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Tech Disruption

An Examination of Emerging Technologies That May Impact the Edmonton Metro Land Development Industry

A Research Document Prepared by the Urban Development Institute – Edmonton Region (UDI-ER)

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EXECUTIVE SUMMARY

Introduction

Tech Disruption: An Examination of Emerging Technologies That May Impact the Edmonton Metro Land Development Industry is a qualitative research report produced by the Urban Development Institute - Edmonton Region (UDI-ER). This document provides UDI-ER Members with a very brief high-level overview of some of the major emerging technological disruptions that are likely to have an impact on the land development industry.

Why Tech Disruption?

Disruption in technology occurs when technological advancements considerably change the nature of an industry by displacing the status quo. This disruption is not necessarily negative – but it does mean significant change.

Over the last few years, changes in technology have been significantly impacting various industries at an exponential rate and according to many experts, are likely to impact the land development industry as well. Therefore, in order to stay competitive, it is crucial for companies to examine the technological changes that are occurring and plan for the consequences that they may have.

Structure of the Report

The report provides an overview of the following six overarching technological changes: Autonomous Vehicles, Augmented Reality, Big Data Analytics, Construction Automation, The Future of Commercial & Industrial and Smart Cities. Each section provides a brief description of what the technological change is, why it is significant and finally, how it could impact the land development industry.

In reading this report, please note that this is by no means an exhaustive list of the number of new technological changes occurring. Furthermore, while the technological changes chosen have been separated into individual sections for the purpose of giving this report structure, most of these technological innovations overlap each other. As an example, smart cities operate largely by capitalizing on big data analytics.

Finally, UDI-ER is not taking a particular position on this research. Rather, we have compiled relevant information that is currently available. This document's purpose is to be a launching off point for any Members who may wish to look further into the topics discussed. Therefore, please note the bibliography/further reading section at the back, which provides a list of sources (including hyperlinks) for additional analysis.

Thank you for taking the time to read this report. We hope you find it beneficial.

1. AUTONOMOUS VEHICLES

1.1 What is it?

Fully Autonomous Vehicles (AVs) work by applying artificial intelligence to the navigation of vehicles, negating the need for human driving. There is a certain amount of automation in current vehicles today (e.g. automatic braking or blind spot warning systems), however, these are not considered *fully* autonomous. To help distinguish the level of autonomy in a vehicle, the automotive industry has developed a 5 level system of driving automation: from Level 1, which has some level of driver assistance (e.g. steering and acceleration/deceleration assistance), to Level 5, which is fully automated and where a human does none of the driving.[1] For the purpose of this report, fully autonomous vehicles (AVs) will refer to level 5.

1.2 Why is it significant?

In terms of timelines, there are competing opinions on when AVs will become commercially available. Experts are predicting anywhere from 10 – 50 years. A KPMG report predicts that Level 5 AVs will be commercially available by 2040.[2] Conversely, a J.D. Power report argues that the immense challenges of perfecting self-driving vehicles means they won't be happening anytime soon.[3] The report states that by 2034, only 10% of vehicles will be fully autonomous.[4]

1.3 How could it impact the industry?

1.3.1 Parking

One of the most significant impacts of AVs will be on parking – specifically, the anticipated decreased need for parking spaces (at least as existing in its current capacity). Some have predicted a decline of 50 per cent of parking demand over the next several decades.[5] If true, this would conceivably affect land prices by opening up a considerable amount of urban land, often in prime city center locations.[6]

1.3.2 Land Use Planning

AVs will likely change the way cities are designed but it is difficult to predict how at this point in time. Experts argue that AV's will impact the way we design buildings and curb space.[7] For example, as many AVs are likely to be electrically powered, a reduction in

[1] The PPSC Working Group. ***The Future of Automated Vehicles in Canada.*** Page 8.
[2] KPMG. ***2019 Autonomous Vehicles Readiness Index.***
[3] J.D. Power. ***Mobility Confidence Index.***
[4] Ibid.
[5] Nyren, R. ***Outlook for Technology in Real Estate: How are Technologies Changing the Real Estate Industry?*** Page 61.
[6] Martinez-Almeida, P. ***Beyond Prop Tech***. Page 12.
[7] Nyren, R. ***Outlook for Technology in Real Estate: How are Technologies Changing the Real Estate Industry?*** Page 61.

noise may ease current setback requirements, thereby increasing the availability of buildable land.[8] Additionally, AVs will ideally drive more efficiently, allowing for higher speeds and smaller leeways – creating a likely change in the design of roadways.[9]

Furthermore, many experts have questioned how AVs will impact where people choose to live in relation to city centres. Some have argued that the diminishing burden of physically driving along with the ability to perform other tasks while commuting may actually encourage people to live farther away from city centers, increasing the desirability of the suburbs.[10] Conversely, others contend that with the significant increase in AV ride-sharing, people may choose to stay closer to city centers.[11]

2. AUGMENTED REALITY

2.1 What is it?

Many people are somewhat familiar with Virtual Reality (VR), which can generally be defined as technology that acts a substitute for physical locations and creates a virtual world. Augmented Reality (AR) is in the same vein, technologically speaking; however, AR is different in that it superimposes visual information on top of real surroundings, often by utilizing a smart phone or tablet application.[12] Because AR utilizes picture overlays that appear when viewing a space in person, this technology can be used as a revolutionary marketing tool as it enables for full viewing and immersive experiences in yet-to-be-built projects.[13]

2.2 Why is it significant?

AR appears to be a rapidly emerging technology, which can potentially benefit a number of industries; Apple CEO Tim Cook has stated that this technology will have as big an influence as smartphones.[14] Other experts are predicting that AR will have a significant impact on marketing and cost savings within the real estate industry in general.

2.3 How could it impact the industry?

As a developer, it is conceivably a challenge to have prospective buyers visualize the end product. However, with this technology, a person may be able to view the end product in real life. In other words, this technology adds reality to something which seems otherwise intangible.[15]

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[8] Martinez-Almeida, P. ***Beyond Prop Tech***. Page 12.
[9] The PPSC Working Group. ***The Future of Automated Vehicles in Canada***. Page 22.
[10] Martinez-Almeida, P. ***Beyond Prop Tech.*** Page 17.
[11] The PPSC Working Group. ***The Future of Automated Vehicles in Canada.*** Page 22.
[12] Realtor Magazine. ***Augmented Reality: Real Estate's Next Disruptor?***
[13] Ibid.
[14] T4G. ***Augmented & Virtual Reality Is Set to Disrupt Real Estate.***
[15] Forbes Real Estate Council. ***Eight Ways Virtual and Augmented Reality Are Changing the Real Estate Industry.***

2.3.1 A marketing tool

AR technology is likely to be utilized as a marketing tool. For example, this technology can be used to stage a property at a fraction of the cost. Additionally, AR can be employed for virtual tours at various development sites, by enabling a virtual tour of a property from anywhere with a Wi-Fi connection.[16]

2.3.2 Preferred technology of the next generation of homebuyer

Experts are also predicting that AR technology could become very popular with the next generation of homebuyers (Generation Z). This group – the demographic immediately following millennials - are likely to view the home buying process as much more of a social activity. According to one expert, with AR technology, "Gen Z homebuyers can point smartphone cameras at a 'for sale' sign and instantly see the price, build date, and whether the house is [Internet of Things] enabled. They'll also be able to see if anyone has left any interesting comments about the property".[17] Therefore, AR technology is definitely an area to keep a close eye on moving forward.

3. BIG DATA

3.1 What is it?

Big Data can be defined as a "combination of an approach to informing decision making with analytical insight derived from data, and a set of enabling technologies that enable that insight to be economically derived from at times very large, diverse sources of data."[18]

3.2 Why is it significant?

Although still in its formative stages, multiple types of industries are beginning to amass vast amounts of real-time data from a variety of sources through cloud-based computing and utilizing it to make predictions of future trends and inform business strategy[19].

3.3 How could it impact the industry?

3.3.1 An Untapped Resource

Big Data enables developers to measure and value things that have not been available in the past. Large volumes of data - such as land records, realtor listings or other forms of user generated data - have barely been utilized by the industry to date.[20]

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[16] Seven Tablets. ***How Are Companies Using Augmented Reality in Real Estate.***
[17] Venture Beat. ***No more open houses? How AR will affect the real estate industry.***
[18] Canadian Urban Institute. ***Smart Planning our Smart Cities.*** via http://bigdata-madesimple.com/what-is-big-data-definitions-from-40-thought-leaders/.
[19] Kiger, Patrick J. ***The Developing Power of Big Data.***
[20] ScrapeHero. ***Big Data and the Future of the Real Estate Industry.***

3.3.2 Utilizing the Data

Modelling is applied to the latest economic, demographic and geographic data using big data analytics to remove human error when a property value is analyzed.[21] Detecting ideal zones or site selection through big data technologies can be utilized to choose optimal locations. For example, according to *the Urban Land Institute (ULI):*

> One criterion that has been difficult to understand is how well a proposed development would fit into a constellation of existing businesses. Traditional data sets can be outdated or lack geographic detail, only capturing how many businesses are in a [postal] code rather than on a given block. But better data abound: the amount of data about how people shop and do business is exploding through companies like Google and Yelp.[22]

Additionally, certain companies are beginning to utilize artificial intelligence to perform predictive analytics in 5 minutes, whereas previously it took from 3 to 6 months of careful work by experts.[23]

However, while the benefits to such a substantial amount of data seem endless, the true challenge for companies will be hiring the experts who are able to sift through and knowledgeably analyze the substantial amount of available information.[24]

4. CONSTRUCTION AUTOMATION

4.1. What is it?

Construction Automation is an overarching term to describe the automation, digitization and revolution of the construction process. This technological change is largely focused on two key factors: reducing the high cost of construction, by making up for labour shortages and significantly reducing waste, and increasing workplace safety.

4.2. Why is it significant?

While this technology is largely in the incubation phase, experts are predicting disruption is likely sooner rather than later as research and development in the sector increases. Therefore, experts are contending that companies involved in the construction process should being crafting strategies to take these innovations into account.

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[21] ScrapeHero. ***Big Data and the Future of the Real Estate Industry.***
[22] Nyren, R. ***Outlook for Technology in Real Estate: How are Technologies Changing the Real Estate Industry?*** Page 61.
[23] The Startup Magazine. ***How Big Data Has Transformed the Real Estate Industry.***
[24] Nyren, R. ***Outlook for Technology in Real Estate: How are Technologies Changing the Real Estate Industry?*** Page 62.

4.3 How could it impact the industry?

4.3.1. Prefabricated Home Construction

The automation of prefabricated home construction leverages existing infrastructure for transportation and warehousing. Prefabricated parts are constructed in a warehouse and then transported to construction sites – thereby reducing required labour and waste. Some experts argue that as this process increases economies of scale, it will drive down higher construction costs.[25]

4.3.2. Robotics

Recent innovations in robotics have been developing. This includes mechanical arms that automate highly repetitive tasks like bricklaying and tying rebar – often much more efficiently.[26] Although still in the formative stages, this technology is rapidly developing.

4.3.3. 3D Printing

3D printing technology is now being used for everything from rapid prototyping component manufactures and scale modelling, to the full-scale printing of house and bridge components. For example, the United State Marine Corps recently used 3D printers to print a pedestrian foot bridge.[27]

4.3.4. Unmanned Aerial Vehicles

Unmanned Aerial Vehicles (i.e. Drones) are now becoming increasingly common on construction sites. Drones are surveying vast areas of land within minutes, conducting inventory management, and undertaking inspections. This is reducing time, cost and the risk of safety issues.[28]

5. THE FUTURE OF COMMERCIAL AND INDUSTRIAL

5.1 What is it?

Although not a technological innovation in and of itself, recent technological changes are disrupting both the commercial and industrial sectors quite substantially.

5.2 Why is it significant?

These disruptions include multiple asset classes: workspaces, retail shopping centers, distributions centers and office and more.[29]

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[25] GenieBelt. ***Construction automation. What does it mean for the future of the industry?***
[26] TheB1M. ***9 Construction Tech Trends to Watch in 2019.***
[27] ESUB. ***How Automation in Construction is Reshaping the Construction Industry.***
[28] B1M. ***9 Construction Tech Trends to Watch in 2019.***
[29] Forbes Real Estate Council. ***Eight Ways Virtual and Augmented Reality Are Changing the Real Estate Industry.***

5.3 How could it impact the industry?

5.3.1 Commercial – retail

It should not be surprising for many to hear that brick and mortar retail is currently undergoing disruption due to the significant increase in e-commerce (i.e. online shopping) that has been occurring over recent years. Online retail sales in Canada grew by an estimated 30% in 2017 alone.[30] Globally, by 2021, e-retail sales are expected to surpass $600 billion (USD).[31] However, for certain items', shopping remains a largely social and experiential activity. Therefore, this is leading many retailers towards a hybrid approach of scaling down retail stores as showrooms while moving inventory and fulfillment online.[32]

5.3.2 Commercial - office

The traditional office space is largely moving towards shared or co-working spaces. This is largely being driven by the ability to work remotely, the start-up community, the preference of millennials, and the desire to drive down operational costs.[33]

5.3.3 Industrial

Conversely, largely due to the increase in e-commerce, demand for industrial space is increasing. According to *a BDO Canada report,*

> e-commerce is a key driver behind the growing need for clean, automated distribution centres that are accessible to major urban areas. With a growing demand for options like overnight shipping and same-day delivery, fulfillment and product availability are significant competitive differentiators for retailers. This is leading to a tighter industrial real estate market relative to downtown centres as companies push to meet customer expectations.[34]

This model of overnight shipping and same-day delivery (i.e. the Amazon model) is largely replacing the traditional retail model of maintaining product within a retail store. Therefore, many large retailers are moving towards making investments in this realm.

6. SMART CITIES

6.1 What is it?

A smart city is when you can derive data from everything that is connected and utilize it to improve the lives of, and improve communication between, citizens.[35] Some

[30] BDO Canada. ***Four Key Disruptors in Canadian Commercial Real Estate.***
[31] Forbes Real Estate Council. ***Eight Ways Virtual and Augmented Reality Are Changing the Real Estate Industry.***
[32] BDO Canada. ***Four Key Disruptors in Canadian Commercial Real Estate.***
[33] Ibid.
[34] Ibid.
[35] Tech Republic. ***Smart cities: A cheat sheet.***

examples of a smart city could include a smart meter that enables digital payments (i.e. smart parking) or analyzing real time traffic flows for the purpose of optimizing streetlights (i.e. smart traffic management).

6.1.1 The Internet of Things

The Internet of Things (I.O.T) is essentially a network of connected devices – such as vehicles, sensors or home appliances – that can substantially increase efficiencies by communicating and exchanging data.[36] Smart cities fall under the overarching world of I.O.T., with everything from streetlights to parking spots digitally connected.

6.2 Why is it significant?

According to a recent International Data Corporation (IDC) report, across the globe, smart city technology spending reached $80 billion in 2016, and is expected to grow to $135 billion by 2021.[37] Therefore, as experts are predicting the world to become more urban, with 60% of the population expected to live in cities by 2050, smart cities are more than a trend – they are the wave of the future.[38]

6.3 How could it impact the industry?

6.3.1 Smart Buildings

Legacy infrastructure and new buildings "can be retrofitted and new buildings constructed with sensors to not only provide real time space management and ensure public safety, but also to monitor the structural health of buildings."[39]

6.3.2 Smart Infrastructure

Sensors can detect leaks in water mains and other piping systems - thereby reducing costs and improving efficiencies.

6.3.3 Wireless Networks

Advanced wireless network infrastructure, such as 5G, will be essential for the development of Smart Cities. According to *a Tech Republic article,* Smart Cities,

> will involve advanced and low-latency applications that leverage big data analytics and real-time video and information sharing, enabled by symmetrical fiber or 5G wireless networks. Computing and storage at the edge, and fiber that goes deep into neighborhoods is critical to get cities to that point.[40]

[36] Tech Target. ***Internet of Things Agenda.***
[37] SmartCitiesWorld. ***Smart city enabling tech spending to reach $80bn.***
[38] Tech Republic. ***Smart cities: A cheat sheet.***
[39] Tech Target. ***Internet of Things Agenda.***
[40] Tech Republic. ***Smart cities: A cheat sheet.***

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The Urban Development Institute-Edmonton Region (UDI-ER) is a non-profit association representing the land development industry in Edmonton Metro. Recognizing that the development of land is an essential function of our economy, UDI-ER's activities and objectives focus on Building Communities Together by promoting wise, efficient and productive urban growth.

We welcome the opportunity to continue the dialogue and develop innovative solutions to preserve affordability.

Let's continue the conversation.

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