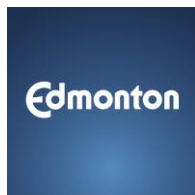


LINK.EDM: Redefining engagement

Integrated Services Centre Project

City of Edmonton

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## EXECUTIVE SUMMARY

Using kiosks for service delivery may feel like a step back to 1999, but good kiosk design can bridge gaps in Customer Service Channels and increase citizen engagement. LinkNYC provides an excellent example of good kiosk design that provides excellent customer service.

For kiosks to be truly effective, a full cost accounting of the project (which includes realistic strategy plans, good communication between partnering agencies, and ‘back-end’ support including monitoring) is important. Moreover, there are several Edmonton-specific requirements for kiosk projects. These specific requirements include items like:

- Similar user experiences designed as an ‘application,’ across the various kiosks presently in the city,
- Using existing kiosks to capacity and their haptics and capability can withstand Edmonton’s weather, and
- Kiosks are web-enabled to access Edmonton.ca, the City’s primary service channel

These specific conditions should be integrated into an overall Customer Service Strategy that outlines City of Edmonton customer service strategies across all departments, instead of the several Branch oriented customer service strategies that currently exist.

## LINK.EDM: REDEFINING ENGAGEMENT

### INTRODUCTION

In 2010, Castro, Atkinson, and Ezell advocated, “governments should... help create a climate conducive to [the] expansion of self-service technologies. This [statement] means that government should support the development and deployment of technologies that enable self-service, like broadband, electronic IDs, and mobile payment systems.”<sup>1</sup> An integral part of these systems can be a robust kiosk setup. As well, as part of an overall channel strategy (where customers or citizens are presented with several options for contact i.e.: in person, web access, mail, smart technology, and kiosks), kiosks can address gaps that exist between various elements of government service.

These gaps may either be actual (i.e.: between web/mobile citizens and non-web/mobile citizens) or perceived (i.e.: a lack of citizen awareness of the options available). The gaps also point to sensitivities around social justice issues, demographic preferences, poorly planned service channels, as well as transition points between one technology and another. Consequently, whether it is a “ruggedized display structure”<sup>2</sup> as part of a Smart City, e-government platform or dedicated kiosks at a recreation centre, advances in technology allow kiosks to perform functions that are limited only by funding, imagination, and user uptake.

For this report, e-government “refers to [the] government’s effort to enhance access to and delivery of government information and service to citizens, business partners, employees, and governmental entities through information technologies, particularly Web-based Internet applications.”<sup>3</sup> E-Government comprises part of an overall Smart City, a concept defined as an “ecologically healthy city using advanced technologies and having economically productive and ecologically efficient industries, a systematically responsible and socially harmonious culture, and a physically aesthetic and functionally vivid landscape.”<sup>4</sup> In short, a Smart City integrates all its various resources and services to provide them seamlessly to its citizenry. By creating

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<sup>1</sup> Castro, D., Atkinson, R., & Ezell, S. (2010). *Embracing the self-service economy*. Information Technology and Innovation Foundation. P 9.

<sup>2</sup> *Civiq Smartscapes* Retrieved from: <http://civiqsmartscapes.com/company>

<sup>3</sup> Anna Ya Ni, & Alfred Tat-Kei Ho. (2005). Challenges in e-government development: Lessons from two information kiosk projects. *Government Information Quarterly*, 22. P 59.

<sup>4</sup> Yigitcanlar, T., & Lee, S. H. (2014). Korean ubiquitous-eco-city: A smart-sustainable urban form or a branding hoax? *Technological Forecasting and Social Change*, 89. P 100.

opportunities for innovative Open Data projects that can be mined by the public, Smart Cities increase citizen engagement, which in turn increases the functionality of a city. In this manner, citizens are encouraged and enabled to directly affect the daily experience of their city.

Note that the review of kiosk use in other municipalities was very challenging, since cities are making daily customer service decisions, managing their customer service strategies and determining if and where kiosks might fit in that scheme. Additionally, cities may define and use kiosks, other web-oriented technology, or any combination thereof in many, varied ways, making it harder to discern use. Professor Ken Kernaghan's (2012) report "*Anywhere, anytime, any device: Innovations in public sector self-service delivery*" and Jennifer Bernardi's (2000) "*Review of international one-stop access initiatives*" were instrumental as environmental scans in the creation of this report. This report proceeds from the bibliographies of Kernaghan and Bernardi's reports both of which provided comprehensive, albeit dated, overviews of kiosks and service processes across Canada.

## METHODOLOGY

A review of journals, books, websites, and references regarding kiosks started in May 2016. Overall, 398 documents and resources were pulled from the Internet, the University of Alberta library databases and other City documentation. This number includes government documents and other industry-specific white papers. There are an additional 101 websites included in the bibliography. Another data source is interviews with stakeholders from various City of Edmonton departments, including: Recreation Facilities, Sustainable Development, Information Technology, E-Services, Citizen Engagement, and Call Centre Operations. Key search terms included: self-service, kiosk, and e-government.

A closer assessment of the collected articles resulted in culling 193 articles or books from the total number documents:

- 110 articles from scholarly journals because they were not relevant or were too generic to the scope of this report;
- 59 articles on Smart Cities that discuss Smart City initiatives either 1) more philosophically or 2) substantially different than the scope of this project, and

- 24 articles that are too dated to be of use to this project

The remaining articles and grey literature sources form the basis of this report.

### Project Scope

The intent of this report is explore options for creating a responsive, technology-based system for the Integrated Front Counter that takes advantage of the City of Edmonton (COE)'s Open Data and Innovation and Continuous Improvement Initiatives. The Integrated Front Counter wishes to use kiosks to connect citizens to and highlight the City of Edmonton's web services. Consequently, the report:

- Identifies *innovations in service channels* and how to gather those ideas on an ongoing basis, based on current trends. These trends would align with both the COEs service plan and citizen expectations.
- Examines the potential for kiosk use to increase the “*Open City*” initiatives and recommend the types of open data that might be of interest to citizens. Data of potential use to citizens include property, licensing, and festival and event requirements. This Open City initiative “strives to transform the City of Edmonton into a more transparent, open and accessible organization; connected to the public and responsive to their vision for government.”<sup>5</sup>
- Investigates options for the self-service channel that are supportive and flexible for citizens. These options are based not only on the COEs *requirements for the Integrated Front Counter (IFC)* project but also may offer the potential to create multiple IFCs across the city. At each of these IFCs, citizens would have the option to start or complete transactions including: ticket payments, library and licensing services, status checks for requests, recreation registrations, online crime reporting, abandoned well searches, appointment scheduling for Integrated Service Centre services, investigation of development plans for a neighborhood, and confirmation of Alberta government regulations and requirements.

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<sup>5</sup> City of Edmonton. .. Open city. Retrieved from:  
[http://www.edmonton.ca/city\\_government/initiatives\\_innovation/open-city.aspx](http://www.edmonton.ca/city_government/initiatives_innovation/open-city.aspx)

- Recognizes the *environmental requirements, work processes and current challenges* of creating a robust Customer Service channel strategy across diverse departments. Note: existing work processes, including the COE's choice of Edmonton.ca as the main service strategy, drives these environmental requirements. The report also identifies various COE regulations, policies, and directives dealing with safety, security, and data protection. Notably, the report deals with current Payment Card Industry. (PCI) Standards Compliance and finally,
- Investigates *self-service options issues and lessons within the City and other municipalities*, which are recognized as best in class service. The report recommends user-oriented, design-centred guidelines,

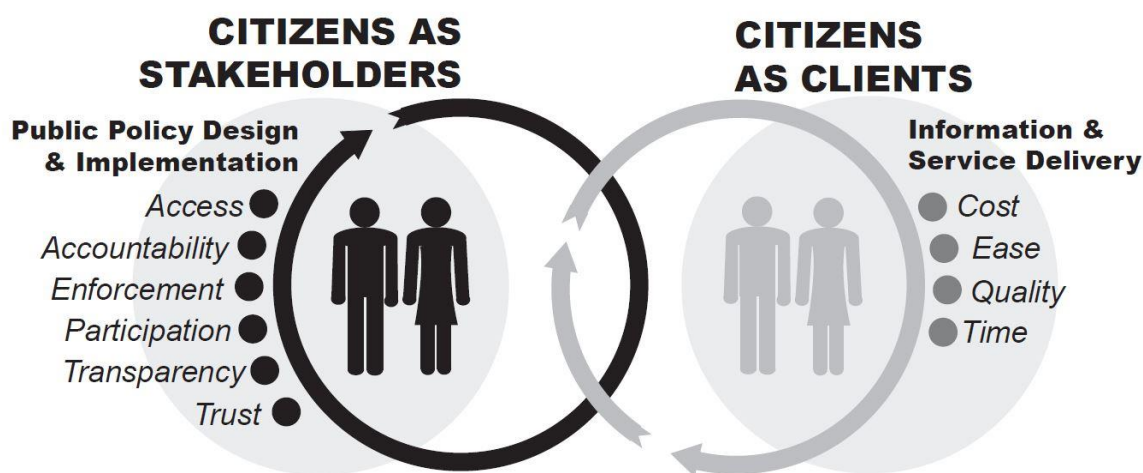
Finally, the report forwards the sustainability goals of the COE by way of ensuring integrating fiscal responsibility, engaged citizenry, common platforms and processes. In many ways, the COE's sustainability goals align with the United Nations' Sustainability Goal Number 11, which addresses issues around making cities "inclusive, safe, resilient and sustainable."<sup>6</sup> These two sustainability goals could feature an integrated, open, Smart City where citizens engage with the municipality to create change, and uses Zambrano's (2008) definition of citizens whereby they are both stakeholders and clients when considering or developing electronic government initiatives, including kiosks.<sup>7</sup> The duality of the citizenry is part of the complexity around designing end user systems that kiosk initiatives must address.

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<sup>6</sup> Sustainability Goal 11, retrieved from: <http://www.un.org/sustainabledevelopment/cities/> states that by 2030, cities should, amongst other things, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management; provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities; support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning; substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.

<sup>7</sup> Raul Zambrano. (2008). E-Governance and development: Service delivery to empower the poor. *International Journal of Electronic Government Research*. 4(2). P 492

## Dual Role of Citizens in e-governance



**Figure 1: Zambrano's Dual role of Citizens**

Zambrano's diagram (above) clearly outlines the various roles citizens perform for governments. Although the "citizen as client" desires cost-effective, easy, quality and timely transactions, the "citizen as stakeholder" relies on the government to be accessible, accountable, participatory, transparent, and trustworthy. Moreover, the "citizen as stakeholder" relies on the government to enforce rules and regulations in an unbiased manner. Regardless, it is important to remember, as Kotamraju and van der Geest point out:

Regulations are often archaic, historical conditions and contexts remain relevant to present-day situations, and dense texts in official, non-accessible language cannot simply be rewritten because of their legal or administrative status. Governments cannot pick and choose which content to make available on a website; they need to make it all available and in ways that pass legal scrutiny, which, of course, as we found, created information overload for service users...E-government websites...need to design for even the most rare exceptions, rather than focusing solely on the majority of the population. The availability of services in different languages and to people with visual impairments, for example, is one obvious consequence of governments' need to include their entire population.<sup>8</sup>

<sup>8</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services, *Behaviour & Information Technology*, 31(3). P 269.



Where a commercial kiosk has no obligation to provide outdated information to its clientele, according to Kotamraju and van der Geest, a government must. These considerations require governments to be “intentionally blind to users’ actual needs and demands and put their own needs explicitly and unwaveringly in front of those of their users.”<sup>9</sup> Governments govern all, not specific minorities or majorities, therefore the systems in place must be able to address each end of the citizen spectrum. Moreover, governments require a:

Serious, long-term committed relationships with their citizens and inhabitants, whom they like to see as active participants in a transparent public administration. Users, on the other hand, particularly when they are in information-seeking mode, want a quick foray into e-government. [Additionally] Governments, as part of their function to preserve public order, have high incentives to build long-term, cradle-to-grave relationships with their citizens. Part of governments’ role in society is to keep records about their citizens and, in particular, about governmental interactions with their citizens.<sup>10</sup>

Kotamraju and van der Geest emphasize that not only do people want accurate information from their government institutions, but also they want it just up to the point of identification. This complicating factor is because citizens may be “seeking information or services that have serious consequences on their lives [such as] remaining within the law by paying taxes but also seeking to minimise their personal tax burden.”<sup>11</sup> Consequently, with an overarching kiosk strategy, the prospect of engaging citizens and successfully integrating kiosks into other departments and initiatives becomes higher.

### *Innovations in Service Channels*

As mentioned, a channel is a method through which a customer can access the company and include telephones, mail, in-person visits, kiosks, smartphone technologies, and web applications. There is also the potential that a person may initiate his or her experience with the company in one channel, (perhaps on-line), and conclude the same task related to that experience in a different channel (perhaps in-person), etc. The multiplicity of channel options presents a challenge to service providers since tracking transactions initiated in one channel but completed in another channel becomes vital, regardless of the initiating and concluding channels chosen.

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<sup>9</sup> Ibid. P 270.

<sup>10</sup> Ibid. P 271.

<sup>11</sup> Ibid.

Kiosks today *can* provide innovation to service channels. However, when discussing kiosks, it is important to consider their position as part of an overall customer service and channel strategy model. Kernaghan (2000) recommends municipalities tailor these types of strategies to meet the needs of citizens in one of three ways:

1. Life events: registration of birth, schools, and jobs.
2. General topic headings: services grouped into topics like business, government, citizens, and education.
3. Demographics: categories of services slated for workers, seniors, and children. These categories are often used with general topic headings.<sup>12</sup>

Kernaghan believes aligning business in one of these three ways provides comprehensive access for citizens for several reasons. First, the front-facing service is seamless. Second, these channel strategies provide comprehensive services, in social, technological, geographic and demographic terms. Third, the strategies provide for multiple channels with the same service levels throughout them all. This method of service delivery would integrate well with web-enabled kiosk systems.

Kotamraju and van der Geest (2012) write of melding Customer Service and Channel strategies that would be of use for the Dutch government. Instead of a “single comprehensive overview of the process of moving to the Netherlands to live and work, the Dutch government provides several websites that offer access to the particular services or touch points required in this transactional journey.”<sup>13</sup> Kotamraju and van der Geest’s point is apt: confusing and challenging processes can make for confusing and challenging, as well as possibly failed, interactions. Ya Ni and Tat-Kei Ho (2005), writing about the challenges governments have installing kiosks, acknowledge the “significant managerial and policy challenges in these kiosk projects, which often result in project failures and underestimated financial burdens for government agencies.”<sup>14</sup> Overcoming managerial and policy issues including incomplete, truncated or out-dated Customer Service and Channel Strategies becomes paramount for the municipality contemplating kiosk use.

However, although several departments have independent Customer Service Strategies, there is no *overall* COE Customer Service Strategy for its citizens. Instead, the Customer

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<sup>12</sup> Ken Kernaghan. (2000). *Bricks, Clicks and Calls: Clustering services for citizen-centred delivery*. Retrieved from: Institute of Public Administration of Canada [www.iccs-isac.org/en/pubs/kk.ppt](http://www.iccs-isac.org/en/pubs/kk.ppt)

<sup>13</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services, *Behaviour & Information Technology*, 31(3), P 267.

<sup>14</sup> Anna Ya Ni, & Alfred Tat-Kei Ho. (2005). Challenges in e-government development: Lessons from two information kiosk projects. *Government Information Quarterly* 22, P 59.

Information Services Branch “is the face of the City to Edmontonians and the first point of contact for two-way communication.”<sup>15</sup> It provides 24-hour access to information and services in Edmonton, however, concentrates the COE’s Customer Service on a web platform – Edmonton.ca. This channel is quite effective, presently, with 14 million visits annually. This channel is supported by Edmonton’s 311 helpline. This helpline receives 2.1 million calls and manages diverse calls for each of the seven departments in the city. However, reliance on one or two channels can be problematic if these platforms are cumbersome or difficult to use. Torres, Pina, and Acerete (2005) while discussing e-government developments, like Smart Cities, in the European Union, caution:

Some of the benefits promised by e-government can only bear fruit if the content of websites is citizen centric and designed specifically for the Internet. Recreating the existing organizational structure does not contribute to transforming government, and it does not help citizens unfamiliar with the organization to navigate through the website. So, even though e-government has a huge potential to contribute to government modernization, it is being developed according to a narrow conception of services.<sup>16</sup>

The narrow definition of services may result in challenging interactions, customer dissatisfaction, and mistrust, which a municipality cannot afford (see Zambrano’s chart, page 5). Torres *et al.* continue saying “For every e-government project, coherence must be seen as the ultimate test: users will ignore governments’ efforts in carrying out e-government strategies and visions if the service leads to more bureaucracy and/or less societal, economic, and individual benefits.”<sup>17</sup> Again, Zambrano’s chart provides a useful reminder of the “citizen as client.”

Moreover, while the COE’s Vision and Strategic Plans, known as “The Ways” addresses the “City’s efforts to deliver the greatest value of services and infrastructure that are most important to Edmontonians while managing the opportunities and challenges of our ever-

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<sup>15</sup> COE, *Branch-Customer Information Services*. Retrieved from: [http://www.edmonton.ca/city\\_government/documents/PDF/Budget2015\\_Customer\\_Information\\_Services.pdf#search=onacity](http://www.edmonton.ca/city_government/documents/PDF/Budget2015_Customer_Information_Services.pdf#search=onacity)

<sup>16</sup> Lourdes Torres, Vicente Pina, & Basilio Acerete. (2005). E-government developments on delivering public services among EU cities. *Government Information Quarterly*, 22. P 234.

<sup>17</sup> *Ibid.* P 236.

changing city,”<sup>18</sup> it does not provide for measurable City-wide customer service results. Instead all Customer Service oriented departments individually track their statistics.

A scan of municipalities in Canada with Customer Service Strategies, as exemplified by the City of Brampton, show that these strategies attempt to:

- Reinforce a customer-focused culture.
- Set the vision, and establish the overriding principles and values, which govern how we will develop and deliver customer service.
- Respond to our customers’ expectations through the development of service standards and performance measurements.
- Set out a plan for implementing and maintaining activities, which improve customer service.
- Ensure that employees have the skills and knowledge required to provide excellent service to both internal and external customers.
- Develop a continuous improvement and measurement framework to ensure progress, identify required changes, and report on successes.<sup>19</sup>

These points from the City of Brantford speak to an overarching Customer Service Strategy “demonstrate[ing]...commitment to providing outstanding customer service.”<sup>20</sup> The COE does have a “OneCity” strategy; however, this strategy is solely for employees, for internal self-serve options.

Additional support for a channel strategy comes from The Institute for Citizen-Centred Service. Its Citizen First 7 report (2014) analyzes “drivers of satisfaction with government services and includes qualitative insight [from] survey respondents regarding how service experiences can be improved.”<sup>21</sup> According to this report, “a substantial proportion of

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<sup>18</sup> COE, *City vision and strategic plan*. Retrieved from: [http://www.edmonton.ca/city\\_government/city-vision-and-strategic-plan.aspx](http://www.edmonton.ca/city_government/city-vision-and-strategic-plan.aspx)

<sup>19</sup> City of Brampton, *Brampton City Service Strategy*. Retrieved from: <http://www.brampton.ca/EN/City-Hall/News/Pages/Media-Release.aspx/234>

<sup>20</sup> Ibid.

<sup>21</sup> Prychodko, N., & Dziong, M. (2014). *Citizens First 7*. Institute for Citizen-Centred Service: Toronto, ON. Retrieved from: <http://www.iccs-isac.org/research/citizens-first/citizens-first-7/?lang=en>.

population uses government services online.”<sup>22</sup> Furthermore, the report outlines several key points including how awareness drives usage, how a preference for telephone use is based on difficulties with getting help or responses online, and how concerns about privacy issues are diluted by the ability to get good service. The report recommends a service or smart card for common government agencies. The report points out that increased use of any channel the government has is based on 1. Awareness, 2. Fast access to information, (five pages or less of reading, and less than seven minutes to find results for a search) and 3. On-site search functionality.<sup>23</sup> Finally, while on-line/web access is an important channel, it supports all other channels, or drives access to other channels, and other channels drive access to it. Consequently, although the COE has chosen a web-based channel as its primary tool for citizens, it behooves the City to maintain or create other channels citizens can use for access. Consequently, the Channel Strategy is not merely a departmental concern at this point but becomes a reflection of the “Open City” concept to which the COE is aspiring.

Interestingly, the “OneCity” concept available to the employees is also expected by citizens who have been primed by retail channel strategies and are only concerned with front-facing, frontline solutions to their entire transaction, regardless of the jurisdiction of the transaction beyond the front counter. Torres, *et al.* (2005) recommend governments provide their customers with the “same level of responsiveness and service ... as they expect from the private sector.”<sup>24</sup> Moreover:

The growth of citizens’ expectations are (sic) leading to a new approach to service delivery by the public administration. In order to keep up with expectations, governments are taking a pro-active approach by anticipating the citizen’s needs and making changes in how it works in order to meet those needs.<sup>25</sup>

The authors attribute these changes to the municipality’s desire to improve their relationships with its citizens. These policies may become the basis upon which the IFC models its e-government initiative as the IFC project will experience this multi-channel, multi-departmental

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<sup>22</sup> Ibid.

<sup>23</sup> Prychodko, N., & Dziong, M. (2014). *Citizens First 7*. Institute for Citizen-Centred Service: Toronto, ON. Retrieved from: <http://www.iccs-isac.org/research/citizens-first/citizens-first-7/?lang=en>.

<sup>24</sup> Lourdes Torres, Vicente Pina, & Basilio Acerete. (2005). E-government developments on delivering public services among EU cities. *Government Information Quarterly*, 22, P 233.

<sup>25</sup> Ibid.

service challenge. Consequently, citizens coming to the department will have the option of waiting to speak to a person or using a kiosk to complete their transaction regardless of the method with which they initiated their transaction.

Eriksson and Nilsson (2007) argue it is important to consider each channel of the strategy as part of the whole process since once clients have decided to interact with the company; they evaluate the company on the sum of all the channels.<sup>26</sup> Since kiosk use forms but one of several methods by which customers interact with the company; however, inexpertly configured kiosks reflect poorly on the overall experience with the company. The Citizens' First 2000 document, written by Spears and Seydegart (2000) rates various channels and the attendant satisfaction in citizen use. Spears and Seydegart acknowledge that each channel "provide(s) a different mix of services. Some are more complex than others, and the differences in access ratings may reflect the nature of the services that are accessed through a particular channel rather than any inherent ease or difficulty of the channel itself."<sup>27</sup> Their findings reflect the complexity of the transactions that the IFC will experience. Bosch (2005), consulting for the Oshawa Customer Service Strategy, identifies issues that the City of Oshawa must work on, two of which align with issues the COE must address as well. These two issues are:

1. Every department has its own expectations of how to treat customers and there is no harmonized service standard for customer service dealings across the corporation.
2. Although customer service practices are part of existing front-line roles (dealing with customers over the telephone and counter), these peripheral functions interrupt daily assigned work and lead to overall inefficiencies within branches.<sup>28</sup>

Since the COE funnels its customers to its website, it will be important to coach customers in kiosk use when this channel is added to an overall Customer Service Strategy.

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<sup>26</sup> Kent Eriksson, & Daniel Nilsson. (2007). Determinants of the continued use of self-service technology: The case of Internet banking. *Tecnovation*, 27. P 165.

<sup>27</sup> Spears, G., & Seydegart, K. (2000). *Citizens First 2000*. Toronto, ON: Institute of Public Administration of Canada.

<sup>28</sup> Bosch, R. (2005), *Oshawa Customer Service Strategy*. Retrieved from: <https://www.oshawa.ca/city-hall/resources/customerservicestrategy.pdf>

## The Integrated Front Counter Project

The COE is in the midst of combining several of its citizen service oriented departments into the Integrated Front Counter Project (IFC)<sup>29</sup>, as part of a Citizen Service Delivery Model. The intent of the IFC kiosks is to assist customers in paying fees or tickets, register for programs, check the status of jobs, and perform various searches (i.e. open data records, 311 calls, tax assessments, etc.). Integrating kiosks into this project would allow the COE to increase citizen engagement and provide opportunities for increased Open Data and Smart City projects.

Moreover, the IFC is located downtown and comprises part of the inner core development including the arena and the Integrated Services Building. Although there is no present intent to create IFC stations elsewhere in the city, this option should remain open. The COE's Current Planning Service Centre *Front Counter Service Level* goal is to “ensure Current Planning Service Centre customers are seen by an advisor within 15 minutes of arrival at the front counter at least 80% of the time.”<sup>30</sup> The departments that comprise the IFC include Assessment and Taxation, Drainage, Bylaw Ticket Administration, Current Planning, Edmonton Transit/ Transportation Operations, and Community and Recreation Facilities. Each of these departments has citizen-facing counters each of which performs various tasks related to living, working and playing in Edmonton.

Unlike the “One City” concept, the “Open City” project enables citizens to access data sets the COE collects as a part of its daily functioning that are harvested from the citizens providing the data. The bi-way communication that flows from citizen to city and back provides a formidable tool for understanding potential directions for Edmonton based on how the public engages with the data. Kiosks provide an excellent opportunity for both harvesting and receiving data to be added to the Open Data database.<sup>31</sup> This move is part of a larger technological and cultural change. Consequently, the COE developed its “OpenCity” objectives whereby Objective 1.1 “Public information is managed in a way that facilitates accessibility and usability. The City

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<sup>29</sup> Note that the Integrated Service Centre Project is also known as the Integrated Front Counter, but for the purposes of this report IFC will be the acronym used.

<sup>30</sup> COE, *Dashboard*, Retrieved from: <https://dashboard.edmonton.ca/en/stat/goals/ybf9-nqrg/dnp6-7sbv/xtcu-jpb6>

<sup>31</sup> Stakeholder interview, 3 August 2016. For more information on COE Open Data, see [https://www.youtube.com/watch?v=Yuh\\_pnuLiGU](https://www.youtube.com/watch?v=Yuh_pnuLiGU)

and other stakeholders adhere to data management practices that result in information being easily accessed in common formats” nests Objective 1.2 where “Edmontonians are connected to the City and to each other.”<sup>32</sup> Part of these objectives may include providing kiosks for increased and effective self-service options. The Open Data available to citizens has the potential to be unlimited. Presently it includes budgetary information, access to 311 data, details about facilities and structures, analytics, maps, and transportation. All this information can be used by residents for their own projects and is curated at the Open Data Portal.<sup>33</sup> Access to Open Data engages citizens in very tangible ways. To date, citizens using the available open data have created maps examining bicycle/car collisions as well as historical GIS place name maps.

### WHY CHOOSE KIOSKS

Kiosks may seem like dated technology, given the numerous and varied web applications that exist today.<sup>34</sup> In discussion with COE stakeholders about kiosks and their potential, conversations centred on “Why have kiosks at all?” “What is Edmonton's customer service strategy?”, “Do we have a channel strategy?”, “Would kiosks compete with our website?”, “What are the maintenance costs for kiosks?”, “Since departments have varying methods of interacting with customers, what does the journey for service look like?”, “How are we OneCity for our citizens?” “Other corporations have completely removed their customer service counters, or are creating customer service opportunities in non-central locations, why does the COE persist in bringing its citizens to the core?” “The present channels (311 and the website) deal well with diversity, presently, what is the purpose of another channel?” and “How do you tier service delivery for generic questions to specific answers?” These questions highlight customer relationship management and expectation management issues, since similar service to retail is expected, but the customer is unaware of how deep and broad government requirements/regulations are.<sup>35</sup>

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<sup>32</sup> COE, *Foundational Elements*, Retrieved from:  
[http://www.edmonton.ca/city\\_government/initiatives\\_innovation/foundational-elements.aspx](http://www.edmonton.ca/city_government/initiatives_innovation/foundational-elements.aspx)

<sup>33</sup> COE, *Open Data Portal*, Retrieved from: <http://ace.edmonton.ca/opendatablog/2016/01/18/welcome/>

<sup>34</sup> This viewpoint was apparent in some of the interviews the author conducted with various user groups at the COE. Particular emphasis was made on cellular phone penetration in Alberta (reported to be 95%) making it appear that an intermediary channel like kiosks had little value.

<sup>35</sup> These concerns are in accordance with Michael Giebelhausen, Stacey Robinson, Nancy Sirianni, & Michael Brady's (2014). “Touch versus tech: When technology functions as a barrier or a benefit to service encounters.” *Journal of Marketing*, 78, 113-124 and Kotamraju, & van der Geest (2012). “The tension between user-centred design and e-government services.” *Behaviour & Information Technology*, 31(3), 261-273, DOI: 10.1080/0144929X.2011.563797



Kiosk use, however, is not diminishing. The “*Global Self-Service Kiosk Market 2016-2020*” released in February of 2016 indicated “The global self-service kiosk market is expected to grow at a CAGR [compound annual growth rate] of 4.67% during the period 2016-2020.”<sup>36</sup> It identified key vendors, market trends, opportunities and threats, as well as the strengths and weaknesses of each of the key vendors. Moreover, Technavio Business Wire issued a report indicating the global demand for self-service kiosks derives from the retail sector adoption of it. The report indicates “the market size of the global self-service kiosk market is predicted to reach close to USD 18 billion in revenue by 2020” with the top three segments of the market being retail, entertainment and travel retail.<sup>37</sup> Technavio also reports the “retail segment's contribution to the self-service kiosk market in 2015 was more than 46%, in 2015.”<sup>38</sup> Colin Shaw, CEO of Beyond Philosophy, notes, “By 2017, only 1/3 of customer service interactions will require human assistance. As many as 2/3 of customer service interactions will occur without human-to-human contact.”<sup>39</sup> Shaw’s post underlines not only the ubiquity of self-service systems but also the consequences of losing the trust of customers who rely on consistent self-service options, as previously discussed. Far from being outmoded technology, kiosks address important issues for municipalities including the provision of information and services to citizens in a cohesive way.

Rowley and Slack (2007) provide questions that assist managers determine kiosk use in their work areas. These questions include, “(1) What does our service operation actually do? (2) What sorts of processes are involved in creating the core product that we offer to customers? (3) Where do customers fit in our operation?”<sup>40</sup> These questions also form the basis of an ongoing check in for forecasting future demands of service with which to align the City’s service package plan with citizen expectations.

However, when considering the return on investment (ROI) for kiosks, other factors come into play. As an example, far more complex tasks may be distributed to staff increasing staff engagement and customer satisfaction with personal attention. Kiosks may reduce full-time equivalent positions that are performing repetitive, even redundant tasks; provide greater job and

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<sup>36</sup> *Research and Markets*, 17 February 2016 /PRNewswire (<http://www.researchandmarkets.com/research/vnrmsl/global>). This report was not accessible.

<sup>37</sup> *Global demand for self-service kiosks largely influenced by its adoption in the retail sector*, says Technavio. (2016, Feb 02). Retrieved from: <http://login.ezproxy.library.ualberta.ca/login?url=http://search.proquest.com/login.ezproxy.library.ualberta.ca/docview/1761799931?accountid=14474>

<sup>38</sup> Ibid.

<sup>39</sup> Shaw, Colin. (7 May 2015). *The problem with self-service*. Retrieved from: <https://www.linkedin.com/pulse/problem-self-service-colin-shaw?forceNoSplash=true>

<sup>40</sup> Jennifer Rowley, & Frances Slack. (2007) Information kiosks: A taxonomy. *Journal of Documentation*, 63(6), P 880.

service satisfaction; shrink the digital divide, and increase customer engagement. Choosing to implement kiosks warrants clearly defining the types of kiosks that exist.

### *Types of Kiosks*

People may not consider a screen on a wall providing information about building tenants as a kiosk. Nonetheless, it is. Similarly, people may call small businesses located in the middle of the mall hallways kiosks, which they are. In between these two examples, electronic kiosk types abound, which this section addresses.

More importantly, the definition of what a kiosk is must also define whether the machine under consideration is considered a ‘courtesy computer’ or a ‘kiosk.’ This factor speaks to the COE’s particular definition of kiosks, and how this definition impacts all future kiosk projects. The COE differentiates between courtesy computers that have limited or no access to the COE’s internal network and kiosks that have variable degrees of connection to the City’s internal network.

The kiosks the IFC project managers desire feature a high level of connectedness to the COE’s internal network. A ruling request the project submitted to Treasury Management indicated these kiosks would have limited access to edmonton.ca, Government of Alberta sites, as well as some industry sites, which were unspecified.<sup>41</sup> Citizens could use the kiosks/computers to make online payments through the existing City of Edmonton online payment channel on the edmonton.ca website. The request indicated that website access occurs through an external hosted URL, redirected to COE Service Providers. The online payment channel itself is considered PCI compliant, however in stakeholder discussions, it is apparent that if there is an existing payment channel (i.e. teller stations); then computers that provide the same service function as another payment channel open the COE up to risk. Consequently, Treasury Management’s rejected kiosk use as proposed for the IFC. A possible solution for this negative ruling is for the citizen to be able to complete any search or transaction, until the point they must make a payment to the City, at which time they are issued a chit with a job number. The citizen would then take the chit to the payment counter. This type of transaction (search, issue chit, then pay) substantially reduces COE risk from a PCI compliance perspective and is in line with the Treasury Management ruling. Moreover, citizens are accustomed to multi-step processes in municipal dealings.

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<sup>41</sup> Douglas Aird, Director of Treasury Management, COE Courtesy Computers Approach, July 18, 2016.

Industry standards do not differentiate between various machines, considering all of them as ‘kiosks’ but label them as to activity. The activity that serves different purposes also drives different requirements. ELO Touch Kiosk (ELO) vendors define kiosks as communication tools but divide them into five categories: point-of-information, product promotion, service or transaction, product dispensing, and Internet commerce (which include web-enabled kiosks).<sup>42</sup> Point-of-Information kiosks are both “the simplest kiosks to implement” and “the most difficult to justify in terms of ROI.”<sup>43</sup> These kiosks often promote products or services and can be found in malls. They are basically information booths, and provide advertising opportunities for the businesses in the area, as well as potentially dispensing coupons for customers.

Product and service kiosks are similar to those that might provide parking for a fee. They can be found in banks, universities, hotels, corporations and government buildings, where they broker mortgages, provide enrollment or reservations for classes or hotels, and allow benefit package choice.<sup>44</sup> A product-dispensing (vending) kiosk is “a single installation that handles all the processes required to make a sale, from creating the product and delivering the product, to receiving payment. For this reason, vending kiosks can be the most complex kiosks to implement.”<sup>45</sup> Internet commerce kiosks are used “in much the same way [a person uses] a public telephone or ATM machines” as these kiosks connect to the Internet and allow customers to purchase products for delivery later.<sup>46</sup> Another version of Internet commerce kiosks is the web-enabled kiosk that makes “an existing Web site into a public-access kiosk application...[which can] also be accessed from a local disk.”<sup>47</sup> The various types of kiosks can be combined (product information/vending/web) to provide the greatest ROI. Slack and Rowley note kiosks are not “one-size-fits-all” and most often are designed to suit a specific application. They cite factors like housing, input/output devices, interfaces, presentation, and location, all of which affect the type of kiosk chosen and implemented. After several discussions with

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<sup>42</sup> Strategies for Successful Kiosk Implementation Types of Kiosks. (2004). *ELO Touch*. Retrieved from: <http://www.elotouch.com/Solutions/CaseStudies/kioskwp.asp>. See also Frances Slack, & Jennifer Rowley. (2004). Challenges in the delivery of e-government through kiosks. *Journal of Information Science*, 30 (4) P 371.

<sup>43</sup> Ibid.

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> Ibid.

stakeholders, at the COE, it appears web-enabled, Internet-connected kiosks (as per ELO) would offer the most functionality for the IFC project.

### *Mobile Devices or Kiosks*

An argument presented in several user group meetings was that mobile technologies were replacing kiosk use, particularly since the COE's website is slated for upgrading and simplification in the fall of 2016. This argument can be split into three considerations. First, it speaks to a conception of how services are delivered in the community. Second, it questions why the City should invest in kiosks when customers are accessing the information via their own mobile devices, and third, it asks, "why not install mobile devices rather than kiosks?" For the first consideration, Torres, Pina, and Acerete declare:

Some of the benefits promised by e-government can only bear fruit if the content of Web sites is citizen centric and designed specifically for the Internet. Recreating the existing organizational structure does not contribute to transforming government and it does not help citizens unfamiliar with the organization to navigate through the Web site.<sup>48</sup>

Presently the COE's website is laborious and clunky, requiring citizens to spend considerable time navigating its pages. The COE's website renovation, which essentially mimics a Google-type search platform, will address this first consideration.<sup>49</sup> The second consideration (customers using their own devices) presupposes that cellular phone use is robust, which may be accurate from a technical standpoint but does not address social issues with which a municipality deals (see the section on Social Justice and User Readiness, page 33).

These social issues may include digital comprehension (where smartphone functionality is available but not understood), preference, awareness and even the cost of bandwidth, which does not allow customers to access the mobile applications created. Michael Ionescu, a kiosk developer, argues that kiosks are still relevant in a mobile world, stating:

80 percent of the time spent on smartphones are (sic) spent either on gaming or social networking. What about the remainder? Looking up maps and using the GPS for directions? That stat doesn't even warrant a category. Looking up local restaurants and

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<sup>48</sup> Lourdes Torres, Vicente Pina, & Basilio Acerete. (2005). E-government developments on delivering public services among EU cities. *Government Information Quarterly*, 22. P 234

<sup>49</sup> Stakeholder interview, 7 July 2016.

shopping destinations? Nope. The remaining 20 percent is split between news, entertainment, and "other." Some of the best features of a smartphone are completely underutilized. Phones can be used to access online coupons, look up local destinations, get an airline border pass, make reservations, use an NFC capability to act as a credit card, etc. Yet, none of those things even register on a breakdown of smartphone usage.<sup>50</sup>

Ionescu makes the case for integrating cell phone and kiosk use, describing opportunities for unique content that enables users to send information from a kiosk to their phone and vice versa. Third, using mobile devices rather than kiosks must address the use for which each device is meant. Eric Anderson of Clearwave Corporation (2015) lists some of these issues on the Kiosk Marketplace blog, arguing the ROI for using tablets is not borne out by research findings. While tablets have an initial lower cost, they have higher service and maintenance costs, which do not make them feasible for use. Overall, kiosks have rugged designs, intended for all-hour access. Anderson, talking about other advantages, says the:

Average lifespan of a kiosk is 6.5 years, whereas a tablet is 1.8 years; kiosks come with integrated management software allowing the kiosk to be serviced and updated automatically, and one kiosk can handle 50 patients per standard clinical day, so you will only need four kiosks to handle 200 patients per day. With tablets, however, you will need many more units to handle that same patient volume.<sup>51</sup>

Although Anderson is using kiosks for a medical application, the argument is pertinent for the COE's IFC.

Pooja Maharshi, from the LERABlog,<sup>52</sup> identifies other cellphone/kiosk integration opportunities, citing key locations for kiosk placement and calling kiosks a bridge between mobile devices and services, including advertising and applications that are too cumbersome for

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<sup>50</sup> Michael Ionescu. (20 Feb 2012). *Are kiosks still relevant in a mobile world?* Retrieved from: <http://www.kioskmarketplace.com/blogs/are-kiosks-still-relevant-in-a-mobile-world/>. Ionescu wrote a three part blog on this topic, addressing unique content; cell phone interactions; larger more interactive displays (in Part two); and other types of kiosks that exist in North America (in Part three)

<sup>51</sup> Eric Anderson. (16 Jan 2015). *Is a kiosk or tablet best for self-service registration?* Retrieved from: [http://www.kioskmarketplace.com/blogs/is-a-kiosk-or-tablet-best-for-self-service-registration/?utm\\_source=NetWorld%20Alliance&utm\\_medium=email&utm\\_campaign=EMNAKMC01202015](http://www.kioskmarketplace.com/blogs/is-a-kiosk-or-tablet-best-for-self-service-registration/?utm_source=NetWorld%20Alliance&utm_medium=email&utm_campaign=EMNAKMC01202015)

<sup>52</sup> The LERABlog is a "resource of comprehensive information about business and finance, advertising and marketing as well as Internet technologies, media and entertainment." Retrieved from: <http://lerablog.org/>

cell phones.<sup>53</sup> This last point is important as it touches on the use of Smartcards that can be integrated into the IFC. Based on engagement interviews with several COE staff, Smartcards are of great interest, since these cards can collect data, could be cleansed and added to the Open City databases.

These three considerations – perception of service delivery, methods of accessing information and device robustness - form a strong argument for an updated website accessed via web-enabled kiosks. This solution allows city/citizen interaction regardless of the type of devices to which the citizen has access.

### *Environmental Requirements, Work Processes and Current Challenges*

As argued, kiosks form an important part of both a Customer Service and Channel strategy. Consequently, there are several factors that municipalities must consider before investing in them. Slack and Rowley argue it is important to understand why kiosks are being considered as a solution.<sup>54</sup> Although ROI is a starting point, it is vital to consider other elements including whether the ROI is achieved through reduced full-time equivalents (FTEs) or increased revenues or a mix of both. Charles Fishman from the Fast Company blog advises:

From vending machines to ATMs, the key is to automate a task that already needs to be done, not to invent a task and then provide a computer to do it. In both airports and fast-food restaurants, kiosks provide a service that customers already need. And they do it with a complete lack of self-aggrandizing flourish. It's not about the technology; it's about the task.<sup>55</sup>

Fishman's emphasis on knowing why kiosks are being deployed is fundamental and reinforces Slack and Rowley's research findings. It is important to automate existing tasks and not invent tasks to be automated. These automated tasks might include such things as license or fine payments and status tracking. Other tasks might include: ticket payments, library and licensing

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<sup>53</sup> Pooja Maharshi. (nd). *Why kiosks are still in use in the mobile world*. Retrieved from: <http://lerablog.org/technology/electronics/mobile-devices/why-kiosks-are-still-in-use-in-the-mobile-world/>

<sup>54</sup> Frances Slack and Jennifer Rowley, (2004). Challenges in the delivery of e-government through kiosks. *Journal of Information Science*, 30(4), 369-377.

<sup>55</sup> Charles Fishman. (5 January 2004). *The toll of a new machine, with the sidebar: So you want to hire a robot: The dos and don'ts of self-service automation*. Retrieved from: <http://www.fastcompany.com/49359/toll-new-machine>.

services, status checks for requests, recreation registrations, online crime reporting, appointment scheduling for Integrated Service Centre services, investigation of development plans for a neighborhood, and confirmation of Alberta government regulations and requirements.

### *Environmental requirements*

Depending on the function of the kiosk, numerous hardware components are involved. These components may include: card readers, keypads, cameras, printers, computers, and the shell all of which should be included in this interchangeability. Each component requires careful consideration. Prior to installing kiosks, Michael Ionescu has several guidelines. First, consider if networking and remote monitoring are being installed alongside the kiosks. Ionescu advises that good Internet connections are vital to reliable, sustained kiosk use. Second, he suggests that sufficient time is given to deploying kiosks. This time is used to refine and redesign the kiosks to suit actual use. This step is important because each redesign after implementation can be costly. Like any integrated system, a kiosk installation should be staged so it can be agile enough to take advantage of the results of the alpha and beta phases of testing. Gradual and staged kiosk implementation is highly recommended as it may track both end user and employee acceptance.

Third, Ionescu recommends future proofing the kiosk installation as much as possible. Working closely with the Information Technology department will ensure that whatever technological advancements occur, the kiosks are not made redundant. Fourth and finally, Ionescu suggests that the kiosk components are easily replaceable, which will reduce downtime for the whole unit.<sup>56</sup>

### *Hardware and Software*

Ionescu continues by marking four important issues, including networking and remote monitoring, refining or even redesigning the kiosk systems, future proofing the designs, and maintenance (including component replacement). He advocates updating content remotely, which assists in status tracking, software and power crashes and other malfunctions. Maximizing user experiences is also beneficial, since small changes can be dramatic and draw new users.

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<sup>56</sup> Michael Ionescu. (16 Sept 2011). *Answer these 4 questions before deploying kiosk network*. Retrieved from: <http://www.kioskmarketplace.com/blogs/answer-these-4-questions-before-deploying-kiosk-network/k>

Metal frame kiosks with interchangeable components allow for easy future proofing, including upgrades that can be done on site, rather than having the unit returned to the manufacturer.<sup>57</sup>

It is critical to remember that hardware components have other requirements like ventilation, sound, aesthetics, cleaning – all which need to be included in the final cost of the kiosk implementation. Similarly, with software it is important to consider software upgrades, ongoing maintenance, emergency maintenance, replacement parts, etc. Replacement of consumer goods and general maintenance may be part of the vendor agreement, but it is important to consider them when drafting the agreement. If the software upgrades are integrated into the COE's overall Information Technology processes, these upgrades must be negotiated into service contracts with both internal and external customers, including the COE Information Technology Department's regular upgrade scheduling. Ultimately environmental requirements may be rolled into the negotiated service package as long as the purpose of the kiosks has been determined.

#### *Work processes*

The city has integrated several service desks, all of which are amalgamating their work processes. A web-enabled kiosk system would provide citizens with timely, accurate information. Although initially only at the IFC, there is a potential for the kiosks to be included in a Customer Service and Service Channel Strategy and then located around Edmonton at COE buildings. Not only would the citizen have timely, accurate information, but also this information would be widely available to them regardless of where they were in the city. The city could capitalize on the data gathered from citizen kiosk use to examine data and trends from these machines.

#### *Current Challenges*

Current challenges for kiosk use at the COE are varied. They range from PCI limitations, and citizen engagement, to user needs. This last category of user needs is addressed quite comprehensively since much of the research found on kiosks emphasizes keeping the “citizen as stakeholder” and the “citizen as user” in mind during the design process.<sup>58</sup> High citizen engagement from the beginning not only ensures high citizen engagement throughout the process

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<sup>57</sup> Ibid.

<sup>58</sup> Raul Zambrano. (2008). E-Governance and development: Service delivery to empower the poor. *International Journal of Electronic Government Research*. 4(2). P 492



but also ensures it on an ongoing basis. Citizen engagement in the process is by far the best future proofing the COE could do.

### *Payment Card Industry (PCI) Compliance*

The Payment Card Industry Standards, driven by major credit card companies, mandate requirements for information control and data security for debit and credit cards. CYSEC, a cyber security consulting company, traces this standard back to the “PCI Security Standard Council, which was formed by the five major card companies MasterCard, American Express, VISA, JCB and Discover. This set of requirements serves as a guideline to ensure the protection and security of their cardholder information.”<sup>59</sup>

In 2014, the COE completed its PCI Compliance project ensuring that credit and debit card data is retained appropriately. Moreover, the COE adheres to the most current Payment Card Industry standards, whereby the information for credit card users is not stored unless required, and should it be required, the process for storing this data is rigorously maintained. The COE’s standard is “very binary - we are either 100% compliant or we are not compliant.”<sup>60</sup>

Issues around information privacy and security are important factors for the COE to consider for kiosk use. Korolov, writing in 2015, has five tips to comply with the new PCI requirements, including:

1. Log customers out.
2. Unique credentials for all employees.
3. Service providers must accept responsibility.
4. Protect payment terminals.
5. Have regular penetration tests performed.<sup>61</sup>

The first point addresses the concern that the applications in use log people out automatically. When the terminal is unused, neither user data nor the applications they used should remain accessible or open. The second point, a unique sign-on for each employee, means any employee using the kiosk has an individual computer identity that can be traced, including any third-party vendors that may need access. The third point addresses third-party acknowledgment of

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<sup>59</sup> *Best practice for implementing PCI DSS*. Retrieved from: <http://pcidsscompliance.net/implementing-pci-dss/best-practice-for-implementing-pci-dss-in-to-your-organization/>

<sup>60</sup> Stakeholder interview, 25 July 2016.

<sup>61</sup> Maria Korolov. (15 May 2015). *Five tips to comply with the new PCI requirements*. Retrieved from: <http://www.csoonline.com/article/2922896/compliance/five-new-pci-requirements-for-june.html>

responsibility for data. Here, the COE would be able to pursue reimbursement in the event of breaches. The fourth point addresses employee training to ensure pay terminals are not vulnerable to breaches. Each employ is encouraged to check the terminal after each shift, and fifth and finally, penetration tests should be done regularly from an internal location. Bhargav, in “*PCI Compliance: The definitive guide*” acknowledges:

PCI compliance for merchants is quite a challenge, simply because of the number of cardholder data touch points that are present in a merchant environment. For instance, touchpoints would be the POS terminal at the billing counter for merchants, card payment kiosks, e-commerce servers, internal billing systems, financial reporting systems, workstations, and POS system log files. These are all viable and highly probably areas where cardholder data is not only transmitted or processed, but more dangerously persists in storage. The most recommended approach to PCI compliance for any entity is to create the right scope.<sup>62</sup>

Once this scope is determined, it must be maintained and revisited regularly. Another aspect of PCI compliance is the requirement for COE data and network to be inaccessible to the public. This compliance requirement mirrors Bhargav’s (2014) conditions as well.<sup>63</sup> Bhargav offers scoping advice as well, indicating the importance of PCI Compliance Teams; card-holder data touch points; storing and transmitting information from the touch points with team members, system owners and management. Once more, however, Bhargav cautions “Over time, several touchpoints (sic) can form purely by drift rather than the result of a business strategy.”<sup>64</sup> PCI Compliance creates a significant issue for whether web and payment-enabled kiosks are feasible for the COE. The IFC project team acquired Treasury Management ruling on 18 July 2016,

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<sup>62</sup> Abhay Bhargav. (2014). *PCI Compliance: The definitive guide*. Boca Raton, FL: Taylor Francis Group. P 67.

<sup>63</sup> Ibid. Requirement 1: Install and maintain firewall configuration to protect card-holder data. Requirement 2. Do not use vendor-supplied defaults for system passwords and other parameters. Requirement 3: Protect stored cardholder data. Requirement 4: Encrypt transmission of cardholder data across open, public networks. Requirement 5: Use and regularly update antivirus software or programs. Requirement 6: Develop and maintain secure systems and applications. Requirement 7: Restrict cardholder information by business need to know. Requirement 8: Assign a unique ID to each person with computer access. Requirement 9: Restrict physical access to cardholder data. Requirement 10: Track and monitor access to network resources and cardholder data. Requirement 11: Regularly test security systems and processes. Requirement 12: Maintain a policy that addresses information security for all personnel. P 52-53.

<sup>64</sup> Ibid. P 68.

indicating if the IFC project team desired a payment function, the project team must approach the PCI Steering committee to implement a PCI compliant solution.<sup>65</sup>

Although many of the stakeholders interviewed for this report were aware of the need for PCI compliance, they were also content that the kiosk supplier was meeting the basic requirements for compliance as part of the overall service agreement. The comments around PCI compliance centred on ensuring the vendor remained current on, and managed the PCI requirements.<sup>66</sup>

### *Citizen Engagement*

Harkening back to Zambrano's chart (see page 5), Slack and Rowley also encourage governments to determine the key issues on which they wish to engage and be seen to engage with citizens. These key engagement issues include: understanding the complexity and length of tasks that can reasonably be performed at a public access kiosk; assessing the constraints and potential of kiosk technology, in terms of data entry, printing, user identification, information provision, communications, transactions, payment and service delivery; and considering user expectations and behaviour regarding kiosks.<sup>67</sup> Ultimately, Slack and Rowley advocate for a government strategy using optimal technology in chosen applications with high integration across channels, in terms of information, services, and interface.<sup>68</sup>

These points form a tall order for municipalities and governments. Essentially, kiosk systems fail if users cannot comprehend how to use them. Further, government services must explore the service and knowledge architectures necessary for integrated or one-stop shop government, understand the various organizational architectures and alliances required for service delivery as well as the technological requirements for effective service referrals.<sup>69</sup> In this case, creating workflows based on Kernaghan's user engagement heightens user engagement (see pg. 9 or below<sup>70</sup>). Consequently, Kernaghan's recommended processes, in conjunction with

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<sup>65</sup> Douglas Aird, Director of Treasury Management, COE Courtesy Computers Approach, July 18, 2016.

<sup>66</sup> Stakeholder interviews: 11 May, 18 May, 19 May, 15 June, 30 June, 7 July, 14 July, 25 July, 28 July 2016.

<sup>67</sup> Frances Slack, & Jennifer Rowley. (2004). Challenges in the delivery of e-government through kiosks. *Journal of Information Science*, 30(4). P 374-375.

<sup>68</sup> Ibid. P 375.

<sup>69</sup> Ibid.

<sup>70</sup> Kernaghan recommends municipalities tailor their e-government strategies in one of three ways: 1. Life events: registration of birth, schools, and jobs. 2. General topic headings: services grouped into topics like business,

Slack and Rowley's recommendations, assist both the citizen and the municipality. The following section discusses the various ways citizen engagement is fostered and maintained, as well as some strategies for achieving it.

### *User Needs*

Because of the ubiquity of retail kiosks, there appears to be a similar view that kiosks will work in government and municipal environments. The belief is perhaps accurate; however, it often examines only a portion of the equation – how the kiosk will assist the government deliver services. Nonetheless, knowing what customers expect is vital. Moreover, in order for kiosk uptake to be rapid, it is important to ensure, as Gavett emphasizes, the customers “know what’s expected of them, be capable of doing what’s expected of them, [and] see the value of expending the extra effort in order for it to be something that they would willingly engage in.”<sup>71</sup> Salomann, Dous, Kolbe, and Brenner (2007) elaborate on the importance of the customer experience and expectation, stating:

Customer experience in today’s industrialized service economy basically means pushing buttons, moving mice and talking to machines over and over again... This current, technology-driven scenario comes close to what Alan Cooper, an expert on user interaction, describes as the ‘dancing bear’ phenomenon: a bear dances clumsily, entertaining a circus audience and even though everyone knows that the bear is not a good dancer, they are amazed by the fact that the bear is dancing at all (Cooper, 2004). Nowadays, self-services in customer relationships largely consist of such ‘dancing bears’.<sup>72</sup>

Cooper’s analogy speaks to peoples’ low expectations for effective self-service options. In order to get beyond the ‘dancing bear’ to offer customers a quality experience, several issues must be addressed. Ensuring the self-service experience is not only comprehensible but enjoyable, Collier and Barnes argue, is central to successful kiosk use. In their 2015 article “*Self-service delight: Exploring the hedonic aspects of self-service,*” Collier and Barnes outline five values that increase the likelihood of kiosk use. These values are functional, social, emotional, epistemic, and conditional values, where:

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government, citizens, and education. Or 3. Demographics: categories of services slated for workers, seniors, and children. These categories are often used with general topic headings.

<sup>71</sup> Gretchen Gavett. (11 March 2015) How Self-Service kiosks are changing customer behaviour. *Harvard Business Review*. Retrieved from: <https://hbr.org/2015/03/how-self-service-kiosks-are-changing-customer-behavior>.

<sup>72</sup> Harald Salomann, Malte Dous, Lutz Kolbe, & Walter Brenner. (2007). Self-service revisited: How to balance high-tech and high-touch in customer relationships. *European Management Journal*, 24(4). P 311.

Functional value refers to the “perceived utility acquired from an alternative's capacity for functional, utilitarian, or physical performance” (p 160). Social value refers to the “perceived utility acquired from an alternative's association with one or more specific social groups” (p.161). Emotional value refers to the “perceived utility acquired from an alternative's capacity to arouse feelings or affective states” (p.161). Epistemic value refers to the “perceived utility acquired from an alternative's capacity to arouse curiosity, provide novelty, and/ or satisfy a desire for knowledge” (p.162). Finally, conditional value refers to the “perceived utility acquired by an alternative as the results of a specific situation or set of circumstances facing the choice maker” (p.162).<sup>73</sup>

Relying heavily on research by Sheth, Newman and Gross (1991)<sup>74</sup>, Collier and Barnes argue that ultimately, if a person believes kiosks are useful, easy (or easy to learn how) and fun to use; if other people they know and trust used these kiosks successfully; and if they have the choice to use the kiosk or not, then kiosk use occurs. Further research from Collier, Moore, Horkey, and Moore (2015) indicates in addition to these values, there are situational variables that must be met as well. These variables are divided into “five distinct groups: physical surroundings; social surroundings; temporal perspective; task definition; and antecedent state [which] alter customers' preferences, attitudes, or intentions...For example, a consumer with no time constraints may react quite differently ... than the same user ... feeling rushed.”<sup>75</sup> These situational variables loosely match the values previously listed. The physical and social surroundings are conducive to kiosk use (in the instance where line ups for one-on-one interactions are long); the time may or may not have run out for the person deciding to use a kiosk. Perhaps using the kiosk serves a particular purpose, and finally, they have had previous success using kiosks.

Attendant to these various conditions, the many types of users all have different needs. As an example taken from conversation with stakeholders,<sup>76</sup> developers, whose work relies on the Sustainability Department permitting, are repeat customers who require little assistance, whereas people requiring personal services permits (massage, etc.) may require additional assistance. Both groups come to the Integrated Service Centre regularly, but given their tasks or

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<sup>73</sup> Joel Collier, & Donald Barnes. (2015). Self-service delight: Exploring the hedonic aspects of self-service. *Journal of Business Research*, 68. P 987.

<sup>74</sup> Jagdish Sheth, Bruce Newman, & Barbara Gross. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, 22(2), 159–170.

<sup>75</sup> Joel Collier, Robert Moore, Alisha Horkey, & Melissa Moore. (2015). Why the little things matter: Exploring situational influences on customers' self-service technology decisions. *Journal of Business Research*. 68. P 704.

<sup>76</sup> Stakeholder interview, 29 July 2016.

comprehension, either may not be interested in using a kiosk, or be unable to use a kiosk to its fullest capacity. Another group, consisting primarily of homeowners who do much of their research online beforehand, are unlikely to use kiosks, as they most frequently desire a verbal confirmation that a kiosk (similar to their home computer) is unable to give. Kiosks might be useful for this latter group if the kiosks provided access to the applications the homeowner requires prior to talking to a service centre staff person.

Although citizen expectations may be low due to dancing bears, if the kiosks are easy or easier to use than kiosks in retail situations, then kiosk use occurs at the municipal level as well. However, even if these values and situations are met, users have other issues that are more problematic. These issues include: ease of use and, conversely, the complexity of information the government is required to provide; trust in processes; user-centred design and conversely the time necessary to develop user-centred design; and social justice and user-readiness. These last five issues will be discussed in depth.

### *Ease of Use and Complexity of Information*

These two related issues, ease of use and complexity of information, speak to what data is expected to be on a kiosk. Blackwell, writing about Brussels as an unwired city, acknowledges that people use:

Kiosks to access government information such as garbage pick-up times, how to get from here to there by public transit, contacts for police and other emergency and non-emergency regional government services. The kiosks have printers so users can carry hard copy away with them. Any public content provider can submit information to be posted on the kiosk portal site at no charge. "But they can't just provide any kind of content," Ciocea says. "It must be really citizen driven and it must be easy to use, one or two clicks to find a real answer to a real question."<sup>77</sup>

This type of kiosk use mirrors the utilization and installment plan for similar kiosk systems in Edmonton, examined later in this report. As far as the complexity of government systems, Kotamraju and van der Geest (2012) note that cities:

Are in a unique position, first of having to provide a vast amount of complete information and services; second, of having to provide it to the entire population, which is diverse in

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<sup>77</sup> Gerry Blackwell. (22 June 2004). *Brussels: the unwired city*. <http://www.wi-fiplanet.com/columns/article.php/3372031/Brussels-Unwired-City.htm>

many aspects, and, third, requiring compliance, which requires cumbersome processes that might often run counter to user centricity.<sup>78</sup>

Both the disadvantaged and the wealthiest citizens have needs the city must address. These needs vary in complexity and depth concerning aspects of living, working and playing in their community. The various languages the system must include, which are far beyond the official two languages, are another aspect of the complexity the system requires for end users. The final point, compliance, must also address how to ensure citizens adhere to the rules and regulations the city has set for participating in its processes, as well as how the city fairly enforces them. Juxtapose the depth and breadth of information the municipality must provide against customer expectation, which has been developed in a retail environment, and difficult service encounters may feel designed into the experience. Salomann, Dous, Kolbe, and Brenner, (2007) translate the depth and breadth versus customer expectation as competitive advantage. They believe:

The answer is pretty simple: since you want your customers to do the job for you, you should first start listening to them. They ask for simplicity, control, less annoyance, higher touch, and easy-to-use technologies. By infusing personal touch into self-services companies can change the way customers mentally perceive them.<sup>79</sup>

And, perhaps under these conditions, the customer will view the government as another entity providing services, similar to a retail outlet.

### *Retail Comparisons*

One issue based on retail kiosk interactions is that e-government self-service kiosks are expected to have the same level of service that the retail kiosks possess as alluded to in the introduction. In this manner, relationship management becomes vital, especially as self-service kiosks are an excellent source for harvesting data about citizens needs. Dutta (2015) writing for the Service Council, notes:

When customers choose self-service avenues, they are choosing what's convenient to them but they are still engaging in a conversation with your support organization. They are not eschewing a relationship with the organization. Information about self-service usage paired with knowledge around the customer lifecycle, customer service history,

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<sup>78</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services. *Behaviour & Information Technology*, 31(3). P 268-269.

<sup>79</sup> Harald Salomann, Malte Dous, Lutz Kolbe, & Walter Brenner. (2007). Self-service revisited: How to balance high-tech and high-touch in customer relationships. *European Management Journal*, 24(4). P 312.

usage trends, and more, can help paint a more complete picture about the needs and value drivers of your customers. As a result, this knowledge can trigger corrective or preventive service actions developed to reduce customer angst. Alternatively, this information can be used to personalize content and information available to customers with a focus on increasing the value delivered via the service relationship.<sup>80</sup>

So the comparison to retail kiosks is double-edged. As noted above, citizens expect a level of service that is hard to provide given the complexity of the municipality's requirements. Residents will need to be encouraged to use kiosks to achieve the returns expected, but may insist on the instantaneous results provided by retail kiosks.

Furthermore, with increased use, the city can streamline other processes to increase citizen engagement while provide good customer service. However, the municipality must provide a kiosk service that grows with user needs. Fortunately, with a good kiosk design and good attention to details, the municipality gains valuable information about its citizenry, which can be shared with the citizens in an endless cycle of Open Data opportunities. It is this type of relationship for which the COE is striving, based on the scope of this document. Specifically, to increase engagement with citizens, provide access to Open Data and build a Smart City, a more retail-oriented kiosk solution is recommended.

### *Trust*

There is also a level of trust that the City maintains in its dealings with its customers. Koskela-Huotari, Edvardsson, Jonas, Sorhammar, and Witell, (2016) attribute this trust of institutions a result of institutions being:

Multifaceted, durable social structures having both symbolic and material elements. They consist of laws, norms, values and moral codes that define appropriate behavior among actors, as well as cultural beliefs and cognitive models, frames and schemas that encapsulate the taken-for-granted assumptions and beliefs fundamental to guiding social action in different situations. Accordingly, they are closely related to the notion of the

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<sup>80</sup> Sumair Dutta. (2015) *Getting more with self-service*. The Service Council. Self-service is a conversation: Self-service has to be viewed as a means to learn more about your customers. Retrieved from: <http://paratureprod.blob.core.windows.net/wp-uploads/2015/02/GettingMoreWithSelfService-WhitePaper-ParatureFromMicrosoft.pdf>. P 8



formation and routinization of social “rules of the game” and building mutual trust among individuals.<sup>81</sup>

It is important to maintain this trust. To function smoothly, municipalities must protect and serve its citizens, in both tangible and intangible ways. Knowing that their private information is protected similar their property or lives is fundamental to trust building and retention.

Kotamraju, N.P., & van der Geest (2012) concur:

E-services must be designed with a clear view of the prospective users’ prior knowledge and context of use and must meet users’ expectations to be considered satisfactory. Customers will only accept and adopt e-services of parties they feel they can trust, so the design should represent the trustworthiness of the organisation and create in the customer a sense of confidence and control. When technology-mediated service encounters lack those qualities, they are not perceived as a good alternative to other modes such as face-to-face interactions between employees and customers or government officials and citizens’<sup>82</sup>

Part of maintaining this trust is ensuring that however the customer interacts with the city, the method must be accurate, easy, effective and successful, or if not, then resolved in a timely manner with adequate explanation and compensation offered.<sup>83</sup> The trust also extends to a confidence the information will be used appropriately within municipal boundaries. Although citizens may not mind participating in Open Data Initiatives, the removal of personal details is essential.

### *User-Centred Design and Timing*

User-centred design is crucial but difficult and time consuming. Kotamraju and van der Geest (2012) believe “Many governments pay lip service to user-centred design, but even those with the best of intentions find that incorporating kiosks into the design and deployment of a technology and meeting users’ needs is rarely an easy feat.”<sup>84</sup> However, if user-centred design is

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<sup>81</sup> Kaisa Koskela-Huotari, Bo Edvardsson, Julia M. Jonas, David Sorhammar, & Lars Witell. (2016). Innovation in service ecosystems: Breaking, making, and maintaining institutionalized rules of resource integration. *Journal of Business Research*. P 2.

<sup>82</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services, *Behaviour & Information Technology*, 31(3). P 261

<sup>83</sup> Jiraporn Surachartkumtonkun, Paul Patterson, & Janet McColl-Kennedy. (2013). Customer rage backstory: Linking needs based cognitive appraisal to service failure type. *Journal of Retailing*, 89. P 72-87.

<sup>84</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services, *Behaviour & Information Technology*, 31(3). P 263.

not included or the system is cumbersome, flashy, or “cute,”<sup>85</sup> users may not engage with the kiosks. Torres *et al.* caution that the “users will ignore governments’ efforts in carrying out e-government strategies and visions [particularly] if the service leads to more bureaucracy and/or less societal, economic, and individual benefits.”<sup>86</sup> Spending the time to prototype or pilot kiosks allows governments to ensure the ROI is realized on their installation. But more importantly, it means the kiosks are used and trusted. This caution is also found in the writing of Kotamraju and van der Geest (2012), who reiterate their concerns cited previously, stating:

Drawing on our user research and involvement with the design and development of an e-government service, we present four manifestations of the tension between user-centred design and e-government: (1) users and governments hold contradictory visions of the tasks to be accomplished (2) governments must design for all, that is, for exceptions as well as for the mainstream (3) government and users differ in their commitments to legal rules and regulations (4) government and users have conflicting desires about the nature of their relationship<sup>87</sup>

The contradictory visions, exceptional design requirements, commitments to legalities, and conflicting desire mean governments have a greater responsibility to address the tension between users and government, because “governments might have to come to negative decisions concerning the users’ eligibility for a service, status or product, ... already makes for a negative user experience for which a more user-centred design process cannot compensate.”<sup>88</sup> The issues with user-centred design lead naturally into social justice and user readiness, which also must be considered by government kiosk installations.

### *Social Justice and User Readiness*

Ya Ni and Tat-Kei Ho (2005) discuss social justice issues exacerbated by a digital divide. This divide is created when access to government and municipal resources is through technology that is not affordable across the socio-economic spectrum. With the advent of cellular technology, it may well be that cell phone penetration is high, but what type of cell phones are being used? An additional concern would be if all citizens can afford the bandwidth necessary to

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<sup>85</sup> Charles Fishman. (5 January 2004). *The toll of a new machine with the sidebar: So you want to hire a robot: The dos and don'ts of self-service automation*. Retrieved from: <http://www.fastcompany.com/49359/toll-new-machine>

<sup>86</sup> Lourdes Torres, Vicente Pina, & Basilio Acerete. (2005). E-government developments on delivering public services among EU cities. *Government Information Quarterly*, 22. P 236.

<sup>87</sup> Nalini Kotamraju, & Thea van der Geest. (2012). The tension between user-centred design and e-government services, *Behaviour & Information Technology*, 31(3). P 266.

<sup>88</sup> *Ibid.* P 267.

access the information from the municipality. What kind of web access is available if the phones are not Smart? Moreover, as Ionsecu notes, not all Smartphones are used to their full capacity (see page 15). Ya Ne and Tat-Kei Ho elaborate, indicating:

The problem of "digital divide" is not simply an economic gap between the "haves" and "have-nots." It is a multidimensional policy challenge that is influenced by economic factors as well as technological and social factors, such as availability of user-friendly technological platforms, information literacy, and socio-psychological differences among user groups.<sup>89</sup>

They continue saying, “digitally deprived citizens will not only lose access to public information and services but will also become less vocal and significant in the democratic process.”<sup>90</sup> Another issue, that of negative perceptions of government, must also be addressed when considering e-government and citizenry.

In Gelderman, Ghijssen, and van Diemen’s (2011) article “*Choosing self-service technologies or interpersonal services: The impact of situational factors and technology-related attitudes*” the authors note “the success of technology-based self-services depends significantly on whether or not customers have the capability to use the new information technology.”<sup>91</sup> Customers without the capacity to use the technology may include the most vulnerable people in society, including the elderly, the homeless, and those living with learning challenges or disabilities. Their study examines the factors that effect kiosk use and is augmented not only by their own research but also by research done by Kallweit, Spreer, and Toporowski (2014).<sup>92</sup> In addition to the capacity of use, Gelderman *et al.* acknowledge there are some customers who will not ever use kiosks, because “Customers with a strong desire for personal contact lack the intrinsic motivation to start using technology-based self-services.”<sup>93</sup> Regardless, and as part of

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<sup>89</sup> Anna Ya Ni, & Alfred Tat-Kei Ho. (2005). Challenges in e-government development: Lessons from two information kiosk projects. *Government Information Quarterly*, 22. P 60. See also Anna Mattila, Wonae Cho and Heejung Ro, (2011). The role of self-service technologies in restoring justice. *Journal of Business Research*, 348-355, DOI10.1016/j.jbusres.2010.02.014

<sup>90</sup> Ibid.

<sup>91</sup> Cees Gelderman, Paul Ghijssen, & Ronnie van Diemen. (2011). Choosing self-service technologies or interpersonal services - the impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*, 18. P 414.

<sup>92</sup> Katrin Kallweit, Philipp Spreer, & Waldemar Toporowski. (2014). Why do customers use self-service information technologies in retail? The mediating effect of perceived service quality. *Journal of Retailing and Consumer Services*, 21. P 268-276.

<sup>93</sup> Cees Gelderman, Paul Ghijssen, & Ronnie van Diemen. (2011). Choosing self-service technologies or interpersonal services - the impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*, 18. P 416.

the inherent function of the municipality, no matter how well designed the kiosk may be, if someone does not want to use it, he or she might always choose other modes of interaction.

Given the complexity of not only incorporating but also understanding user needs in e-Government, this report recommends NOT installing kiosks when the ISC opens. Rather, the ISC project team should install kiosks after six months to one year of the ISC opening its doors. This recommendation allows the IFC project team to monitor the business processes that develop as a result of the amalgamation of several departments at the Civic Centre and then tailor kiosk use to those new processes.

### SELF SERVICE OPTIONS IN EDMONTON AND OTHER MUNICIPALITIES

This section outlines some of the various uses for kiosks municipalities or businesses, worldwide. The kiosks considered here range from basic information-oriented kiosks to full service web-enabled kiosks; however, most kiosk platforms are a mixture of information/full service. Many of the kiosk systems in use appear to be wayfinding,<sup>94</sup> air travel,<sup>95</sup> or consumer-good oriented.<sup>96</sup> Moreover, where there have been government- or municipal-based solutions, the projects have been short-lived, or compromised, or both. As noted in the introduction, technological advances and decisions about customer service options change regularly. Since Kernaghan's (2012) report "*Anywhere, Anytime, Any Device*" and Bernardi's (2000) "*Review of*

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<sup>94</sup> See for example: Amanda Raven, Jason Laberge, Joanne Ganton, and Michelle Johnson's blog post on User experience: The magazine of the user experience professionals association. <http://uxpamagazine.org/wayfinding-in-a-hospital/> and Canada Health Infoway .. *Kiosks a boon to triage nurses, ER patients. A special report from Canada Health Infoway, Electronic Health Records for Canadians. Retrieved from: http://v1.theglobeandmail.com/partners/free/infoway/article\_kiosks.html*

<sup>95</sup> See, for example: José Castillo-Manzano, & Lourdes Lopez-Valpuesta. (2013). Check-in services and passenger behaviour: Self-service technologies in airport systems. *Computers in Human Behaviour*, 29. P 2431-2437; Cees Gelderman, Paul Ghijsen, & Ronnie van Diemen. (2011). Choosing self-service technologies or interpersonal services: The impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*. 18. P 414-421 and Andreas Wittmer. (2011). Acceptance of self-service check-in at Zurich airport. *Research in Transportation Business and Management*. 1. P 136-143.

<sup>96</sup> See for example: Haluk Demirkan, & Jim Spohrer. (2014). Developing a framework to improve virtual shopping in digital malls with intelligent self-service systems. *Journal of Retailing and Consumer Services*, 21. P 860-868; Katrin Kallweit, Philipp Spreer, & Waldemar Toporowski. (2014). Why do customers use self-service information technologies in retail? The mediating effect of perceived service quality. *Journal of Retailing and Consumer Services*, 21. P 268-276, and Hayley Peterson. (6 Aug 2015). McDonald's shoots down fears it is planning to replace cashiers with kiosks. *Business Insider*. Retrieved from: <http://www.businessinsider.com/what-self-serve-kiosks-at-mcdonalds-mean-for-cashiers-2015-8>

*international one-stop access initiatives*” provide comprehensive overviews of national and international kiosk use this report follows their findings, updating them where appropriate.<sup>97</sup>

### *Canada*

Federal Government departments have embraced e-government services to varying degrees. As example, Service Canada has kiosk service, however these kiosks are web-terminals, which only provide access to dedicated websites associated with Service Canada.<sup>98</sup> On the other end of the spectrum, Canada Postal Service is planning on offering e-commerce options for parcels, featuring drive-through service and change rooms for trying on on-line purchases.<sup>99</sup>

Provincially, there appears to be varying degrees of success with kiosks, ranging from relatively successful implementations in British Columbia (BC) to implementations and then removals in Ontario (ON). Not all projects in BC were successful, however. In 2012, Kernaghan’s report discussed several kiosk services in smaller BC centres, which are no longer in use.<sup>100</sup> A public service announcement from 2014 out of the City of Vancouver provides information on a “Pop-up City Hall.”<sup>101</sup> At these Pop-up City Hall events, citizens in various locations could get recycling and city-oriented information (including updates on public consultations); register to vote or to attend classes, and learn about job opportunities and recreational programs. This program is similar to Boston’s i-City project or “Mobile City Hall” or even Edmonton’s mobile city hall project (see below). The Province of Ontario has had less success with its kiosk initiatives. In 2012, Alex Ballingall, of the Star, reported that the provincial

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<sup>97</sup> Ken Kernaghan. (2012). *Anywhere, anytime, any device: Innovations in public sector self-service delivery*. A report prepared for the PSSDC-PSCIOC Research Committee. Retrieved from: [http://www.iccs-isac.org/library/2011/10/Self-Service\\_Kernaghan-Report-Final-Sept-2012.pdf](http://www.iccs-isac.org/library/2011/10/Self-Service_Kernaghan-Report-Final-Sept-2012.pdf)

<sup>98</sup> Discussion with Service Canada Manager, 5 May, 2016.

<sup>99</sup> Marina Strauss. (20 October, 2015). *Canada Post embracing e-commerce with modern pickup centres*. The Globe and Mail. <http://www.theglobeandmail.com/report-on-business/canada-post-embracing-e-commerce-with-modern-pickup-centres/article26897779/>

<sup>100</sup> As example, in Kernaghan’s 2012 report, the City of Kamloops installed a kiosk system; however, at present that system is no longer functioning (as per email correspondence with Marvin Kwiatkowski, Development and Engineering Services Director, City of Kamloops).

<sup>101</sup> Pop-Up City Hall. City of Vancouver. Retrieved from: <http://vancouver.ca/news-calendar/pop-up-city-hall-news.aspx>

government was permanently pulling all its ServiceOntario kiosks because of security breaches.<sup>102</sup>

### *Alberta*

The Enoch Reserve has partnered with Advanced Kiosk systems to provide kiosk service for the River Cree Casino in Enoch, Alberta.<sup>103</sup> The Advanced Kiosk system in place at River Cree Casino provides coupons to users. Although, similar to Edmonton, varieties of product/information/web-enabled kiosks exist in retail and banking environments, the City of Calgary does not have kiosks beyond parking oriented systems.

### *Edmonton*

Kiosk use in Edmonton varies considerably. As an example, Landmark Theatres have kiosks for ticket sales;<sup>104</sup> many chain grocery stores have kiosks for grocery checkout;<sup>105</sup> and every bank and its attendant branches, including independent credit unions like the River City Credit Union, has at least one automatic teller machine. Internal to the COE, kiosks are used in various applications, ranging from ticket kiosks for Transit, e-Parking, and wayfinding to pilot projects in Community Recreation Facilities based on the Synced Media kiosk design. The Recreation Facilities has developed their RFP kiosk pilot project at no cost to the COE. Synced Media is providing three kiosks and selling advertisements. Consequently, the City does not pay for the installation or the upkeep as the advertising revenue generates the maintenance costs. Note that the City has right of first refusal on the advertisements. At the end of the pilot the department will be reassessing what programs were accessed and the ease of use for their customers. It appears the chosen kiosks fall under the ‘convenience computer’ category, rather than the ‘kiosk’ category.

### *The Rest of the World*

This section is organized alphabetically rather than geographically; therefore, European solutions precede any kiosk initiatives that originate in the United States.

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<sup>102</sup> Alex Ballingall. (6 November 2012). *Government to pull plug on all ServiceOntario Kiosks* [Ontario government pulls plug on kiosks – security issue - https://www.thestar.com/news/Canada/2012/11/06/government\\_to\\_pull\\_plug\\_on\\_all\\_serviceontario\\_kiosks.html](https://www.thestar.com/news/Canada/2012/11/06/government_to_pull_plug_on_all_serviceontario_kiosks.html)

<sup>103</sup> *Our Work*, Advanced Kiosks. Retrieved from: <http://www.advancedkiosks.com/our-work.php>

<sup>104</sup> See for example: Landmark Cinemas 9, Edmonton City Centre

<sup>105</sup> See for example: The self-serve kiosks at Safeway, Sav-On, Superstore, etc.

## *Europe*

In addition to the various retail oriented kiosk services, there are several innovative government oriented kiosk services in Europe. As an example, in 2013, Barcelona introduced its Virtual Citizen Services Centre.<sup>106</sup> This Centre was a “Cisco Remote Expert for Government Services” solution, featuring high-definition video and high-quality audio; a touch screen and virtual keyboard to display and fill out documents; a high-definition camera and scanner; and a printer. Citizens could press a button on the screen to connect with local agents for assistance. Moreover, the booth could be installed at any Internet-enabled location such as shopping centres, libraries, and post offices.

Writing on the Kiosk Marketplace Blog, marketing professional Vlad Kravstov investigated bill payment kiosks in Eastern European countries. Kravstov estimates the total number of kiosks at more than 500,000 devices.<sup>107</sup> These kiosks typically include the ability to make utility, phone, and insurance payments; transfer money; and deal with work-related payments like employment insurance or pension fund deposits. He writes, “Bill payment kiosks provide a convenient alternative to online or at bank branch payment that is quite appealing to the unbanked population which varies by country, but usually represents a high percentage of the overall population.”<sup>108</sup> Also, the general availability of bill payment kiosks prompts greater use of smart cards like electronic wallets, as alternatives to bank accounts. This evidence is borne out in research done by Slack and Rowley who address government use of technology, particularly around citizen identification, “including smart cards, PINs, and other technologies, such as biometrics and voice signatures”<sup>109</sup>.

## *United States*

There are several kiosk installations in the United States. Kernaghan’s 2012 report notes the following Federal Government departments that use kiosks: The Department of Housing and Urban Development, the US Department of Personnel Management, the Federal Technology

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<sup>106</sup> *Barcelona City Hall launches a pioneer virtual citizen services centre in Europe.* (7 March, 2013). Retrieved from: <https://newsroom.cisco.com/press-release-content?articleId=1152709>

<sup>107</sup> Vlad Kravstov. (2 July 2013). *The evolution of bill payment kiosks in eastern European countries.* Retrieved from: <http://www.kioskmarketplace.com/blogs/the-evolution-of-bill-payment-kiosks-in-eastern-european-countries/>

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

Services of General Services Agency, and the US Postal Service.<sup>110</sup> As with the Canadian examples, many of the installations are discontinued while others are newly created. Following President Barack Obama's digital government initiative, it may be expected that more kiosk-oriented development will occur.<sup>111</sup>

In 2002, Pennsylvania announced that it would be installing kiosks in three of the state's heritage parks as part of a series of grants. The kiosks were located in Bucks County, southwest Pennsylvania, and along the National Road Corridor.<sup>112</sup> Additional kiosks were installed at the Penn State University in October of that year. Other tourism and traffic information kiosks were added in November, also of that year. Although there was installation information available, there are no follow-up records indicative of issues with these programs. More recently, in 2016, Maryland has increased its self-service options by providing emissions-testing kiosks in 18 new locations. If vehicles fail the test, then the citizen must take it to a full-service vehicle inspection location for further testing.<sup>113</sup>

The City of Boston showcases a very innovative, and current program.<sup>114</sup> The Mobile City Hall, “[i]nspired by food trucks, ... is about serving city residents where they live, work and play. City Hall To Go will visit Boston's neighborhoods throughout the year and offer a select menu of city services directly to constituents.”<sup>115</sup> The services available in the Mobile City Hall range from paying parking tickets, accessing registry services or certificates, getting licenses or

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<sup>110</sup> A search on kiosks for the various departments listed provides only dated results. As example, Housing and Urban Development (HUD.gov) turns up 69 archived references, the most recent from 2012. A “state of the web” archive page, dated September 2007, discusses upgrading and modernizing their kiosks (see <http://archives.hud.gov/reports/stateofweb/webstate07.cfm>). Searches on the Office of Personnel Management (<https://www.opm.gov/>), the General Services Agency (<http://www.gsa.gov/portal/category/100000> most recent reference is 2013, informing clients that federal buildings will have lobby kiosks sharing building energy data - [http://www.gsa.gov/portal/mediaId/170911/fileName/CES\\_Energy\\_and\\_Conservation\\_Standards\\_Q\\_&\\_A\\_April\\_2013.action](http://www.gsa.gov/portal/mediaId/170911/fileName/CES_Energy_and_Conservation_Standards_Q_&_A_April_2013.action)) nets similar results. The US Postal Service ([http://www.gsa.gov/portal/mediaId/170911/fileName/CES\\_Energy\\_and\\_Conservation\\_Standards\\_Q\\_&\\_A\\_April\\_2013.action](http://www.gsa.gov/portal/mediaId/170911/fileName/CES_Energy_and_Conservation_Standards_Q_&_A_April_2013.action)) has information current to 2014.

<sup>111</sup> Digital government: *Building a 21<sup>st</sup> Century platform to better serve the American people*. Retrieved from: <https://www.whitehouse.gov/sites/default/files/omb/egov/digital-government/digital-government.html>

<sup>112</sup> *Pennsylvania: land of kiosks*. (19 February 2002). Retrieved from: <http://www.kioskmarketplace.com/articles/pennsylvania-land-of-kiosks/>

<sup>113</sup> Buel Young. (5 April 2016). *MVA expands new self-service VEIP kiosks: Customer convenience drives expansion of seven new easy-to-use kiosks, Governor Hogan reduces kiosk fee from \$14 to \$10*. Retrieved from: <http://www.mva.maryland.gov/about-mva/press-releases/2016/04.05.16%20htm>

<sup>114</sup> *The Mobile City Hall*. (February 2013). Torontoist. Retrieved from: <http://torontoist.com/2013/02/public-works-the-mobile-city-hall/>

<sup>115</sup> *City Hall to go*. City of Boston. Retrieved from: <http://www.cityofboston.gov/cityhalltogo/truck.asp>. See also [http://www.cityofboston.gov/cityhalltogo/menu/New\\_Urban\\_Mechanics](http://www.cityofboston.gov/cityhalltogo/menu/New_Urban_Mechanics) <http://newurbanmechanics.org/project/city-hall-to-go/>



notary services, filing claims or voting, accessing park and recreation services to informational alerts.<sup>116</sup> Occasionally, councilors are in attendance, particularly when the Mobile City Hall is scheduled to be in their ward. Edmonton's Citizen Services launched a similar Mobile City Hall project in Edmonton in 2015. The "City Hall" attended festivals, major events (i.e. Big Bin events), featuring 311 information; access to councilors is various wards; and information about town hall meetings in neighbourhoods. However, at the end of the six-month pilot project, the increase in citizen engagement as a result of the project was insufficient to warrant the project cost.<sup>117</sup>

In Texas, Arlington provides payment kiosks for its citizens who wish to pay their water bills.<sup>118</sup> There is little information on-line about kiosks in Oregon; however, Portland features a "Know your City" kiosk project which is a mobile kiosk offering interested parties information about Portland's history and current activities.<sup>119</sup> This last kiosk is more representative of a small store in the middle of a mall.

#### Kansas City's "Smart City" Program and New York's Link.NYC

The primary purpose of this report is to provide a rationale for a web enabled kiosk system that the COE could not only implement for its Integrated Front Counter but also potentially install in other locations in Edmonton. This system would be a forward thinking, Open Data-oriented, Smart City-based system where citizens engage with the City on many levels. Two instances of this type of kiosk installation stand out: Kansas City's "Smart City" Program and New York City's Link.NYC.

#### *Kansas City's "Smart City" Program*

Another kiosk-related includes Kansas City's integration of kiosks into their "Smart City" program. This program, similar to LinkNYC below, provides free Wi-Fi over fifty blocks; "smart" streetlights that reduce energy consumption; information about local businesses and events, as well as access to city services.<sup>120</sup> The program appears to be a small-scale version of the LinkNYC project in New York City.

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<sup>116</sup> *City hall to go*, City of Boston: Retrieved from: <http://www.cityofboston.gov/cityhalltogo/menu/>

<sup>117</sup> Stakeholder interview, 14 July 2016.

<sup>118</sup> Ryan Hunt. (1 February, 2016) *Arlington Water Utilities unveils new payment kiosks*. Retrieved from: <http://www.arlington-tx.gov/news/2016/02/01/arlington-water-utilities-unveils-new-payment-kiosks/>

<sup>119</sup> *Know your city* (Portland), knowyourcity.org <https://www.kickstarter.com/projects/1607251927/know-your-city-kiosk/posts/923123>

<sup>120</sup> Chris Hernandez. (5 May 2016). *Kansas City launches world's most connected city*. Retrieved from: <http://kcmo.gov/news/2016/Kansas-city-launches-world-most-connected-smart-city/>. See also Bobby Burch. (07

### *The LinkNYC project*

One of the most innovative kiosk systems available, called LinkNYC, is found in New York City. This system allows New Yorkers to connect to free Wi-Fi, browse the web and access city services, make phone calls, see public announcements and charge their USB devices.<sup>121</sup> This ambitious project replaced pay-phone booths with a multi-functional kiosk system with integrated wayfinding capacity. LinkNYC's website states

LinkNYC is a first-of-its-kind communications network ... across the five boroughs with new structures called Links. Each Link will provide superfast, free public Wi-Fi, phone calls, device charging and a tablet for Internet browsing, access to city services, maps, and directions.<sup>122</sup>

The system is in BETA right now; however, coordinators indicate that it is quite well received.<sup>123</sup> In conversation with COE stakeholders, it became apparent a similar system could benefit Edmontonians. Although much of the physical infrastructure for telephone booths has been removed from the streets of Edmonton, the underground cables still exist and could be repurposed to this initiative.

Additionally, the COE has invested in e-park kiosks that could potentially be retrofitted to serve the same functions as the Link.NYC's kiosks. Moreover, the system is paid for through local businesses that advertise on the large screens on the side of the kiosk. The website claims the system uses a:

Groundbreaking digital OOH advertising network [which] not only provides brands with a rich, context-aware platform to reach New Yorkers and visitors, but will generate more than a half billion dollars in revenue for New York City.<sup>124</sup>

This form of income generation is in line with current projects underway in Recreation Facilities, and could be the model the COE develops for its entire Smart-City kiosk system. While the

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March, 2016). *Kansas City's Smart City taking shape with kiosk's arrival*. Retrieved from: <http://www.startlandnews.com/2016/03/Kansas-City's-smart-city-taking-shape-kiosks-arrival/> and Ben Miller. (29 March 2016). *Kansas City, MO., installs first smart city kiosks downtown*. Retrieved from: <http://www.govtech.com/fs/Kansas-City-Mo-Installs-First-Smart-City-Kiosks-Downtown.html>

<sup>121</sup> Link.NYC. Retrieved from: <https://www.link.nyc>

<sup>122</sup> Ibid.

<sup>123</sup> Stakeholder communications, dated 16 June and 22 July 2016.

<sup>124</sup> Ibid.

kiosks are American Disability Association compliant, inquiries into their PCI compliance turned up null. However, because PCI compliance is a worldwide industry standard, it is likely New York City has off-loaded its PCI requirements to the vendor, and like the COE, maintains documentation outlining what the City administration would do in the event of a breach.

Using a Kansas City “Smart City” or LinkNYC type kiosk system in conjunction with continuing the “City Hall to Go” idea may increase engagement, access and citizen/government relationships within Edmonton.

## RECOMMENDATIONS

Over the course of this report, the overriding goal has been to examine what elements related to kiosks would heighten engagement for Edmonton citizens. Ya Ni and Tat-Kei Ho (2005), provide concise recommendations for kiosk development based on planning, communication, investment, monitoring, and full-cost accounting. Specifically, they write:

1. Have a realistic strategic plan. Policymakers and IT managers need to have a strategic plan that has a well-defined purpose and scope and realistic and measurable expectations. The plan should also be integrated with an agency’s mission and long-term performance goals. Event-specific projects may be valuable for public agencies at a given time; however, it may turn out to be obsolete after some time and create unnecessary financial and administrative burdens.
2. Strengthen communication among partnering agencies, constituency groups, and various IT units. Since many kiosk projects involve multiple external partners that may have conflicting goals and expectations, it is critical to involve them early and communicate with all of these groups in the strategic planning process to identify, negotiate, and develop a common understanding and collective long-term vision for a kiosk project.
3. Do not overlook the necessary investment of “back-end” support for kiosk projects. Public agencies need to find a proper balance between showing visible successes, such as placing kiosks in major public places, and investing in costly and inconspicuous IT infrastructure that is not publicly visible but is critical to the agencies’ long-term capacity to implement e-Government strategies.

4. Have a system of performance monitoring. Policymakers need to think about performance issues of a kiosk system over a longer time horizon and to pay attention to system sustainability. Public reporting of performance results should include multiple-year comparisons to allow policymakers and the public to monitor performance of IT investments over time. Greater transparency of kiosk system performance may lead to greater accountability and give managers and policymakers some incentive to think twice before they advocate for a new project.
5. Implement full cost accounting for kiosk projects. All projects, including those funded by external grants or equipment donations, should include a long-term financing plan that shows not only the initial start-up costs, such as software acquisition and hardware costs but also the operating and maintenance costs throughout the expected life span of the equipment or hardware. Performance analysis of a project, such as a cost-effectiveness analysis, should also include the full costs using best possible estimates. This information will help policymakers and managers think beyond the need of the project-launching phase and pay more attention to the human capital demands and related costs in e-government projects during the system operational phase.<sup>125</sup>

However, there are more Edmonton-specific recommendations to consider, and these considerations are laden with stakeholder impressions. First, as stated earlier, with the complexity user needs with respect to e-Government, this report recommends the IFC does not have kiosks when the ISC opens. Rather, the ISC project team should install kiosks after six months to one year of the ISC opening its doors. This recommendation allows the IFC project team to monitor the business processes that develop as a result of the amalgamation of several departments at the Civic Centre and then tailor kiosk use to those new processes.

Second, any kiosks installed at the COE should provide a similar user experience. This experience should be tailored to a more “app” oriented environment, as the mobile “app” oriented landscape is familiar to users. The kiosks should be programmed so the “apps” installed on the kiosk mirror the department in which the kiosks are in – as an example, when a kiosk is located in a recreation facility, the recreation facility’s “applications” would be on top. Other COE “apps” would be accessible to the user as needed/desired.

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<sup>125</sup> Anna Ya Ni, & Alfred Tat-Kei Ho. (2005). Challenges in e-government development: Lessons from two information kiosk projects. *Government Information Quarterly* 22, p 69-70.

Third, and related to similar kiosks in all departments, it is also recommended that the COE use its existing kiosks to capacity. There are several locations in the COE that use kiosks presently (as example: e-Parking, and Transit), and these kiosks could be retrofitted or changed out at the end of their service contract to match new kiosks. These kiosks could also be retrofitted to include the functionality found in the Kansas City or LinkNYC kiosks. Existing kiosks should be assessed for use, abuse, robustness (as they are often found out of doors, and Edmonton's weather can be demanding) and have good haptics and visuals.

Fourth, as the City's primary service channel is the Edmonton.ca website (as noted on the Branch information for Customer Information Services), then perhaps any kiosks that are purchased, installed or negotiated, should access the web portal, as per the 'app' oriented suggestion. Moreover since the website user interface is changing shortly, it makes sense to incorporate any end user training or change management regarding kiosk use into corresponding website information sessions. Since the COE provides free Wi-Fi access to citizens, more education as to how to access the Wi-Fi to save their data is important.

Fifth, the COE should develop a broadly focused Customer Service Strategy, which provides a platform for the City to monitor and update existing customer service programs across the various departments. This Customer Service Strategy would include a Channel Strategy where customer access to the City is outlined clearly. These two tools – an overall Customer Service Strategy and a co-existing Channel Strategy – allow the COE the ability to offer “OneCity” to its citizens based on robust end user requirements. It also allows the COE to respond to future innovations in technology. Moreover, the Channel Strategy would clearly outline the intent of kiosk use at the COE, enabling effective decision-making regarding the ROI of kiosks on an ongoing basis. Once the kiosks are installed, they would provide a source for additional data to be used in the bi-directional communication that presently occurs between the COE and its citizens.

Consequently, when considering installing kiosks in a single location like the Integrated Front Counter, it behooves the City of Edmonton to expand its vision to a greater citywide kiosk-oriented project that enables the municipality to take advantage of existing and future technologies. This expansion includes the formation of a Customer Service Strategy and a

Channel Strategy that incorporate kiosks. In this expansion, the goal of increased citizen engagement, integration into Smart City philosophies and Open Data initiatives will be met and executed appropriately. The expansion also aligns with the overall goals set under the Sustainability Goal 11, from the United Nations.

## BIBLIOGRAPHY

*“Are you being served? Do self-service machines benefit consumers?”* (29 January 2016).

Retrieved from: <http://www.cbc.ca/marketplace/episodes/2015-2016/self-serve>

*“Barcelona City Hall launches a pioneer virtual citizen services centre in Europe.”* (7 March

2013). Retrieved from: <https://newsroom.cisco.com/press-release-content?articleId=1152709>

*“Best practice for implementing PCI DSS.”* .. Retrieved from:

<http://pcidsscompliance.net/implementing-pci-dss/best-practice-for-implementing-pci-dss-in-to-your-organization/>

*“Building energy data.”*.. Retrieved from:

[http://www.gsa.gov/portal/mediaId/170911/fileName/CES\\_Energy\\_and\\_Conservation\\_Standards\\_Q\\_&\\_A\\_April\\_2013.action](http://www.gsa.gov/portal/mediaId/170911/fileName/CES_Energy_and_Conservation_Standards_Q_&_A_April_2013.action)

*“City hall to go, Menu.”*.. City of Boston: Retrieved from:

<http://www.cityofboston.gov/cityhalltogo/menu/>

*“City Hall to go.”* .. Retrieved from <http://www.cityofboston.gov/cityhalltogo/>

*“City Hall to go, Truck.”*.. Retrieved from: <http://www.cityofboston.gov/cityhalltogo/truck.asp>.

*“City vision and strategic plan.”* Retrieved from: [http://www.edmonton.ca/city\\_government/city-vision-and-strategic-plan.aspx](http://www.edmonton.ca/city_government/city-vision-and-strategic-plan.aspx)

*“Customer Service Strategy, Regina.”* .. Retrieved from:

<https://portal.publicpolicy.utoronto.ca/en/ContentMap/citiesandcommunitydevelopment/UrbanPolicyandMunicipalGovernance/Practice%20Area%20Library/City%20of%20Regina%20Customer%20Service%20Strategy.pdf>

*“Digital Government: Building a 21st century platform to better serve the American people,”* ..

Retrieved from: <https://www.whitehouse.gov/sites/default/files/omb/egov/digital-government/digital-government.html>

*“Embrace Smart Technology.”* .. Retrieved from

<http://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities.html>

*“General Services Agency.”*.. Retrieved from: <http://www.gsa.gov/portal/category/100000>

*“Global demand for self-service kiosks largely influenced by its adoption in the retail sector; says Technavio.”* (2 February 2016). Retrieved from <http://login.ezproxy.library.ualberta.ca/login?url=http://search.proquest.com/login.ezproxy.library.ualberta.ca/docview/1761799931?accountid=14474>

*“Government kiosks provide greater efficiency.”* .. Retrieved from: <http://www.slabbkiosks.com/government.php>

*“Government kiosks: Local and national level.”* .. Retrieved from: <http://www.cammaxlimited.co.uk/solution/government-projects/>

*“Government kiosks.”* .. Retrieved from: <http://www.advancedkiosks.com/self-service-kiosks/government-kiosks.php>

*“Government kiosks.”* .. Retrieved from: <http://www.olea.com/kiosk-applications/government-kiosks/>

*“Housing and Urban Development.”* .. Retrieved from: <http://archives.hud.gov/reports/stateofweb/webstate07.cfm>

*“How companies are using technology to boost the customer experience.”* (19 February 2016). Retrieved from: [http://www.businessinsider.in/How-companies-are-using-technology-to-boost-the-customer-experience/articleshow/51062615.cms?utm\\_source=ten\\_minutes\\_with&utm\\_medium=Referral&utm\\_campaign=Content\\_Partnership](http://www.businessinsider.in/How-companies-are-using-technology-to-boost-the-customer-experience/articleshow/51062615.cms?utm_source=ten_minutes_with&utm_medium=Referral&utm_campaign=Content_Partnership)

*“Improved service to the community.”* .. Retrieved from: <http://neoproductsgroup.com/industries/government>

*“Intersection is a technology and media company redefining the urban experience.”* .. Retrieved from: <http://www.intersection.com/>

*“KCMO = The world’s most connected Smart City.”* Retrieved from <http://kcmo.gov/smartcity/>

*“Kiosk EMV compliance vs. PCI kiosk compliance with thanks to Andrew Savala of KioskSimple.”* .. Retrieved from <http://kioskindustry.org/kiosk-emv-compliance-vs-pci-kiosk-compliance/>



- “*Kiosk vs. mobile: Industry insiders weigh in.*” (25 January 2011). Retrieved from:  
<http://www.retailcustomerexperience.com/articles/kiosk-vs-mobile-industry-insiders-weigh-in/>
- “*Kiosks provide customer experience boost for local governments.*” (2 May 2016). Retrieved from <http://www.kioskmarketplace.com/blogs/kiosks-provide-customer-experience-boost-for-local-governments/>
- “*Kioware PA-DSS Certification.*” Retrieved from [www.kioware.com](http://www.kioware.com)
- “*Know your total cost of ownership.*” (2015). Louisville: Network Media Group DBA Network Alliance, LLC. Retrieved from:  
<http://login.ezproxy.library.ualberta.ca/login?url=http://search.proquest.com/login.ezproxy.library.ualberta.ca/docview/1783942170?accountid=14474>
- “*Lilitab PCI compliance statement.*”.. Retrieved from: <https://www.lilitab.com/pages/pci-compliance-statement>
- “*Londoners finding kiosks a big i-plus.*” (2 March 2002). Retrieved from:  
<http://www.kioskmarketplace.com/articles/londoners-finding-kiosks-a-big-i-plus/>
- “*New Urban Mechanics.*” .. Retrieved from: <http://newurbanmechanics.org>
- “*Office of Personnel Management.*”.. Retrieved from: <https://www.opm.gov/>.
- “*Our Kiosks.*”.. Retrieved from: <http://www.advancedkiosks.com/self-service-kiosks/our-kiosks.php>
- “*Pcpolicyportal.com Launches All New PCI Policy Templates Packet for Self Service Kiosk Machines for Merchants Seeking Rapid & Comprehensive PCI DSS Certification in 2015.*” (26 February 2015). Retrieved from  
<http://www.prweb.com/releases/2015/02/prweb12542819.htm>
- “*Pennsylvania: land of kiosks.*” (19 February 2002). Retrieved from:  
<http://www.kioskmarketplace.com/articles/pennsylvania-land-of-kiosks/>
- “*Prepping kiosks for EMV.*” (2015). Louisville: Network Media Group DBA Network Alliance, LLC. Retrieved from:

<http://login.ezproxy.library.ualberta.ca/login?url=http://search.proquest.com.login.ezproxy.library.ualberta.ca/docview/1783035531?accountid=14474>

“*Research and Markets.*” (17 February 2016). Retrieved from:

<http://www.researchandmarkets.com/research/vnrmsl/global>

“*River Cree Casino, Enoch Alberta.*” .. Retrieved from: <http://www.advancedkiosks.com/our-work.php>

“*Security and PCI compliance for retail point of sale systems.*” (2010). Retrieved from:

<http://www.mcafee.com/ca/resources/solution-briefs/sb-security-pci-compliance-retail-pos.pdf>

“*Self-Service Kiosks, General requirements.*” .. Retrieved from:

<http://www.accessforward.ca/general/self-service-kiosks>

“*Smart card basics.*” .. Retrieved from: <http://www.smartcardbasics.com/>

“*Smarter cities. Connected citizens.*” .. Retrieved from <http://civiqsmartscales.com/company>

“*Solutions for government.*” .. Retrieved from: <http://zivelo.com/industry/government/>

“*Solutions.*” .. Retrieved from <http://civiqsmartscales.com/solutions>

“*State and local government solutions.*” .. Retrieved from:

[http://www.dynatouch.com/government/state\\_local\\_gov\\_kiosk.aspx](http://www.dynatouch.com/government/state_local_gov_kiosk.aspx)

“*Strategies for successful kiosk implementation types of kiosks.*” (2004). Retrieved from:

<http://www.elotouch.com/Solutions/CaseStudies/kioskwp.asp>

“*Summit research associates.*” .. Retrieved from: <http://www.summit-res.com/>

“*Sustainable Development Goals.*” .. Retrieved from: <https://sustainabledevelopment.un.org>.

“*Synced interactive technology.*” .. Retrieved from: <http://syncedmedia.com/products>

“*Take a side on self-service.*” (27 January 2016). Retrieved from:

<http://www.cbc.ca/marketplace/blog/self-serve>

“*Top Kiosk software products.*” .. Retrieved from: <http://www.capterra.com/kiosk-software/>

“*Transport for London: Delivering e-government.*” (2004). London, UK: City of London.

Retrieved from: <http://content.tfl.gov.uk/e-gov.pdf>

“*Transportation coordination platform for cities.*”.. Retrieved from:

<http://www.sidewalklabs.com/flow/index.html>

“*The US Postal Service.*”.. Retrieved from:

[http://www.gsa.gov/portal/mediaId/170911/fileName/CES\\_Energy\\_and\\_Conservation\\_Standards\\_Q\\_A\\_April\\_2013.action](http://www.gsa.gov/portal/mediaId/170911/fileName/CES_Energy_and_Conservation_Standards_Q_A_April_2013.action)

“*When customer service becomes self-service.*” (September 2014). Retrieved from:

Consumerreports.org, 33-35

Alexander, M., MacLaren, A., O’Gorman, K., & White, C. (2012). Priority queues: Where social justice and equity collide. *Tourism Management*, 33, 875-884.

Anderson, E. (16 Jan 2015). *Is a kiosk or tablet best for self-service registration?* Retrieved from: [http://www.kioskmarketplace.com/blogs/is-a-kiosk-or-tablet-best-for-self-service-registration/?utm\\_source=NetWorld%20Alliance&utm\\_medium=email&utm\\_campaign=EMNAKMC01202015](http://www.kioskmarketplace.com/blogs/is-a-kiosk-or-tablet-best-for-self-service-registration/?utm_source=NetWorld%20Alliance&utm_medium=email&utm_campaign=EMNAKMC01202015)

Arnfield, R. (9 April 2014). *PCI compliance essential for kiosk operators.* Retrieved from <http://www.kioskmarketplace.com/articles/pci-compliance-essential-for-kiosk-operators/>

Asgarkhani, M. (2007). The reality of social inclusion through digital government. *Journal of Technology in Human Services*, 25(1-2), 127-146, DOI: 10.1300/ J017v25n01\_09

Atoji, C. .. *Self-service technology helps companies help themselves.* Retrieved from: <http://searchcio.techtarget.com/tip/Self-service-technologies-help-companies-help-themselves>

Ballingall, A. (26 December 2012). *Ontario government pulls plug on kiosks: Security issue.*

Retrieved from:

[www.thestar.com/news/canada/2012/11/06/government\\_to\\_pull\\_plug\\_on\\_all\\_serviceontario\\_kiosks.html](http://www.thestar.com/news/canada/2012/11/06/government_to_pull_plug_on_all_serviceontario_kiosks.html)

- Barthold, K. (2013). *San Antonio, TX audit report Payment Card Industry Data Security Standards, Security governance*. Retrieved from <https://www.sanantonio.gov/Portals/0/Files/CityAuditor/Reports/FY2013/AU13-012.pdf>
- Beatson, A., Lee, N., & Coote, L.V. (2007). Self-Service technology and the service encounter. *The Service Industries Journal*, 27(1), 75-89, DOI: 10.1080/02642060601038700
- Bernardi, J. (2000). *Review of international one-stop access initiatives. Report for Service Canada, Implementation Team*. Toronto, ON: Institute of Public Administration of Canada. Retrieved from: [www.iccs-isac.org/en/pubs/sw\\_bernardi.doc](http://www.iccs-isac.org/en/pubs/sw_bernardi.doc)
- Bhargav, A. (2014). *PCI Compliance: The definitive guide*. Boca Raton, FL: Taylor Francis Group
- Blackwell, G. (22 June 2004). *Brussels: The unwired city*. Retrieved from: <http://www.wi-fiplanet.com/columns/article.php/3372031/Brussels-Unwired-City.htm>
- Bosch, R. (2005). *Oshawa Customer Service Strategy*, City of Oshawa. Retrieved from: <https://www.oshawa.ca/city-hall/resources/customerservicestrategy.pdf>
- Brock, E. (2010). *Self-service government: Machines can handle money, dispense supplies and more*. American City and Country.com. Prism Business Media. Retrieved from: <http://americancityandcounty.com/technology/government-automation-201003>
- Brown, J. (2 August 2012). *Are government kiosks making a comeback?* Retrieved from: <http://www.govtech.com/e-government/Are-Government-Kiosks-Making-a-Comeback.html>
- Buell, M., & Norton, M. I. (2011). The labor illusion: How operational transparency increases perceived value. *Management Science*, 57(9), 1564-1579.
- Burch, B. (07 March, 2016). *Kansas City's Smart City taking shape with kiosk's arrival*. Retrieved from: <http://www.startlandnews.com/2016/03/Kansas-City's-smart-city-taking-shape-kiosks-arrival/>
- Canada Health Infoway .. *Kiosks a boon to triage nurses, ER patients. A special report from Canada Health Infoway, Electronic Health Records for Canadians*. Retrieved from: [http://v1.theglobeandmail.com/partners/free/infoway/article\\_kiosks.html](http://v1.theglobeandmail.com/partners/free/infoway/article_kiosks.html)

- Canright, C. (2012). At your self-service: To complement brick and mortar storefronts, kiosk stations offer cost-slimming retail growth and customer driven service. *IBM Mag.org, ICBA Independent Banker*. 36-38.
- Carrington, D. (16 January 2013). *US mobile payments forecast 2013-2017: Mobile payments to reach \$90B by 2017*. Retrieved from: [http://blogs.forrester.com/denee\\_carrington/13-01-16-us\\_mobile\\_payments\\_forecast\\_2013\\_2017\\_mobile\\_payments\\_to\\_reach\\_90b\\_by\\_2017](http://blogs.forrester.com/denee_carrington/13-01-16-us_mobile_payments_forecast_2013_2017_mobile_payments_to_reach_90b_by_2017)
- Castillo-Manzano, J., & Lopez-Valpuesta, L. (2013). Check-in services and passenger behaviour: Self service technologies in airport systems. *Computers in Human Behaviour*, 29, 2431-2437.
- Castro, D., Atkinson, R., & Ezell, S. (2010). *Embracing the self-service economy*. Information Technology and Innovation Foundation. Retrieved from [www.itif.org](http://www.itif.org).1-54
- Chang, H-L., & Yang, C-H. (2007). Do airline self-service check-in kiosks meet the needs of passengers? *Tourism Management*. 29, 980-993.
- Cisco Systems (2011). *Cisco PCI solution for government: Securing citizen payment card data*. Retrieved from: [http://www.cisco.com/c/dam/en\\_us/solutions/industries/docs/gov/Public-Sector\\_AAG\\_PCI.pdf](http://www.cisco.com/c/dam/en_us/solutions/industries/docs/gov/Public-Sector_AAG_PCI.pdf)
- City of Brampton. (8 April 2016). *Brampton City Service Strategy*. Retrieved from: <http://www.brampton.ca/EN/City-Hall/News/Pages/Media-Release.aspx/234>
- City of Brantford. (2013). *Customer Service Strategy*. City of Brantford. Retrieved from: <https://mybrantford.ca/CustomerServiceStrategy.aspx>
- City of Edmonton. (17 June 2016) *Dashboard*. Retrieved from: <https://dashboard.edmonton.ca/en/stat/goals/ybf9-nqrg/dnp6-7sbv/xtcu-jpb6>
- City of Edmonton. (17 June 2016). *Foundational elements*. Retrieved from: [http://www.edmonton.ca/city\\_government/initiatives\\_innovation/foundational-elements.aspx](http://www.edmonton.ca/city_government/initiatives_innovation/foundational-elements.aspx)
- City of Edmonton. (2015). *Branch-customer information services*. Retrieved from; [http://www.edmonton.ca/city\\_government/documents/PDF/Budget2015\\_Customer\\_Information\\_Services.pdf#search=onecity](http://www.edmonton.ca/city_government/documents/PDF/Budget2015_Customer_Information_Services.pdf#search=onecity)

City of Edmonton. .. *Customer information services: 2016-2018 Business plan*. Retrieved from:

[http://onecity.edmonton.ca/assets/PDFs/CIS\\_BusinessPlan.pdf#search=customer information services 2016-2018 business plan](http://onecity.edmonton.ca/assets/PDFs/CIS_BusinessPlan.pdf#search=customer%20information%20services%202016-2018%20business%20plan)

City of Edmonton. .. *Open city*. Retrieved from:

[http://www.edmonton.ca/city\\_government/initiatives\\_innovation/open-city.aspx](http://www.edmonton.ca/city_government/initiatives_innovation/open-city.aspx)

City of New York, *Link.NYC*. Retrieved from: <https://www.link.nyc>:

City of Newport. (2012). *Customer service strategy*. Retrieved from:

<http://www.newport.gov.uk/documents/Council-and-Democracy/Customer-Services-Strategy-2012-2017.pdf>

City of Vancouver. (2016). *Corporate business plan*. Retrieved from:

<http://vancouver.ca/files/cov/corporate-business-plan.pdf>

City of Vancouver. (8 May 2014). *Vancouver launches Pop-up City Hall*. Retrieved from:

<http://vancouver.ca/news-calendar/pop-up-city-hall-news.aspx>

Collier, J. E., & Barnes, D., C. (2015). Self-service delight: Exploring the hedonic aspects of self-service. *Journal of Business Research*, 68, 986-993.

Collier, J. E., & Sherrell, D.L. (2010). Examining the influence of control and convenience in a self-service setting. *Journal of the Academy of Marketing Science*, 38, 490-509, DOI: 10.1007/s11747-009-0179-4

Collier, J. E., Moore, R. S., Horkey, A., & Moore, M.L. (2015). Why the little things matter: Exploring situational influences on customers' self-service technology decisions. *Journal of Business Research*, 68, 703-710.

Collier, J., Moore, R., Blakeney, A., Moore, M., (2012). Summary brief, situational variables and attitudes towards self-service technology choice: A qualitative-quantitative approach, *Society for Marketing Advances Proceedings*. 150-151

Cooper, B. (22 May 2015). *What do millennials want from kiosks?* Retrieved from:

<http://www.kioskmarketplace.com/blogs/what-do-millennials-want-from-kiosks/>

Cullen, R. (2005). E-Government, A citizens' perspective. *Journal of E- Government*, 1(3), 5-28, DOI: 10.1300/J399v01n03\_02

- Cyprus, B. (9 October 2013). *PCI 3.0 is a wake-up call for SAQ-C merchants*. Retrieved from: <http://www.retailcustomerexperience.com/blogs/pci-30-is-a-wake-up-call-for-saq-c-merchants/>
- Dabholkar, P. A. (1996). Consumer evaluations of new technology-based self-service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing*, 13, 29-51
- Demirkan, H., & Spohrer, J. (2014). Developing a framework to improve virtual shopping in digital malls with intelligent self-service systems. *Journal of Retailing and Consumer Services*, 21, 860-868.
- Dutta, S. (2015). Getting more with self-service. *The Service Council*. Retrieved from: <http://servicecouncil.com>
- Eriksson, K., & Nilsson, D. (2007). Determinants of the continued use of self-service technology: The case of Internet banking. *Tecnovation*, 27, 159-167.
- Esprida Corporation. (2015). *Meeting PCI DSS requirements for retail kiosks: Moving from compliance to security*. Retrieved from: <http://kioskindustry.org/wp-content/uploads/2016/02/esp-pci-compliance-2015.pdf>
- European Commission. (2010). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The European eGovernment Action Plan 2011-2015 Harnessing ICT to promote smart, sustainable & innovative Government*. Retrieved from [www.umic.pt/images/stories/publicacoes5/action\\_plan\\_en\\_act\\_part1\\_v2.pdf](http://www.umic.pt/images/stories/publicacoes5/action_plan_en_act_part1_v2.pdf)
- Farooq, A. (September 2009). Haptics in kiosks and ATMS for the disabled. *Paper written for the Department of Computer Sciences, Haptic Communication and Interaction*. University of Tampere, Finland.
- Fishman, C. (1 May 2004). *The toll of a new machine, with sidebar: So you want to hire a robot: The dos and don'ts of self-service automation*. Retrieved from: <http://www.fastcompany.com/49359/toll-new-machine>

- Fombelle, P.W., Sirianni, N.J., Goldstein, N.J., & Cialdini, R. B. (2015). Let them all eat cake: Providing VIP services without the cost of exclusion for non-VIP customers. *Journal of Business Research*, 68, 1987-1996.
- Ford, T-R., & Ponder, N., (2010). Summary Brief: The impact of customer need gratification on the use of self-service technology. *The Society of Marketing Advances Proceedings*, 79-80.
- Garrish, D. (2012). *From Bizpal to Mycity in Kamloops. Institute for Citizen-Centred Service*. Retrieved from: [http://www.iccs-isac.org/en/msd/casestudies/msd\\_kamloops\\_mycity.htm](http://www.iccs-isac.org/en/msd/casestudies/msd_kamloops_mycity.htm)
- Gavett, G. (11 March 2015) *How Self-Service kiosks are changing customer behaviour*. Harvard Business Review. Retrieved from: <https://hbr.org/2015/03/how-self-service-kiosks-are-changing-customer-behavior>
- Gelderman, C.J., Ghijsen, P. W. Th., & van Diemen, R. (2011) Choosing self-service technologies or interpersonal services: The impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*, 18, 414-421.
- Giebelhausen, M., Robinson, S.G., Sirianni, N.J. & Brady, M. K. (2014). Touch versus tech: When technology functions as a barrier or a benefit to service e-counters. *Journal of Marketing*, 78, 113-124.
- Gillam, G., Simmons, K., Stevenson, D., & Weiss, E. (2014). Line, line, everywhere a line: Cultural considerations for waiting-line managers. *Business Horizons*, 57, 533-539.
- Goffin, P. (13 January 2016). *Public works: Replacing phone booths with Wi-Fi kiosks*. <http://torontoist.com/2016/01/public-works-replacing-phone-booths-with-wi-fi-kiosks/>
- Griffith-Greene, M. (28 January 2016). *Self-Checkouts: Who really benefits from technology?* <http://www.cbc.ca/news/business/marketplace-are-you-being-served-1.3422736>
- Günay, A., & Erbuğ, C. (2015). Eliciting positive user experiences with self-service kiosks: pursuing possibilities, *Behaviour & Information Technology*, 34:1, 81-93, DOI: 10.1080/0144929X.2014.937459
- Hagen, S., & Sandnes, F.E. (2010). Towards accessible self-service kiosks through intelligent user interfaces. *Personal Ubiquitous Computing*, 14, 715-721.



- Hall, C. (19 July 2011). *Government services continue to embrace self-service tech*. Retrieved from: <http://www.kioskmarketplace.com/articles/government-services-continue-to-embrace-self-service-tech/>
- Hassenzahl, M., & Tractinsky, N. (2006). User experience: a research agenda. *Behaviour & Information Technology*, 25(2), 91-97, DOI: 10.1080/01449290500330331
- Health Management Technology. (2015). “*How self-service check-in works in the real world: Baptist health CFO Katrina Belt gives the insider scoop on kiosk adoption and use by staff and patients.*” 18-19.
- Hernandez, C. (5 May 2016). *Kansas City launches world's most connected city*. Retrieved from <http://kcmo.gov/news/2016/kansas-city-launches-world-most-connected-smart-city/>
- Hunt, R. (1 February, 2016). Arlington Water Utilities unveils new payment kiosks. *Arlington Government*. Retrieved from <http://www.arlington-tx.gov/news/2016/02/01/arlington-water-utilities-unveils-new-payment-kiosks/>
- Hwang, Y., & Kim, D.J. (2007). Customer self-service systems: The effects of perceived web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems*, 43, 746-760
- Ionescu, M. (16 September 2011). *Answer these four questions before deploying kiosk network*. Retrieved from: <http://www.kioskmarketplace.com/blogs/answer-these-4-questions-before-deploying-kiosk-network/k>
- Ionescu, M. (2 September 2011). *The quick guide to self-service self-sufficiency: Part one*. Retrieved from: <http://www.kioskmarketplace.com/blogs/the-quick-guide-to-self-service-self-sufficiency-part-1/>
- Ionescu, M. (9 September 2011). *The quick guide to self-service self-sufficiency: Part two*. Retrieved from: <http://www.kioskmarketplace.com/blogs/the-quick-guide-to-self-service-self-sufficiency-part-2/>
- Ionescu, M. (20 February 2012). *Are kiosks still relevant in a mobile world?*. Retrieved from: <http://www.kioskmarketplace.com/blogs/are-kiosks-still-relevant-in-a-mobile-world/>

- Ionescu, M. (5 March 2012). *Are kiosks still relevant in a mobile world?: Part two*. Retrieved from: <http://www.kioskmarketplace.com/blogs/are-kiosks-still-relevant-in-a-mobile-world-part-2/>
- Ionescu, M. (20 March 2012). *Are kiosks still relevant in a mobile world?: Part three*. Retrieved from: <http://www.kioskmarketplace.com/blogs/are-kiosks-still-relevant-in-a-mobile-world-part-3/>
- Ionescu, M. (21 June 2011). *A checklist for building a self-service kiosk program*. Retrieved from: <http://www.kioskmarketplace.com/blogs/a-checklist-for-building-a-self-service-kiosk-program/>
- Ionescu, M. (26 September, 2011), *Keep it simple, stupid*. Retrieved from: <http://www.kioskmarketplace.com/blogs/keep-it-simple-stupid/>
- Ionescu, M. (28 Feb, 2013). *Consider these five things when purchasing kiosk hardware*. Retrieved from: <http://www.kioskmarketplace.com/blogs/consider-these-5-things-when-purchasing-kiosk-hardware/>
- Kallweit, K., Spreer, P., & Toporowski, W. (2014). Why do customers use self-service information technologies in retail?: The mediating effect of perceived service quality. *Journal of Retailing and Consumer Services*, 21, 268-276.
- Kernaghan, K. (2000). *Bricks, clicks and calls: Clustering services for citizen-centred delivery*. Brock University, PowerPoint. Retrieved from: Institute of Public Administration of Canada [www.iccs-isac.org/en/pubs/kk.ppt](http://www.iccs-isac.org/en/pubs/kk.ppt)
- Kernaghan, K. (2012). *Anywhere, anytime, any device: Innovations in public sector self-service delivery*. A report prepared for the PSSDC-PSCIOC Research Committee. Retrieved from: [http://www.iccs-isac.org/library/2011/10/Self-Service\\_Kernaghan-Report-Final-Sept-2012.pdf](http://www.iccs-isac.org/library/2011/10/Self-Service_Kernaghan-Report-Final-Sept-2012.pdf)
- Klier, J., Klier, M., Müller, A-L., & Rauch, C. (2016). The impact of self-service technologies – towards an economic decision model and its application at the German Federal Employment Agency. *Journal of Decision Systems*, 25(2), 151-172, DOI: 10.1080/12460125.2016.1141274

- Korolov, M. (15 May 2015). *Five tips to comply with the new PCI requirements*. Retrieved from: <http://www.csoonline.com/article/2922896/compliance/five-new-pci-requirements-for-june.html>
- Koskela-Huotari, K., Edvardsson, B., Jonas, J.M., Sorhammar, D., & Witell, L. (2016). Innovation in service ecosystems: Breaking, making, and maintaining institutionalized rules of resource integration. *Journal of Business Research*, 1-8. <http://dx.doi.org/10.1016/j.jbusres.2016.02.029>
- Kotamraju, N.P., & van der Geest, T.M. (2012). The tension between user-centred design and e-government services. *Behaviour & Information Technology*, 31(3), 261-273, DOI: 10.1080/0144929X.2011.563797
- Kravstov, V. (2 July 2013). *The evolution of bill payment kiosks in eastern European countries*. Retrieved from: <http://www.kioskmarketplace.com/blogs/the-evolution-of-bill-payment-kiosks-in-eastern-european-countries/>
- Kruper, J. (2013). *Kioware and PCI compliance: PA-DSS Certification*. Retrieved from: <http://www.kioware.com/resources.aspx?resID=10>
- Latour, B. (1996). *Aramis or the love of technology*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press.
- Liljander, V., Gillberg, F., Gummerus, J. & van Riel, A. (2006). Technology readiness and the evaluation and adoption of self-service technologies. *Journal of Retailing and Consumer Services*, 13, 177-191.
- Lin, J-S. C., & Hsieh, P-L. (2007). The influence of technology readiness on satisfaction and behavioral intentions toward self-service technologies. *Computers in Human Behavior*, 23, 1597-1615.
- Liu, S. (2012). The impact of forced use on customer adoption of self-service technologies. *Computers in Human Behavior*, 28, 1194-1201
- MacDonald, A., & MacMillan, J. (2016). *Is there a G.O.C. app for that?* Dalhousie University, NB.

Maharshi, P. .. *Why kiosks are still in use in the mobile world*. Retrieved from:

<http://lerablog.org/technology/electronics/mobile-devices/why-kiosks-are-still-in-use-in-the-mobile-world/>

Mattila, A. S., Cho, W. & Ro, H. (2011). The role of self-service technologies in restoring justice. *Journal of Business Research*, 348-355, DOI10.1016/j.jbusres.2010.02.014

Metzger, P. (21 February, 2013). Public works: Mobile city hall. *Toronto-ist*. Retrieved from <http://torontoist.com/2013/02/public-works-the-mobile-city-hall/>

Meyers, M. (2014). *Vehicle registration renewal iPad kiosks dramatically reduce wait time at Arkansas Revenue Offices*. Retrieved from:

<http://www.nascio.org/portals/0/awards/nominations2015/2015/2015AR3-NASCIOAwardSubmission2015-ARStarKiosks11-1.pdf>

Miller, B. (29 March 2016). *Kansas City, MO., installs first smart city kiosks downtown*.

Retrieved from: <http://www.govtech.com/fs/Kansas-City-Mo-Installs-First-Smart-City-Kiosks-Downtown.html>

Miller, L. (3 June 2015). *Self-service: Why Millennials, Gen Z expect it*. Retrieved from:

<http://www.retailcustomerexperience.com/articles/self-service-why-millennials-gen-z-expect-it/>

Mkude, C.G. & Wimmer, M. A. (2015), "E-Government systems design and implementation in developed and developing countries: Results from a qualitative analysis." In Tambouris, E. (2015). *Electronic government*, 14th IFIP WG 8.5 International Conference, EGOV 2015, Thessaloniki, Greece, August 30-September 2, 2015, Proceedings. pp 44-58.

Moshe, O. (18 November 2014). *Self-Service: The benefits and five tips for success*. Retrieved from <https://www.sysaid.com/blog/entry/self-service-the-benefits-and-5-tips-for-success>

Multi-state information Sharing and Analysis Center. (2012). *Cyber security, Secure credit card payment process Payment Card Industry Standard Compliance: A non-technical guide essential for business managers, office managers and operations managers*. Retrieved from : <https://www.its.ny.gov/sites/default/files/documents/Credit-Card-Processing-PCI-Compliance-2012.pdf>

- Murray, J. (6 May 2015). *I loathe this self-service plague: Mail's Jenni Murray launches fightback against a plague of modern life*. Retrieved from: <http://www.dailymail.co.uk/news/article-3069562/I-loathe-self-service-plague-supermarkets-banks-petrol-stations-automated-tills-replacing-humans-Launching-Mail-s-fightback-JENNI-MURRAY-spent-maddening-week-grappling-worst-offenders.html>
- Oghazi, P., Mostaghel, R., Hultman, M., & Parida, V. (2012). Antecedents of technology-based self-service acceptance: A proposed model. *Services Marketing Quarterly*, 33(3), 195-210, DOI: 10.1080/15332969.2012.689937
- Orel, F. D., & Kara, A. (2014). Supermarket self-checkout service quality, customer satisfaction, and loyalty: Empirical evidence from an emerging market. *Journal of Retailing and Consumer Services*. 21, 118-129.
- Paris, M. (2005). Local e-government and devolution: Electronic service delivery in Northern Ireland. *Local Government Studies*, 31(3), 307-319, DOI: 10.1080/03003930500095137
- PCI Security Standards. .. *PCI compliance over view video*. Retrieved from: <http://training.pcisecuritystandards.org/webinar-pci-dss-3.2-overview-video?submissionGuid=f7e437d6-c184-41ad-bde7-e414c7d62446>
- PCI Security Standards Council. .. *Case Study: Validated point-to-point encryption (P2PE) solution: The Hillman Group*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (2009). *Information supplement: PCI DSS wireless guideline*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (April 2010). *PIN transaction security, point of interaction: Modular security requirements*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (October 2010). *Navigating PCI DSS: Understanding the intent of the requirements*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council. (2012). *PCI Mobile Payment Acceptance Security Guidelines for developers*. Retrieved from: <https://www.pcisecuritystandards.org/>

- PCI Security Standards Council (2013). *Solution requirements: Encryption, decryption, and key management within secure cryptographic devices (hardware/hardware)*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (February 2013). *Point-to-Point encryption: Glossary of terms, abbreviations, and acronyms*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (2014). *PIN security requirements V. 2*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (2014). *PIN Security: Requirements and testing procedures V. 2*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (February 2014). *Self-Assessment questionnaire C and attestation of compliance: Merchants with payment application systems connected to the internet- no electronic cardholder data storage*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (2015). *Skimming: A resource guide from the PCI Security Standards Council*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council (April 2015). *Understanding the SAQs for PCI DSS V. 3*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council. (June 2015). *Securing account data with the PCI point-to-point encryption standard V. 2*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council. (July 2015). *Technical FAQs for use with P2PE, V. 1.x*. Retrieved from: <https://www.pcisecuritystandards.org/>
- PCI Security Standards Council. (September 2015) *Program Guide, V. 2.0*. Retrieved from: <https://www.pcisecuritystandards.org/>
- Peterson, H. (6 Aug 2015). *McDonald's shoots down fears it is planning to replace cashiers with kiosks*. Retrieved from: <http://www.businessinsider.com/what-self-serve-kiosks-at-mcdonalds-mean-for-cashiers-2015-8>
- Prychodko, N., & Dziong, M. (2014). *Citizens first 7*. Institute for Citizen-Centred Service: Toronto, ON.

- Public Works Canada, (2013). *Citizen compass: A roadmap to meeting Canadians' expectations*. GTEC 2013: Canada's Government Technology Event. Toronto, ON: Institute of Public Administration of Canada. Retrieved from: [my.presentations.techweb.com/events/gtec/ottawa/2013/concurrent-sessions.../769](http://my.presentations.techweb.com/events/gtec/ottawa/2013/concurrent-sessions.../769)
- Quinton, S. (26 April 2016). *What is a smart city? Future Structure*. Retrieved from: <http://www.govtech.com/fs/What-Is-a-Smart-City.html>
- Raven, A., Laberge, J., Ganton, J., & Johnson, M. (September 2014). Wayfinding in a hospital: Electronic kiosks point the way. *User Experience: The Magazine of the User Experience Professionals Association*. Retrieved from: <http://uxpamagazine.org/wayfinding-in-a-hospital/>.
- Red Dot Net. (2009). *Ten reasons why kiosk projects fail*. Retrieved from: [http://www.reddotnet.com/downloads/whitepapers/RedDotNet-WP\\_10-Reasons-Kiosks-Fail.pdf](http://www.reddotnet.com/downloads/whitepapers/RedDotNet-WP_10-Reasons-Kiosks-Fail.pdf)
- Rosenbaum, M.S., & Wong, I.A. (2015). If you install it, will they use it?: Understanding why hospitality customers take "technological pauses" from self-service technology. *Journal of Business Research*. 68, 1862-1868.
- Rowley, J. E., & Slack, F. (2007) Information kiosks: A taxonomy. *Journal of Documentation*, 63(6) 879 - 897, DOI: [dx.doi.org/10.1108/00220410710836402](https://doi.org/10.1108/00220410710836402)
- Salomann, H., Dous, M., Kolbe, L., & Brenner, W. (2007). Self-service revisited: How to balance high-tech and high-touch in customer relationships. *European Management Journal*, 24(4), 310-319. DOI: 10.1016/j.emj.2007.06.005
- Scantis, M. (31 May 2016). *Visitor's bureau installs kiosks in downtown Springfield*. Retrieved from: <http://www.springfieldnewsun.com/news/news/local/visitors-bureau-installs-kiosk-in-downtown-springf/nrXW8/>
- Shamdasani, P., Mukherjee, A., & Malhotra, N. (2008). Antecedents and consequences of service quality in consumer evaluation of self-service Internet technologies. *The Service Industries Journal*, 28(1), 117-138, DOI: 10.1080/02642060701725669
- Shaw, C. (7 May 2015). *The problem with self-service*. Retrieved from: <https://www.linkedin.com/pulse/problem-self-service-colin-shaw?forceNoSplash=true>

- Sheth, J.N., Newman, B.I., & Gross, B.L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, 22(2), 159–170.
- Sigwald, R. (2016). Self-Service customer service models in libraries. *Journal of Library Administration*, 56(4), 453-478, DOI: 10.1080/01930826.2016.1157429
- Simon, F., & Usunier, J-C. (2007). Cognitive, demographic, and situational determinants of service customer preference for personnel-in-contact over self-service technology. *International Journal of Research in Marketing*, 24, 167-173.
- Slack, F., & Rowley, J. E. (2004). Challenges in the delivery of e-government through kiosks. *Journal of Information Science*, 30 (4) 2004, pp. 369–377. DOI: 10.1177/0165551504045855
- Slawsky, R. (16 October 2012). *Finding the sweet spot with bill payment kiosks*. Retrieved from: <http://www.retailcustomerexperience.com/whitepapers/finding-the-sweet-spot-with-bill-payment-kiosks/>
- Slawsky, R. (2015). *Prepping kiosks for EMV: Time is running out for kiosk deployers to make their machines EMV-ready. Here's what they need to know*. Retrieved from: <http://www.kioskmarketplace.com/whitepapers/prepping-kiosks-for-emv/>
- Spears, G., & Seydegart, K. (2000). *Citizens first 2000*. Toronto, ON: Institute of Public Administration of Canada.
- Surachartkumtonkun, J., Patterson, P.G., & McColl-Kennedy, J. R. (2013). Customer rage backstory: Linking needs based cognitive appraisal to service failure type. *Journal of Retailing*, 89, 72-87.
- Tambouris, E. (2015). *Electronic government*, 14th IFIP WG 8.5 International Conference, EGOV 2015, Thessaloniki, Greece, August 30-September 2, 2015, Proceedings.
- Terschuren, P. *New technologies empower visitor management systems to improve physical security efficiency and cost-effectiveness*. Retrieved from: <http://us.sourcesecurity.com/news/articles/technologies-empower-visitor-management-systems-improve-physical-security-efficiency-co-11899-ga-co-2998-ga.20356.html>



- Tillstrom, A. (23 April 2015). *Summer kiosk tellers needed: Great volunteer opportunity*. (Portland, Oregon). Retrieved from: <http://knowyourcity.org/2015/04/23/summer-kiosk-tellers-needed/>
- Torres, L., Pina, V., & Acerete, B. (2005). E-government developments on delivering public services among EU cities. *Government Information Quarterly*, 22, 217-238.
- Walker, A. (17 March, 2016). *This plan could save your city's busted public transit*. Retrieved from: <http://gizmodo.com/the-us-government-has-a-plan-to-save-your-city-s-busted-1765532705>
- Wang, Y-S., & Shih, Y-W. (2009). Why do people use information kiosks? A validation of the Unified Theory of Acceptance and use of technology. *Government Information Quarterly*, 26, 158-165
- Weerakkody, V., Dwivedi, Y. K., El-Haddadeh, R., Almuwil, A., & Ghoneim, A. (2012). Conceptualizing e-inclusion in Europe: An explanatory study. *Information Systems Management*, 29(4), 305-320, DOI: 10.1080/10580530.2012.716992
- Wittmer, A. (2011). Acceptance of self-service check-in at Zurich airport. *Research in Transportation Business and Management*. 1, 136-143.
- Ya Ni, A., & Tat-Kei Ho, A. (2005). Challenges in e-government development: Lessons from two information kiosk projects. *Government Information Quarterly* 22, 58–74.
- Yigitcanlar, T., & Lee, S. H. (2014). Korean ubiquitous-eco-city: A smart-sustainable urban form or a branding hoax? *Technological forecasting and social change*, 89, 100-114.
- Young, B. (April 5, 2016). *MVA expands new self-service VEIP kiosks: Customer convenience drives expansion of seven new easy-to-use kiosks, Governor Hogan reduces kiosk fee from \$14 to \$10*. Retrieved from: <http://www.mva.maryland.gov/about-mva/press-releases/2016/04.05.16%20htm>
- Zambrano, R. (2008). E-Governance and development: Service delivery to empower the poor. *International Journal of Electronic Government Research*, 492, 2-11
- Zhao, F., & Khan, M. S. (2013). An empirical study of e-government service adoption: Culture and behavioral intention. *International Journal of Public Administration*, 36, 710-722.

Zhu, Z., Nakata, C., Sivakumar, K., & Grewal, D. (2007). Self-service technology effectiveness: The role of design features and individual traits. *Journal of the Academy of Marketing Science*, 35, 492-506 DOI: 10.1007/s/11747-007-0019-3

Zhu, Z., Nakata, C., Sivakumar, K., & Grewal, D. (2013). Fix it or leave it?: Customer recovery from self-service technology failures. *Journal of Retailing* 89, 15–29.

## APPENDIX A

### Kiosk Distributors

Accessforward: <http://www.accessforward.ca/general/self-service-kiosks>

Advanced Kiosks: <http://www.advancedkiosks.com/self-service-kiosks/government-kiosks.php>

Cammax Limited: <http://www.cammaxlimited.co.uk/solution/government-projects/>

Capterra: <http://www.capterra.com/kiosk-software/>

CISCO: <http://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities.html>

Dynatouch: [http://www.dynatouch.com/government/state\\_local\\_gov\\_kiosk.aspx](http://www.dynatouch.com/government/state_local_gov_kiosk.aspx)

ELO Touch: <http://www.elotouch.com/Solutions/CaseStudies/kioskwp.asp>

NEOproducts Group: <http://neoproductsgroup.com/industries/government>

Olea: <http://www.olea.com/kiosk-applications/government-kiosks/>

Summit Research Associates: <http://www.summit-res.com/>

Synced Media: <http://syncedmedia.com/products>

Tempest Development Group: <http://www.tempestdg.com/> (used by cities of St. Albert and Lethbridge)

Zivelo: <http://zivelo.com/industry/government/>