of this Element is to understand the impact of mobility applications and benefits in a more fundamental way.

Our business and enterprise environments have already undergone immense transformation triggered by smartphone electronic mobility which is like the previous Internet revolution. We are witnessing this transformation all around us. Everywhere in our daily lives – from how we transact with businesses, how we work and educate, and how we entertain – are things based on the smartphone. Mobile phones are now exceeding 8 billion, which is about the world population. The average person has a smart phone and looks at it in excess of 100 times per day, that is every 15 minutes or so for text messages, phone calls, emails, time and calendar services, and so on. Furthermore, the market for wireless wearables is growing exponentially each year, which is propelling electronic mobility to a new level.

The importance of work location is significantly reduced and even made irrelevant in many business processes. Mobility offers high flexibility and new forms of conducting work across organizational boundaries with new effective ways of collaborating with workers, customers and other stakeholders, as well as dealing with objects and machines.

2 Makeup of High Velocity Enterprise

Making a high velocity enterprise consists of introducing high velocity business operations with high mobility across all business tasks. The strategic aspects of high velocity enterprise are well covered in MIT professor Steven J. Spear's 2015 book. In this Element, we deal with how to formulate and achieve high velocity business operations that are essential to making a high velocity enterprise.

The smartphone has dominated enterprise and our lives with its built-in computing and communications capabilities along with its immense sensory powers, like cameras, GPS, accelerometer, altimeter, gyro, sound and other sensors, and its powerful multi-core computing capabilities. Its ease of use with natural user interfaces, wide availability at any place and at any time and affordable consumer price is driving its use in many enterprise business processes. We are beginning to witness the replacement of PCs with smartphones for many business and professional applications, potentially moving toward the high velocity real-time enterprise era where smartphones are ideal due to their immense sensors accessibility and their ability to offer virtual workspace and dashboards on the screen. The current workhorses of desktop and laptop PCs are becoming less relevant.

High velocity business operations in an enterprise have major benefits when high connectivity between data and processes takes place, as in these examples:

- When point-of-sale data is employed with manufacturing and stored warehouse data, the business can efficiently optimize its supply chain to increase sales and to provide world-class customer experience.
- A business can predict when its machinery or a piece of equipment might fail by spotting defects in production line, resulting in preventive actions with significant saving of expenses.
- A freight operation can reroute during busy congestion times, thus improving customer efficiency and savings.

Achieving similar benefits with up-to-date real-time information will become normal to the enterprise when proper mobile devices and platforms are employed as described in the succeeding sections of this Element.

2.1 Prevalent PC versus Smartphone

Mobile computing devices like smartphones are only slowly finding business applications and they have not yet replaced PCs and laptops in any significant way. PCs are still the workhorses of the business and enterprise and this situation may continue for few years. Soon, however, smartphones will start to replace PCs and laptops in a measurable way because of their wide availability, low cost, ease of operation and millions of apps that are already available on them. As an end user computing device, the smartphone has advantages over PC for work-related tasks, as shown in Table1.

As seen from Table 1, a smartphone provides many different user experiences far different and superior to those of the PC, making it a preferred work tool replacing the conventional PC desktop.

2.2 Work and Workplace Transformation

Electronic mobility has changed the prior legacy concepts of work and workplace. The concept of work as performed at a workplace generally located in a fixed geographic location of a business is becoming less relevant.

- Electronic mobility transforms work as a fluid and global collaborative item that can be performed at any place and at any time.
- It interacts with all business stakeholders – employees, employers, customers, suppliers, partners and others – in a continuous uninterrupted manner, thus providing better coordination and work efficiency as well as increased velocity.

Table 1 Conventional PC versus smartphone advantages

No.	Item	PC-Desktop /Laptop	Smartphone	Comparative impact
1	Access and availability	At a desk	Any place and time	Immensely better
2	Application programs available	Few hundred thousand with bulky codes	Millions of "apps" with light code	Order of magnitude more mobile apps versus PC applications
3	Mapping and selecting	Mouse and touchpad clicks	Natural gesture navigation	20 seconds versus 2 seconds
4	Data capture	Keyboard data entry	NFC, bar code and QR codes automatically captured	40 seconds versus sub-second
5	Capturing location, address and relevant environment details	Manual keyboard entry	GPS aided lookup, automatic and often real-time	Immensely superior
6	Image capture	Manual and tedious	Built-in camera	Immensely superior
7	Accelerometer for movement input	Not available	Built-in and automatic	Immensely superior
8	Various sensors data inputs like direction, temperature, pressure and the like	Not available	Automatic	Immensely superior

Increasing proliferation of electronic mobility in business is inevitable due to the following powerful drivers:

- Business efficiency and extending electronic mobility across time and space,
- Proliferation of inexpensive and free databases, like government census, health and income, and social network data, which aid in structuring new value-creation frameworks for superior business services,
- Global competition demanding fast services and responses,