

Designing an Intelligent Advertising Business Model in Seoul's Metro Network

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Modern businesses are adopting new technologies to serve their markets better as well as to improve efficiency and productivity. The advertising industry has continuously experienced disruptions from the traditional channels (radio, television and print media) to new complex ones including internet, social media and mobile-based advertising. This case study focuses on proposing intelligent advertising business model in Seoul's metro network. Seoul has one of the world's busiest metro network and transports a huge number of travelers on a daily basis. The high number of travelers coupled with a well-planned metro network creates a platform where marketers can initiate engagement and interact with both customers and potential customers. In the current advertising model, advertising is on illuminated and framed posters in the stations and in-car, non-illuminated posters, and digital screens that show scheduled arrivals and departures of metros. Some stations have digital screens that show adverts but they do not have location capability. Most of the current advertising media have one key limitation: space. For posters whether illuminated or not, one space can host only one advert at a time. Empirical literatures show that there is room for improving this advertising model and eliminate the space limitation by replacing the poster adverts with digital advertising platform. This new model will not only be digital, but will also provide intelligent advertising platform that is driven by data. The digital platform will incorporate location sensing, e-commerce, and mobile platform to create new value to all stakeholders. Travel cards used in the metro will be registered and the card scanners will have a capability to capture traveler's data when travelers tap their cards. This data once analyzed will make it possible to identify different customer groups. Advertisers and marketers will then be able to target specific customer groups, customize adverts based on the targeted consumer group, and offer a wide variety of advertising formats. Format includes video, cinemagraphs, moving pictures, and animation. Different advert formats create different emotions in the customer's mind and the goal should be to use format or combination of formats that arouse the expected emotion and lead to an engagement. Combination of different formats will be more effective and this can only work in a digital platform. Adverts will be location based, ensuring that adverts will show more frequently when the metro is near the premises of an advertiser. The advertising platform will automatically detect the next station and screens inside the metro will prioritize adverts in the station where the metro will be stopping. In the mobile platform, customers who opt to receive notifications will receive them when they approach the business premises of advertiser. The mobile platform will have indoor navigation for the underground shopping malls that will allow customers to search for facilities within the mall, products they may want to buy as well as deals going on in the underground mall. To create an end-to-end solution, the mobile solution will have a capability to allow customers purchase products through their phones, get coupons for deals, and review products and shops where they have bought a product. The indoor navigation will host intelligent mobile-based advertisement and a recommendation system. The indoor navigation will have adverts such that when a customer is searching for information, the recommendation system shows adverts that are near the place traveler is searching or in the

direction that the traveler is moving. These adverts will be linked to the e-commerce platform such that if a customer clicks on an advert, it leads them to the product description page. The whole system will have multi-language as well as text-to-speech capability such that both locals and tourists have no language barrier. The implications of implementing this model are varied including support for small and medium businesses operating in the underground malls, improved customer experience, new job opportunities, additional revenue to business model operator, and flexibility in advertising. The new value created will benefit all the stakeholders.

Key Words : Business model, Intelligent advertising, Location-based advertising, Value creation, Metro

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1. Introduction

In the business world, digital transformation, going digital or leveraging digital platforms has become a common vocabulary. Even though there have been different definitions of digital (Dorner and David, 2015), one thing is obvious; traditional business models are at a great risk of disruption or have already experienced disruption from new market entrants leveraging innovative business models. This disruption is expected to continue as businesses integrate new technologies and models into their operations. Because of increasing connectivity, consumers have access to more information, sharing of information among consumers is at a new high level. The influence of social media on consumer behavior is fast changing the consumer tastes and preferences. Businesses desiring to be market leaders have to be very flexible and responsive to the changing consumer needs.

Traditionally, businesses have relied on mainstream media channels to promote new products or create brand awareness. The three

main channels previously used in advertising have been radio, print media (including newspaper, magazine, billboard), and television. However, as new technology advancement continues, new channels have come into existence, usually based on the Internet. The new channels include internet ads, mobile advertising, short message service, blogs, and social media platforms. These new channels are relatively cheaper, allows easy distribution of content, engages directly with consumers, and allows customization to a specific consumer group. The capability to determine the location of a user has led to development of location-based advertising, leveraging on increased connectivity and increased use of mobile devices.

1.1 Intelligent advertising model

Today's consumers are connected to the internet through many channels. Increased connectivity due to high internet speed, mobile computing, and location-based services creates a good platform for intelligent advertising service. Intelligent system as defined by Gartner (2016) is a system that can

learn, adapt and potentially act autonomously rather than simply execute predefined instructions. Connectivity has led to generation of huge amounts of data that in its natural form is less useful to both consumers and marketers. To create new value from this huge amount of data, advanced analytics is required to ensure that consumers get the most relevant information at the time they need it.

Marketers are interested in communicating the most relevant products features to customers and create lasting impression that can influence customers' purchase decision (Court et al., 2009). In order to communicate the most relevant product features to a customer, the advertiser has to know the customer type they are engaging with, their needs, and their location. This means that marketers should be able to determine the consumer type, their location and their needs. Ability to determine these parameters creates an opportunity for marketers to personalize the information they communicate (personalized adverts), and are able to communicate this information based on proximity of customer to the place where they can purchase the product.

Intelligent advertising model should be able to air adverts to the most relevant customer groups based on their needs. Getting the right message to the intended consumer at the time they need the information is a game changer that intelligent systems can enable. Consumer needs can be classified according to market segmentation including age, gender, income, social class, and geographic segmentation (Larsen, 2010). In the

subway setting, it is possible to identify customer groups at the access gates if the subway fare-cards are registered and the access gates configured to collect data when passengers swipe their fare cards. This data once analyzed it can provide useful insights at to what major customer types are onboard or what customer types are waiting to board a metro. With many travelers using subway transportation coupled with amazing shopping experience in the subway stations in Seoul, there is great potential for marketers to engage with customers and possible make a sale.

1.2 Subway advertising in Seoul

Seoul has a population of ten million people and the number of registered motor vehicles in Seoul stood slightly above three million (Seoul metropolitan, 2017). This suggests that there is a huge population of Seoul residents who use public means of transport to commute. Subway in Seoul covers a distance of 1,005 kilometers and makes 2,482 daily trips (Korail, 2017). Seoul has one of the busiest metro network in the world transporting over 2.6 billion people annually (Seoul statistics, 2017). The huge number of daily travelers creates an opportunity for marketers to promote new products, brand visibility, as well as attracting and retaining customers.

Advertising in the subway in Seoul takes three different types. Type 1 is in-car advertising where adverts are placed inside the metro as either illuminated framed ads, ceiling hanging or poster-type adverts. Type 2 is in-store advertising

where ads are placed in the station facilities as either posters, illuminated adverts or digital boards. Type 3 ads are placed in the travel guide that shows the schedule of arriving metros (Seoul metropolitan, 2017). A quick check of the in-car ads show that almost all ads are picture-based with exception type 3 ads. This creates a limitation on space since one space can only show one advert for a preset time. The cost and time required to change an advert as well as disposal of expired framed adverts increases operating costs for both the advertising agency and the advertiser. A second limitation is that to increase the effectiveness of a picture frame, the size matters. According to Google AdSense, wider ads tend to outperform others due to their readability. With limitation on physical space for in-car or station advertisements, the effectiveness of picture advertisements is limited. In the case of Microsoft campaign for its new product, Microsoft surface, the company combined static image with cinemagraphs for social media advertisements. The results shows that static images with cinemagraphs increased engagement rates and reduced cost per engagement (Flixiel, 2017).

In this article, we are going to design an intelligent advertising business model in Seoul's metro network. Business model is a realm of value streams, revenue streams and logistical streams with the appropriate roles of participants (Mahadevan, 2000; Lim & Hong, 2017). It consists of customer value proposition, scope of offerings, price, revenue source, connected activities, implementation, capabilities, and

sustainability (Afuah and Tucci, 2001). In addition, we are going to analyze the subway advertising business model with this framework. After reviewing some related literatures in section two, section three propose the new subway advertising business model in Seoul metro. Section four analyzes the proposed business model and section five concludes with some remarks.

2. Literature review

This section provides a review of literature related to application of location-based service in business, contents of adverts and its effect on influencing customer behavior, and how advertising on digital platform can lead to new value creation. As new advertising channels emerge and businesses adopt them, key areas to focus on should be how businesses can create and capture new value and leverage new technology to engage with customers by developing new connections and building new relationships. The digital channels are evolving and providing both challenges and opportunities for marketers (Bruce, Murthi, and Rao, 2017). Advertisers and business operations have to evolve with the technology in order to remain relevant to the fast changing consumer needs.

2.1 Location-based advertisements

The advertising industry is experiencing disruptions from different fronts. Most of the

changes stem from the internet, social media platforms and mobile computing. Traditionally, the main advertising channels were radio, television and print media – newspapers, magazines and billboards.

The emergence of web 2.0 has been revolutionary in the way businesses conduct their affairs. With its three principles; participation, sharing and openness, web 2.0 empowers consumers to create, generate or co-create content which directly affects brands or products and this content is distributed privately, semi-privately, and publicly through a network of friends, followers and users. This means consumers are not just accessing information; they contribute through sharing or engaging with the information. With web 2.0, different channels exist which change the traditional advertising models. These include social media advertising channels.

In social media platform advertising, marketers reported that top four preferred platforms were Facebook, Twitter, LinkedIn, and YouTube. Similarly, marketers' preference for social media is based on key benefits, that is, increasing exposure and traffic (Stelzner, 2016). Social media platforms allow businesses to engage with customers directly through photos, videos, or cinemagraphs. Satisfied customers as well as dissatisfied customers will re-create and share content based on their experience with a product that could have negative or positive impact on the company. The option to "like", "share" and "tag" in social media platforms leads to co-creation and customers maybe buy a product based on review read on a social media

platform. With these new developments in the advertising industry, this paper proposes a new business model that will provide more effective advertising platform for underground advertising business.

Advertisements air with some level of geographical localization. The channels used in advertisement are usually localized, for example, a local television will air most of the adverts related to the local events or a daily newspaper will have printed adverts promoting products to the readers who are in a specific area. The area covered by this localization is usually national boundaries, or trade blocks. Since the invention of internet, localization has continued to improve allowing marketers to engage customers based on their proximity to specific place. There is evidence that messages from a nearby source are more persuasive (Fujita et al., 2008; Kim et al., 2009). Nearness in this context refers to both psychological (social, temporal or hypothetical) and real distance (Hunh et al., 2017). Based on this evidence, location-based advertising is more effective in persuading customers for an engagement. Marketer's goal is to create positive and lasting impressions in the minds of customers and advertisement alternatives that lead to greater level of engagement will be the best choice.

2.2 Display of advert

The channel a marketer uses for advertising affects both the short-term and long-term carry-over effects [Bruce et al]. Carry-over effects

determines whether a customer will select a brand or product for active evaluation when triggered to consume a product (Court et al., 2009). Television adverts have short-term effect compared to print adverts (Sethuraman et al., 2011), while radio adverts are better than billboard adverts when it comes to carry-over effects (Berkowitz et al., 2001). This scenario is attributable to how human brain remembers past events. Edgar (1946) posits that people can remember 10% of what they read, 20% of what they hear, 30% of what they see and 50% of what they can see and hear. Viewing an advert creates impressions that accumulate over time and are likely to influence a consumer behavior (Court et al., 2009). Using a channel that has a higher retention rate of the impression will be beneficial to the marketers.

The display size of an advert has no significant effect on the consumer decisions (Cho, 2003; Dreze and Hussherr, 2003). Advert viewers learn to ignore larger adverts even when they are easy to notice (Cho 2003; Dreze and Hussherr 2003). However, animated adverts arouse greater emotions (Detenber et al., 1998). To achieve maximum return on advertising, marketers choose channels that lead to higher likelihood of engagement with the customers. This suggests that ability to run animated adverts will be provide an more effective advertising channel compared to still photos. With new products coming to the market every day, channels that are able to air different types of adverts will be more beneficial to marketers. There is evidence that consumers who have low user experience and low brand

familiarity are more attracted to animated adverts (Dahlen, 2001). This creates a good opportunity for marketers to target and convince these customers to buy their brands.

The content of an advert plays a critical role in the minds of viewers. MacInnis et al. (2002) show that adverts with emotional content increases customer engagement compared to rational based adverts. Ability to include motion in adverts creates a better way to increase advert emotion (Detenber et al., 1998). These studies clearly show that the content of an advert plays a critical role in arousing consumer emotions and therefore engagement. Although still pictures can arouse different emotions when used as adverts, the capability to combine sight, motion and sound provides a better way to stage emotional content.

2.2.1 Personalization of adverts

Research has shown that the success of internet-based transactions is highly dependent on whether personalization delivers personalized and context-sensitive information to mobile users (Xu et al., 2008). Xu *et. al* define mobile personalized adverts as promotion messages send to customer phones based on their demographic, preference, context and content. Customers usually respond to advertising messages on their phones in different ways. Message that is personalized and relevant to a user's lifestyle is considered "customer-friendly" (Dezoya, 2002) and that identification of consumer patterns and needs could boost marketing techniques (Rao and Minakakis, 2003).

Personalized messages are perceived by customers as reflecting their own needs (Kim and Han, 2014), and thus personalized advert is likely to be perceived as being likable. Kim and Han (2014) postulate that personalization of smartphone adverts enhances informativeness and credibility, and that personalization minimizes irritation on mobile adverts. Customer needs can be clustered based on segmentation (Larsen, 2010) and this evidence makes this model achieve personalization for mobile-based adverts for both customers who visit the shopping malls as well as travelers who use the subway. Customer preference could be identified based on what they are searching on their phones, information they share with their friends, and what they purchase. Identification of customer preferences makes it easy to personalize advert message. Considering the definition of personalization by Xu et.al (2008) customer demographics can be used as a guide for personalization of adverts. In operationalizing this model, subway travel cards will have to be registered. This will enable identification of customers and personalization of adverts will then be achieved.

Mobile computing has continued to change how modern businesses conduct their affairs. Mobile advertising offers a perfect platform for personalization of adverts (Xu, 2006). Greer and Murtaza (2003) explain that to benefit from personalization, communication ought to be in real time. When customers perceive personalized advert message as reflecting their own needs, and that message is considered informative and credible

Kim and Han, 2014), consumers will have a positive attitude towards it. Tucker (2014) explain that personalized adverts are more effective than just generic worded adverts. The above literature clearly shows the superiority of the proposed model by its capability to deliver customized advertss, target specific customers as well as offer unlimited digital advertising space.

2.3 New value in digital platforms

Digital transformation is disrupting traditional business models creating new opportunities for new entrants and replacing existing market leaders (Lim et al., 2017; Wessel, 2017). In broad terms, digital transformation means the changes that new technology has on the overall business operations (Reddy and Reinartz, 2017). Businesses have to innovate to remain relevant as well as to respond to changing customer needs. With digital transformation, traditional businesses are faced with greater risks of getting out of business because value creation in digital economy does not follow the traditional value creation methodology (Wessel, 2017). Digital economy creates data that is accessible by both the consumers as well as competitors creating in new connections and opportunities (Wessel, 2017). Similarly, digital platforms create new value and deliver new capabilities that give businesses a competitive advantage to firms that adopt them in their business.

Digital advertising platform offer a good opportunity to combine location-based advertising

and customization so that marketers can create tailor-made adverts targeting specific customer groups. This case study, therefore, proposes a new platform that brings together different customer groups and is capable of creating new value for each customer groups by facilitating an exchange of information. The platform operator will as well be able to capture part of the new value as compensation and reward.

3. New business model for the subway advertising

3.1 Analysis of current subway advertising model

The analysis of the current advertising model will be on four key business model parameters; that is value proposition, offerings, resource structure, and cost structure and profit formula.

3.1.1 Value proposition

The current business model offer advertisers a big number of viewers for the adverts they put in-car or at the station. In addition, subway advertisements are cheaper than bus stop advertisements. A report by Joogang daily (2014) put the monthly cost of bus stop adverts to be 16M (sixteen million) and three million Won for subway adverts. This price saving offers a value proposition to advertisers in the current model. Compared to newspaper adverts, this business model offer a longer visibility allowing marketers

products to remain visible for longer period. Longer display of an advert will lead to more views and ultimately pass the message to many customers in the targeted market. Compared to radio and television adverts, this business model offers customers a permanent view of the advert allowing interested customers to view and read the information over time. Television and radio adverts once aired, customers may not have a chance to listen or watch it again until the next scheduled advert airing. On the other hand, written message offer more benefits including possibility for a customer to translate the message into a different language that is easier to understand and query words they do not understand.

3.1.2 Offerings

The existing business model involves selling advertising spaces to marketers who intend to promote their products, or create brand awareness. Advertisers can choose different options for advertisement: Type 1 adverts whereby adverts are inside the car as either framed ads, ceiling hanging or in-vehicle lighting advertisement. Type 2 adverts are placed in-store within the station facilities as either posters, illuminated boards, or digital boards. Type 3 ads in the travel guide that shows the schedule of arriving metros, Seoul metro. The cost varies for the each type and size of the advertisement.

This model has a major limitation; space. When a marketer purchases advertising space for a pre-defined period, no other advert can be put in

that space. This is beneficial to the advertiser in that the advert remains on display for the whole period paid for. However, the provider of the advertisement space loses revenue. The limited available space is underutilized and since optimization opportunities exist, the provider of the space should consider innovating the current business model. Innovating the business model will create new value, change the rules of the game, and deliver competitive advantages to the subway operator.

3.1.3 Resource system

Metro stations and metros offer one of the key resources required for operationalizing the current business model. In the wake of indoor LBS, there are new opportunities that the business could exploit to create and capture new value in the model. Businesses are adopting cooperation to reduce costs and therefore, it is important that a new model incorporating collaboration is implemented in the subway advertising.

3.1.4 Cost structure and profit model

Advertising business in Seoul metros has two key partners who play important roles in operationalizing the business. The metro operator and advertising agency work together as partners in the advertising business. The operator licenses an advertising agency for a pre-defined period to manage the activities related to advertising. The operator incurs costs including facilities maintenance, selection of advertising agency, and

administration and maintenance costs.

The number of slots available for placing an advert determines the revenue income that the operator receives. The available slots are limited to the physical space available in the facilities and therefore, limits the revenue. The business world is experiencing a paradigm shift that eliminates the challenges related to physical space by adopting digital channels. There is, therefore, a need for business model innovation in the subway advertisement business.

3.2 New business model

Businesses face different challenges that force them to reinvent their operations and remain relevant or remain the same and close doors. Investors put their money into these businesses with a goal to maximize wealth and therefore, the option of closing down should never be a consideration. Company CEOs have to navigate through a volatile and highly dynamic market to meet the goals of the investors. An interview published by Harvard Business Review (Groysberg and Katherine, 2015) identified CEOs major concerns to be talent management, operating in global marketplace, and regulation and legislation. New challenges keep on coming, but how can businesses remain responsive to the changing customer needs? How can businesses remain relevant in the market place? The answer is innovation. This article focuses on business model innovation.

Business model innovation reframes a

company's value proposition to the customer segments and/ or repositions a company's role in the supply chain (Moore, 2004). Business model innovation may not necessarily demand new technology or new markets but focuses on delivery of current offerings produced with existing technologies to a business's existing market (Girotra and Serguei , 2014).

3.3 Identification and targeting of customers

One of the new features that this model will have is ability to identify customer types and allow marketers to target them. Most of the travelers using the subway use travel cards that currently do not have any personal data captured. This case study suggests that the travel cards should have a minimum personal data captured including name, sex, age, and traveler type (local resident or tourist). Travel card issuers will need to collaborate with a third party to enable customers who have subway travel cards registered to receive benefits including discounts, exclusive deals and similar benefits. However, Privacy concerns must be addressed.

When subway cards are registered, new data generated from the system will not only enable identification and targeting of subway travelers but will create new value to the subway operator. Customers passing through the card scanners will be identifiable by their age group and sex. This data collected at the scanners will be collated, and analyzed per station to identify customer groups

based on age, gender, and other parameters. Consumer needs can be classified according to market segmentation including age, gender, income, social class, and geographic segmentation (Larsen, 2010). It makes it possible for this advertising model to create new value compared to existing poster model. Marketers, when advertising their products are targeting a specific consumer group as their main customer. The capability to identify customer groups at the scanner and ability to collate, and analyze data per station will make it possible for specific customer groups to get adverts that are personalized and aligned to their needs. This is only possible if the in-car advertising medium is digital screens, not posters, and illuminated boards.

Targeting of customers using the subway will also be done based on time. Advertisers will target customers based on time of the day or day of the week. There will be weekday, weekend, and holiday categories for day of the week targeting and early morning (5.00am to 9.00am), mid-morning (9.00am to 12.00pm) early afternoon (12.00pm to 3.00pm), late afternoon (3.00pm to 6.00pm), evening (6.00pm to 9.00pm) late evening (from 9.00pm) for time of the day. For advertisers who adopt this targeting category, the system will autonomously air adverts based on time specified. To create new value to marketers using this category, the scanner data will be useful in identifying what time of the day different customer groups are likely to be using the subway. This will make the marketers choice of time more factual and the data captured will allow them identify

trends and patterns of travelers.

Customers visiting the underground shopping malls but not using the subway will be targeted when searching for direction (in-door navigation) and/ or information about the underground mall (e-commerce platform). The underground malls are huge and often confusing to move from one point to another. To create new customer experience, there is need to create in-door navigation to enable customers to move with ease within the malls. South Korea has a high smart phone penetration and high internet connection speed enabling mall visitors to use their smart phones anytime. In a situation where the underground shopping malls can be provided to customers in a mobile-based platform, mall visitors will search for information regarding the mall instead of using current signage. This new search capability creates opportunity for mobile-based advertising. In creating this new experience, the operator can capture some of the value by leveraging location-based services to advertise. Customers searching for directions will be targeted for adverts based on pre-set parameters. Customers searching for products or shops within the underground malls will as well be targeted with adverts. The indoor navigation and e-platform are both mobile-based making targeting to be based on the products the customer is searching for or the direction a customer is moving towards. Customers will have an option of using interactive screens installed in the underground malls if they do not want to use their mobile phones.

3.4 Indoor navigation technology

It is expected that in the near future people will spend over 70% of their time indoors and as such indoor real-time locating services are on the increase (Doiphode et al., 2016). The technologies used in indoor navigations continue to grow with main ones including Wi-Fi, Bluetooth, cellular networks, radio frequency identification, near-field technology, and LED light triangulation. All these technologies have different benefits, installation costs as well as accuracy. With success reports in use of Bluetooth 4.0 by SK Telecom for indoor navigation (Kim, 2014), this case study recommends Bluetooth technology for indoor navigation. Since the unveiling of Bluetooth Low Energy (BLE) which reduced energy consumption and costs. Other studies show that that BLE, compared to Wi-Fi, when used in indoor navigation is more accurate, approximately by 27 percent (Zhao et al., 2014). The release of Bluetooth 5 is expected to improve performance of Bluetooth technology even further than the current Bluetooth 4.0 performance. These previous research finding form the basis for recommendation of BLE technology for use in this model.

3.5 System architecture

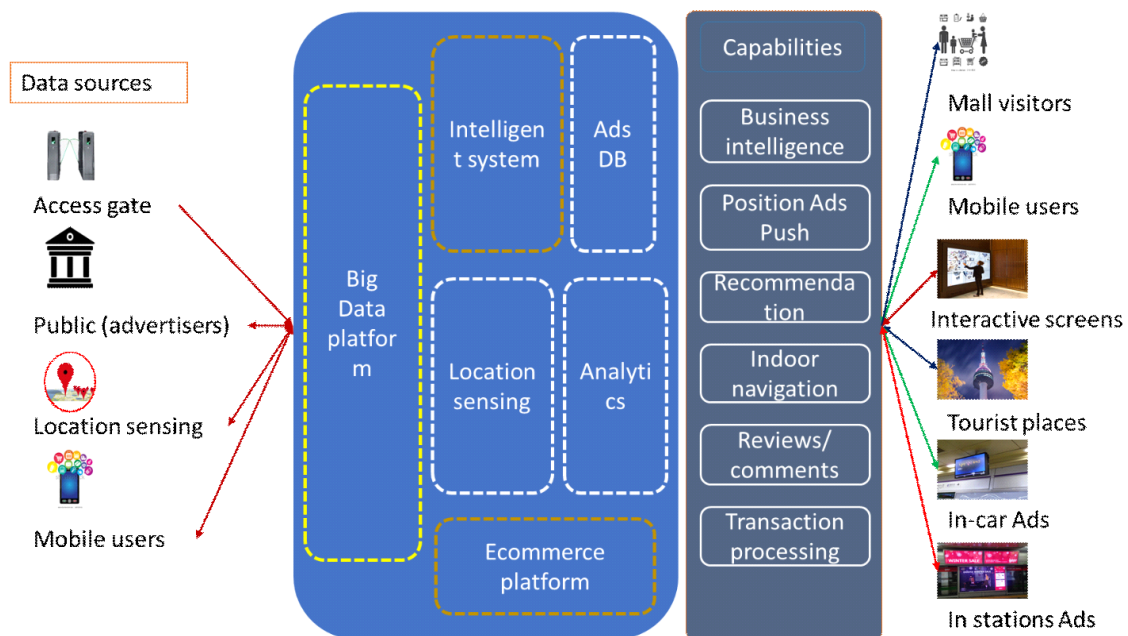
This section presents the system components, and interactions between the components and users. The main source of data will be travelers using the metro, mobile users and parameters provided by the marketers. Scanner data when

analyzed will establish the customer group(s) ready to board or already boarded, and the most appropriate adverts will air. This is the case for in station screens and in-car screens. Mobile users will access the platform from their phones and through indoor positioning. Additionally, customers who opt in to receive notifications will get push notifications for deals or promotions. Mobile users in the e-commerce platform will be able to search, query information, write comments, reviews, and rate products, shops as well as famous places near the station. Shop owners within the mall will access the solution through the e-commerce platform where they will sell, updates stocks, promote products as well as advertising via

this solution. A small fee is charged to the shop owners for use of the e-commerce platform, generating additional revenue to the model operator.

3.6 Intelligent features of the solution

In the age of intelligent systems, Huang (2016) has developed a framework for modelling system smartness as a way to determine how intelligent a system is. This modelling framework proposes a mathematical model that identifies three components to determine intelligence of systems. These are observation (data), learning and prediction (model training), and algorithm design (Huang, 2016). Gomez-Uribe and Hunt (2015)



Credit: All photo icons taken from google site

〈Figure 1〉 System architecture

explain that Netflix recommendation algorithms create an experience that helps members to choose which video is suitable for them. The intelligent features in this proposed model includes location-based capability; mobile-based platform that incorporates indoor navigation and clearly demonstrate clear differences between the proposed and existing model

The advertisement model will have intelligent algorithm that determines the most relevant adverts to air on the stations before customers have boarded metros as well as in-car adverts. This model is based on the thought that all cards used by metro travelers will be registered and at minimum, the age of card owner, sex and status of holder (tourist or resident) will be captured. The entry and exit card scanners will collect data from travelers that will be analyzed to determine the type of customers on-board or ready to board and update the adverts that will air. The parameters to determine which adverts to air will be set in the system. Rule based expert system can be used for this process (Lim, 2007). For example, if fifty percent (50%) of travelers boarding a metro at Seoul station at three o'clock are tourists, then the intelligent advertisement system will air adverts that are targeting tourists. The digital platform will host multi-language system that will be able to air adverts in a language that is easy for the travelers to understand or at least have sub-titles that will make it easy for the tourists to get the message.

Mobile based advertising will be intelligent such that, once a user opts-in for notifications; they receive notifications based on the direction a user

is walking within the underground shopping malls as well as their proximity to shops hosting the deals. The indoor solution will have an intelligent recommendation logic. The system will collect and analyze data on deals that customers are taking, trending fashion, customer feedback, and most favorited shops and recommend these deals to new customers.

4. Analysis of the proposed business model

4.1 Value proposition

4.1.1 Choice of segment

This business model focuses mainly on marketers and advertisers geographically located on or near busy metro stations. The customer segments fall into two categories: small and medium customers, and large business advertisers. The model allows customers not located near the subway lines to advertise as well. However, the latter customers will not have the benefit of location-based advertisements.

4.1.2 Choice of focal customer benefits

The current business model offer businesses advertising space that is limited to physical space and is rigid to customization. The new value proposition optimizes resource allocation by adopting unlimited advertising space that will allow advertisers a wide range of options to

choose. The bulk of advertisement space is available inside the metro (in-car advertisements) that include illuminated panels, ceiling hangings, and normal poster ads. The new model suggests replacement of the illuminated panels with display screens. Display screens are capable of showing adverts as a video, and it can show advert as moving images and still images can incorporate cinemagraphs. Variety allows for customization that ultimately provides a platform for advertisers to target different customer groups.

The system will intelligently air adverts based on a logic that enables marketers to personalize and target specific customer groups. This model proposes registration of metro fare cards used in the subway transport. Registration of cards will lead to generation of travelers' data that will determine which adverts to prioritize and air. Minimum data captured includes age and sex of traveler. Classification of customer groups and needs is grouped based on age and sex. The system uses data of travelers at the metro boarding card scanners to intelligently update the adverts that will be aired as travelers wait for arrival of metro. The analysis of travelers boarding and alighting the metro determines and updates adverts to be given priority in the in-car adverts. This intelligent targeting will enable dynamic targeting and customization.

Display screens in this model will be location enabled. This means that adverts will air based on the current or next metro station. This is in line with the current advertising practice whereby adverts in subway stations air based on the main

business activity around the station. An analysis by JoongAng Daily (2014), show that in Seoul National University of Education station served by line 2 and 3 had 79 adverts, with law firms taking 49.4 percent while in Apgujeong station, line 3 had 135 ads with 78.5% being medical related ads. There is high concentration of legal firms near Seoul National University and high concentration medical businesses near Apgujeong station. Display screens that have location-sensitivity can run the adverts inside the metro creating a broader view and ultimately leading to customer engagement.

Display screen adverts will create a capability for marketers to have flash sales. Marketers, being able to target a specific group of customers, coupled with location-enabled advertisement creates a good opportunity to stage flash sales. This will additionally enable businesses get feedback on customer response regarding the promotion, and measure the performance of the promotion. This model has the potential to cover coupons and discounts. The platform will as well host a mobile platform that enables subway operator to provide indoor navigation. The mobile-based indoor navigation system will incorporate e-commerce functionality as well as host mobile-based advertising. Mobile based advertising will be intelligent such that, once a user enables receipt of notification, they receive notifications based on the direction a user is walking within the underground shopping malls.

Value proposition analysis is in line with Amit and Zott (2000) theoretical foundations of value

creation. The model depicts four possible originators of value creation, See figure 2 above. These four dimensions are interdependent (Johansson and Mollstedt, 2006). Implementation of this solution will lead to lock-in, which ultimately leads to repeat sales and loyalty. This advertising model will be location-based allowing marketers to target customers with detailed information about on-going deals. Shops available in that specific station will have a good opportunity to combine location services with in-door navigation to target and stage customer experiences. Staging customer experiences maybe customized and personalized based on customer groups targeted creating high level of satisfaction. Marketers can as well adopt artificial lock-in including loyalty programs. Users with metro cards could receive discounts or earn points when they buy items within the underground mall. The investment costs required to install in-door navigation as well as bundling options will minimize switching costs for marketers and since the solution will bring together a number of parties together, positive network externalities will yield additional lock-in.

The solution will deliver a number of benefits to the businesses located in the facility and similar businesses located in different parts. The benefits will be bundled to create complementaries. Location-based advertising, digital advertising platform allowing a wide choice of adverts, in-door navigation, and mobile-based solution will be offered as bundles to businesses. Travelers will have an option to search, view and plan their visits

long before they arrive at the station. The solution can incorporate online purchases allowing customers to buy goods and collect once they arrive at the station. This set up will create a hybrid of online and offline offering creating better experience to travelers cum consumers.

Currently, there is no advertising model proving these bundled benefits. The new advertising model novelty will deliver new components enabling customers who visit the busy underground malls to view the whole facility in the mobile phone, enable them to make purchases, and navigate freely. Shop owners will be able to display their goods to many travelers and other consumers who would not otherwise known about the shop. Marketers will have an opportunity to stage customer experiences and target specific customer groups. This will ultimately lead to better customer understanding enabling marketers to provide goods tailor made to satisfy customer needs (Kim and Mauborgne, 1999). The operator will create and capture new value.

This new model will deliver improved efficiency. Hitherto limited physical advertising space will be replaced by digital space resulting into efficient resource allocation. The offline information will be provided via a mobile-based solution reducing search costs and promoting faster decision-making. Adoption of mobile-based solution will lead to reduced costs (Evans and Wurster, 1997). Dyer (1997) provide a better way for buyers and sellers to interact, and a platform for mobile-base ads. The provider will capture part of the value creating value for all parties.

4.2 Offerings

The customer segments available in the new model require different offerings and the business model should suit the needs of the segments. Segment 1 includes small and medium sized businesses. Segment 2 includes conglomerates and big businesses. The needs of these two customer segments are varied and therefore, they need different offering to attract them into the business. A report by JoongAng Daily (2014) posit that conglomerates abandoned the current subway-advertising model. This shows that their business needs were unmet and they had only one option: that is, to leave subway advertising. One of the reasons why conglomerates left the subway-advertising model was that they felt 2-D advertising were outdated. Innovation of the business model has the potential to attract this group of customer segment (JoongAng Daily, 2014).

4.3 Scope of the offering

The innovative business model will provide a digital advertising platform capable of handling the needs of the different customer segments. The display screen inside the metro will be limited in size; however, the station display screens can be large enough providing a platform that will attract both customer segments. This platform have a capability to air video adverts with options for advertisers to target consumers at different travel times. Similarly, the platform have a capability to host cinemagraphs that are more effective than still

photos. Provision of digital screens with capability to host cinemagraphs and/ or video-based ads is more effective than the current illuminated adverts. There is evidence that addition of motion on pictures arouse emotional transmission (Kim, 2007) and that picture motion influences emotional responses (Detenber, Robert, and Gary, 1998). Marketers are interested in arousing consumer emotions. This emotion arousal influence consumer behavior to initiate a purchase (Williams, 2014; Guerreiro et al., 2015). Providing digital platform will not only meet the needs of different customer segments but also provide a channel that is more effective and appealing to both marketers and consumers. The cost of advertising will marginally reduce compared to the current costs.

Location based advertising creates a new platform that enables marketers to air adverts for businesses which are near the location of a customer. Location based adverts will be complemented by notifications send to customers about deals which are very near. The mobile-based solution will merge indoor navigation and e-commerce solution and commercialized by hosting mobile advertising. Seoul has five major underground shopping malls (Express bus terminal underground mall, Yeongdeungpo underground mall, Gangnam terminal mall, Jamsil mall, COEX mall) with numerous shops that offer better deals than other famous shopping malls (English.visitkorea.or.kr). Navigating within these malls can be confusing and stressful, and although many sale deals could be on going, knowing about the deal as well as finding the shop may prove to

be a nightmare. This challenge creates opportunities for indoor navigation and mobile-based advertising. Mobile-based solution offers an additional targeting method whereby marketers can send customized information to customers within a preset distance from the shop.

The success of flash sales will be depended on how easily customers can identify the location where the sale is being held and/ or ability to make online purchases. The subway operator can install indoor navigation system that will allow customers to identify at ease the shops available within the station. Implementation of indoor navigation provides an opportunity for customization to an e-commerce solution along busy underground shopping malls, creating a new platform for mobile-based advertising as well as creating a capability for marketers to stage customer experience. The e-commerce solution will be location- based (based on metro station) allowing shop owners within the facility to promote their products. Shoppers will be able to search in advance to identify deals available in a specific shopping mall prior to arrival. On arrival to the station, the indoor navigation system will guide the customers to the exact location of the shop. This solution will have benefit to customers by shortening the search of shop and ease of identification of deals; to marketers and shop operators by creating a new platform to promote their products, and to subway operator by generating additional revenue through mobile-based advertising. Shop operators may not be able to install the indoor navigation system.

However, the subway operator can install the solution and charge for its usage, create, and capture additional value from shop owners and customers.

4.4 Customer decision process

Since the development of web 2.0, the internet has brought in new dimensions in the way consumers receive, analyze, and use information. Key considerations to think about include the development of social media that has put a lot information into the hands of consumers. Users of social media can create content, share or co-create content that affects brands positively or negatively. With many users in social media, a negative review or mention of a brand is viewed by many users and conversations around the negative comment for that brand can be disastrous. This clearly shows that consumer decision process is changing so fast unlike the time consumers did not have much information. This section discusses the consumer decision process based on the research work by (Court et al., 2009).

The information consumers are exposed to daily through different channels creates impressions about brands and products (Court et al., 2009). These channels could range from Facebook photo, twitter mentions or YouTube ads that run before watching video. Although consumers may not be interested in buying the product when they brand is exposed to them, when a need to buy that product arises the accumulated impressions determines the initial considerations a consumer

will have (Court et al., 2009). Court *et al* (2009) shows that customer decision-making is circular with four phases: initial consideration, active evaluation, purchase and post purchase experience. Marketers work on shortening or eliminating consideration section such that consumers can move from trigger point to purchase directly. This happens due of consumer loyalty and lock-in.

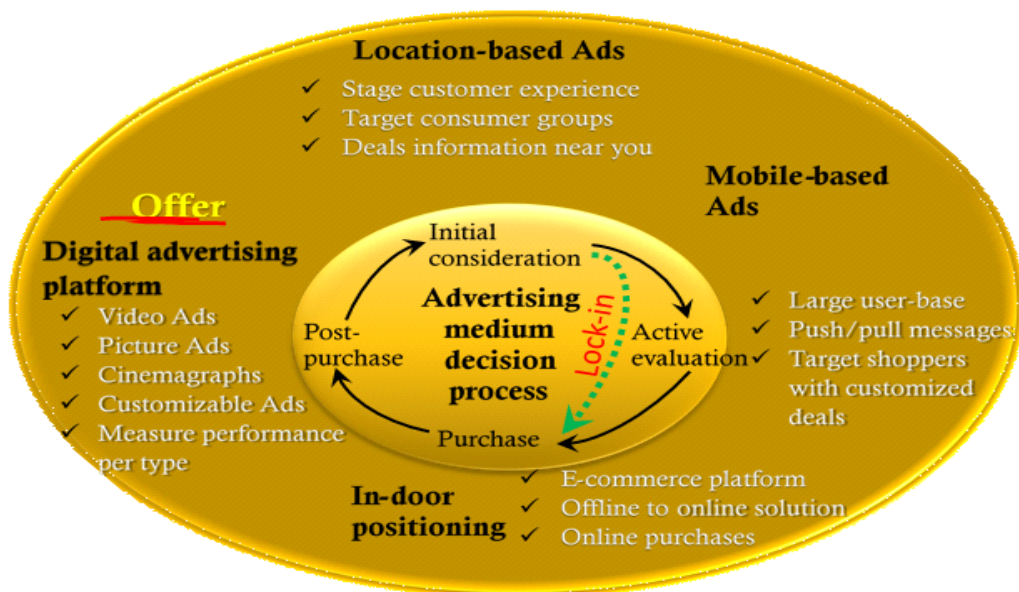
4.5 Egg diagram activity

This section combines the offerings to customers and decision-making process to generate an egg diagram. Marketers and advertisers are interested in creating positive impressions even as they engage in brand awareness. This solution will provide a platform that provides bundled benefits to advertisers. With location-based and

mobile-based advertising this solution positions itself as a must-be advertising channel by offering customers a platform that can air customized ads message and provide a comparative performance between different types of adverts. The ultimate goal will be to eliminate the evaluation stage such that advertisers move from initial consideration to purchase stage. Post-sale support will include performance analytics per type of advert and customer groups.

4.6 Resource system

The business model will be operationalized through internal organization capabilities and partnership with third parties. Key among the benefits that this model will deliver is digital advertising platform that is capable of hosting a



〈Figure 2〉 Egg diagram activity

huge number of adverts. Digital advertising platform will enable marketers and advertisers target specific customer groups, customize ads to different zones, and host intelligent adverts. The operator of this model should be able to provide this capability from within their organization. This resource will have intelligent algorithm that determines the most relevant adverts to air, and it will be linked to the entry and exit card scanners. The data collected from the entry and exit scanners will be analyzed to determine the type of customers on-board or ready to board and update the adverts that will air. It will be a critical resource, and therefore managing it internally is highly recommended.

In the stations, there will be interactive screens that will be targeting customers within the station. These screens will support multi-language interface. In some cases, tourists travelling through subway may want to understand where to get specific products within the mall and due to language barriers, they may not be able to ask other customers. These travelers maybe few compared to locals but they have cash to spend on gifts to their family or shopping for fun. These screens could as well provide tourists with information regarding some of the major tourists' destinations near the station, different restaurants within or near the shopping mall. This will provide an opportunity for businesses near the station to advertise in the station. This resource could be acquired and provided internally or leased from third party. Display screens will replace the framed and illuminated advertisement in the car and

station advertisements. The display screen sizes will vary depending on whether it will be installed in-car or in the station. In-car screens are smaller as compared to those installed within the station.

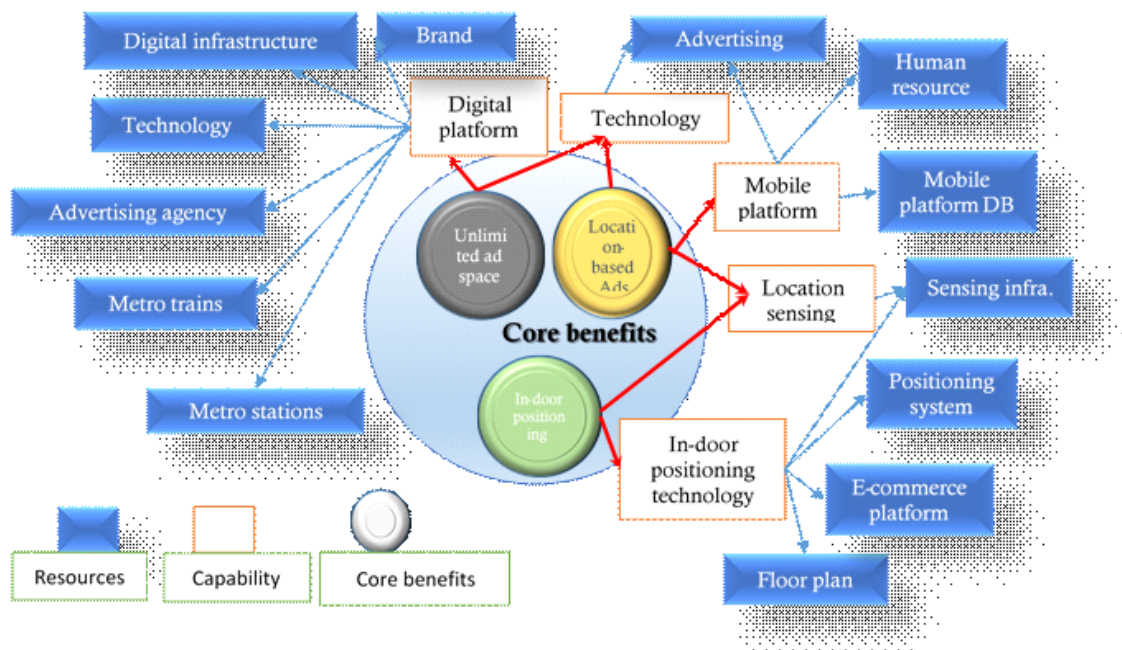
Indoor positioning is the second core benefit that will host mobile adverts and e-commerce platform. Underground shopping malls in Seoul are large and requires a navigation solution to deliver additional value to both the shop owners, mall operator and customers. The indoor navigation will show the location of customer, details of shops near to the customer, and show adverts based on location of customer. The shops will show deals they are having and for customers who opt to receive notifications, they will get deals notifications. Mobile-based advertisements will be intelligent such that location of customer, shops near the location of customers are given higher priority. Customers will be able to search for items and results will be shown in the indoor navigation solution with prices, distance from customer and any deals will be shown as well. Customers will have an option of buying products online and collect them at arrival or have them delivered at their address. The indoor solution will have an intelligent recommendation logic. Customers will be able to view mall details and deals prior to arrival enabling them to decide areas to visit at arrival. This will save customer time and marketers will be able to stage experiences based on the customers they expect to visit their shop.

To deliver this benefit, there will be need to collaborate with an indoor positioning technology provider. This is because technology is changing

so fast and therefore acquiring the solution will require constant upgrading, which could be avoided by having the solution done by a third party. Collaboration will be on the infrastructure but the model operator should acquire the back-end of the positioning solution. The required resources will depend on the technology used in the indoor navigation. Some of the major indoor positioning technologies include the following: Wireless local area network (WLAN), Bluetooth technology, Cellular networks, Near-Field communication technology (NFC); Radio frequency identification (RFID) technology; Led light triangulation technology (Jun and Lee, 2008; Lee and Lee, 2008; Diophode et al., 2016). Indoor building plan is available internally and therefore should be provided to the indoor positioning

provider. The e-commerce platform, mobile-based advertising platform are should be provided internally.

The third core benefit delivered in this model is location-based advertisements. Businesses operating within the subway malls or surrounding the mall will have an opportunity to air ads customized to the needs of customers using the subway. To provide this benefit positioning technology and infrastructure are required. Currently, subway stations are easily identifiable using Global Positioning System (GPS). However, the GPS waves are not accessible underground making it a requirement for an additional positioning technology to be installed that can accurately determine the location of the metro. This resource will be available internally.



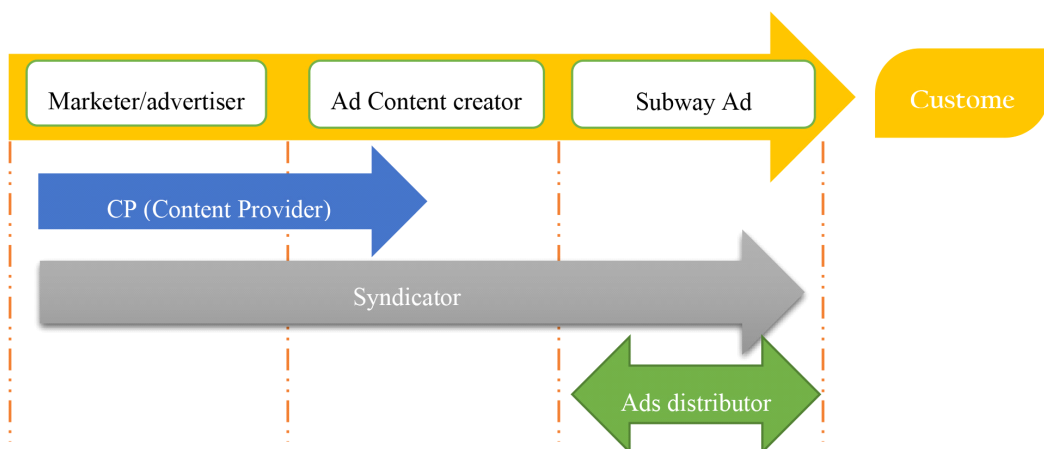
〈Figure 3〉 Resource diagram

4.7 Positioning of the model

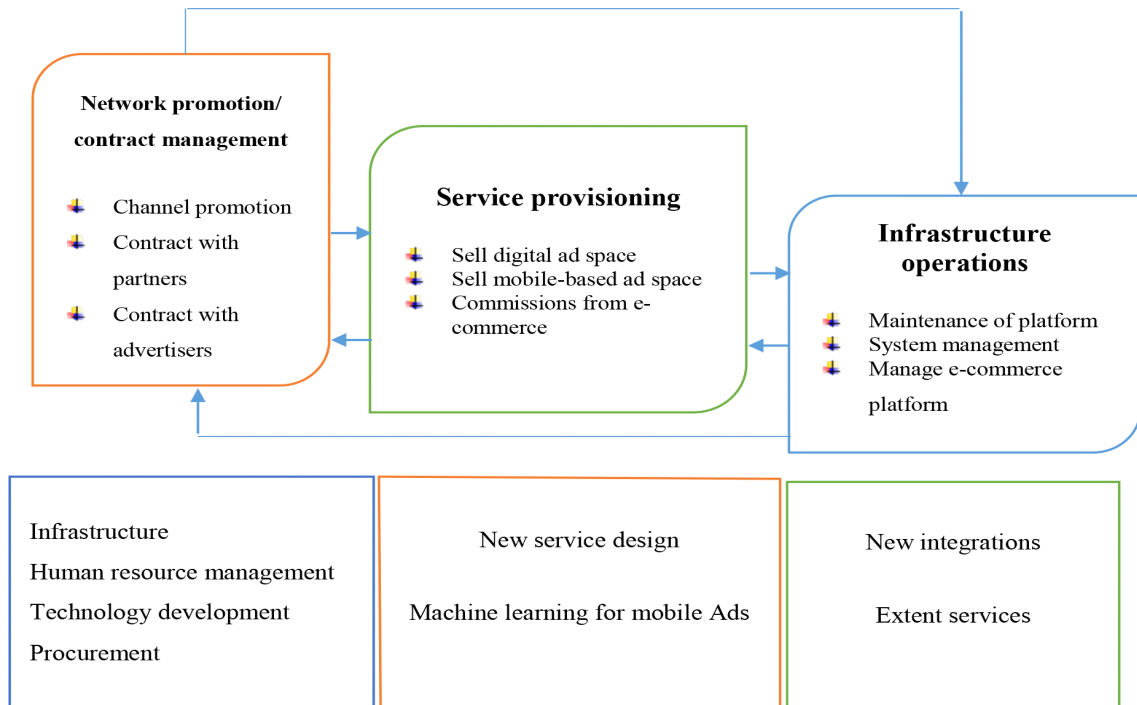
There are four parties will play different roles to create and deliver value to the customers. The marketers or advertisers, advertisement content-creators, subway advertisement operator, and customers. These four parties perform a role in making this model a success. The marketers/advertisers will be the initiator of the service, and with consultation with advertisement content-creator, they will provide advertisement content to the subway ads operator. The subway ads operator collaborates with marketer/advertiser and content-creator to act as a syndicate in the business model. The subway adverts operator distributes the content via in-car screens, mobile devices and interactive screens in the stations.

4.8 Value network

The processes in this model will create a value network where interdependent customers will interact and create new value to the network. This multi-sided network will create value to all the parties involved. Marketers will get unlimited advertising space with possibility to customize adverts, subway operator generates additional revenue and travelers will be able to navigate easily within the subway malls as well as get a view of the whole mall in their mobile phones, making it easy to get information about on-going deals. The primary and secondary value creation activities are adapted from Stabell, and Fjeldstad (1998).



〈Figure 4〉 Positioning in the market



〈Figure 5〉 Value network

4.9 Cost structure and profit model

4.9.1 Source of revenue

The main source of revenue from this model will be advertising. Different channels of advertising will be used to generate revenues for the operator. In-car display screens will be inside the metro to air location based adverts and few screens will air general adverts. At the stations, display screen will air adverts for customers awaiting to board as well as at strategic positions within the subway station. There will also be interactive screens in the stations that will allow customers to query information related to the

subway and products that the customer maybe interested in purchasing. The interactive screens will host advertisements as well. Finally, mobile-based ads will generate additional revenue to the business. The indoor positioning will include e-commerce solution allowing customers to buy goods online as well as host mobile-based adverts. Sales transacted over the e-commerce platform will generate additional revenue to the business. A small commission will be charged for purchases over the platform and generate additional revenue. Event organizers who host events within the busy malls will be able to promote their events through the available

channels creating a new stream of revenue for the business. The pricing strategy suggested for this model is bundling pricing. There are three core benefits and various channels that advertisers will be able to choose.

4.9.2 Cost structure

The major cost investment required in this model will go to acquisition of necessary infrastructure required in operationalizing the business model. Some of the key cost elements include platform development and configuration of scanners to generate required data. Other costs will include development and implementation of the new business model including experimentation costs and reconfiguration costs. Once the solution is implemented costs will be limited to platform maintenance and operation costs. Other costs will include platform promotion costs and partner-related costs.

4.10 Comparison between new and old advertising model

Salesforce.com (2017) explains that digital advertising programs are geared towards the achievement of greater personalization based on

who the customer is. The subway model has potential of achieving greater impact when targeting and personalization of adverts is realized. This case study adds to existing literature by explaining how digital advertising can incorporate location-based service in Seoul's metro network and create new value to different stakeholders. With unlimited digital advertising space that incorporates mobile-based and location-based adverts, and literature already reviewed, the proposed model is far more superior, modern, and effective advertising medium.

Traditional advertising channels are fading out as digital channels takes the lead. The current subway-advertising model can be described as a traditional one considering that there is dominant usage of posters and illuminated advert boards. To create new value for both the marketers, subway operator, and targeted customers, digital platform should replace the existing traditional model. This section compares some of the key differences between the existing and the proposed model, see table 1. Migrating the subway advertising model to a digital platform is more beneficial and will create new value to all stakeholders in the advertising business.

〈Table 1〉 Comparison between new and proposed model

	New platform	Existing platform	Comments
1	Unlimited advertising space	Limited advertising space	In the current model, once a poster or illuminated frame is fixed, it occupies that space for the period paid for. There is no resource optimization. In digital platform, many one screen can show unlimited number of Ads.
2	Personalized and targeted ads	General and non-targeted ads	Digital ads platform creates a new capability for marketers to target specific customer groups and personalized adverts to the needs of the customers.
3	Unlimited visibility	Limited visibility	Once a poster is removed, customers will not be able to see it. Digital platforms are able to retain contents of an advert even when it is no longer airing creating long-term visibility.
4	Co-creation of content between marketers and consumers	Co-creation is hard.	In digital age, consumers are able to comment, review and share experiences about a product or brand and share it with other consumers. New consumers will read the reviews and comments that could influence a purchase or change their preferences.
5	Sharable ads contents and easy for customers to interact with.	Not easy to share the original contents and interaction is limited	Ads viewed on mobile can be shared easily with friends leading to viral marketing.
6	Leverages on modern technology, e.g. mobile and social media	Does not leverage social media and mobile	Social media and mobile is fast changing how advertising and business in general operates and for better results, business models should be aligned social media and mobile platforms.
7	Cost effective advertising platform	Expensive relative to digital adverts	With co-creation, viral marketing and products review marketers can communicate to a large audience with lesser costs than in traditional marketing channels.

5. Implications and conclusions

This study has presented a new business model suggestion to replace the existing business model. The new business model will affect stakeholders in different ways as well as create new opportunities. Modern businesses are relying on technology to deliver new value to customers and advertising business can leverage technology to create and capture new value. This section presents a summary of the expected implications of developing and implementing this new model and

conclusions.

Change of business models creates new opportunities as well as unexpected challenges to the business, its customers and partners. Some of the implications anticipated will include the following; this model will offer a new support for small and medium shop owners located in the busy malls to sell their goods on the e-commerce platform. This additional channel will improve competition and product variety creating a wider selection for customers and additional revenue for the shop owners. The new model will push some

of the small and medium businesses out of business. The businesses in the printing and framing of current hard copy adverts will be out of business as the poster adverts gets replaced with digital content.

This model allows advertisers to target customers and customize adverts based on the perceived consumer needs. In this manner, the advertising model creates flexibility allowing advertisers to change parameters and experiment using same advertisement. With a wide variety of formats to use, this new advertising model presents an alternative that is most likely to increase customer engagement. Increased consumer engagement will relatively reduce the advertising cost and therefore reduce the price of final products. Flexible pricing models can as well be introduced in this model giving advertisers a better way to manage their budgets.

This business model relies on data and intelligence in determining the adverts that will air making it more superior to other advertising channels. Advertisers of new products may be forced to use general advert category for them to understand the exact which customer groups to prioritize. This limitation may be more expensive to advertisers. Intelligence and data based advertising will create a platform that is able to serve all customer types; whether conglomerates or small shop owners, these customers will be able to advertise on this model.

This solution will provide a mobile-based solution that will allow customers to search for deals prior to arrival at the malls. Customers will

be able to plan which shops to visit or what deals to check out. Once at the mall it will be easy to search for facilities like restrooms, metro boarding entrance, and where to get what product. This will save customer time and improve customer experience. The operator of the model will generate new revenues from mobile-based advertising, e-commerce platform, positioning-based adverts, as well as in station interactive screens and in-car screens.

Increased connectivity can be a security threat if the positioning devices are not well secure. This new solution has a number of data that is being generated at different levels including personal data that should be protected according to the applicable laws to safeguard customers' privacy. To avoid security issues, the system as well as infrastructure should be secure.

Digital transformation is revolutionizing the way modern business is conducted, and migration to mobile is opening new opportunities for businesses to interact with their customers. This case presents a digital advertising model that is driven by data and intelligence to air adverts that target specific customer groups. The subway network presents a good platform to stage this advertising model due the large number of travelers who use the public transport system in Seoul and the existence of established underground malls. This model creates new value to customers including a digital advertising space, intelligent-based adverts, location based adverts, indoor navigation, and mobile-based adverts. The business will generate new revenue as well as create new benefits to

different stakeholders including customer experience for travelers using the subway, and reduced cost of advertising. This model should be considered and implemented in the subway network to take advantage of new technology and cost-effective advertising channel that is based on data and intelligence.

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국문요약

서울지하철의 지능형 광고 비즈니스모델 설계

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현대 기업들은 효율성과 생산성을 향상시킬 뿐 아니라 시장 진출을 위해 새로운 기술들을 채택하고 있다. 광고 업계도 전통적인 채널 (라디오, TV 및 인쇄 매체)에서 인터넷, 소셜 미디어, 모바일 기반 광고와 같은 새로운 매체로 지속적인 파괴적 혁신을 경험하고 있다. 본 연구는 서울 지하철에 지능형 광고 비즈니스 모델을 제안한 사례이다. 서울은 세계에서 가장 분주 한 지하철 중 하나로서 메트로 네트워크를 통해 마케팅 담당자가 다양한 고객과 잠재 고객 모두와 교류하고 상호 작용할 수 있는 플랫폼이 될 수 있다. 현재의 광고 매체의 대부분은 공간, 조명 등 국부적 한계를 가지고 있으나 본 사례의 지능형 디지털 광고 플랫폼은 데이터로 구동되는 광고를 통해 위치기반 모바일 전자상거래를 제공할 수 있다. 등록된 지하철 카드를 통해 고객 데이터를 분석하고 특정 고객 그룹을 타겟팅하고, 대상 소비자 그룹을 기반으로 광고 사용자를 정의하고, 동영상, 애니메이션, 쿠폰, 문자 등 다양한 광고 형식을 제공할 수 있다. 위치 정보를 통해 다음역을 탐지하여 지하철 안의 스크린이 다음 정차 할 역의 광고에 우선 순위를 부여하고, 사용자 모바일에서 알림을 수신하도록 선택한 고객은 광고주의 사업장 근처에 접근 할 때 알림을 받게 된다. 또한, 내비게이션 서비스를 통해 지하 쇼핑물의 고객이 상점, 제품, 시설, 이벤트 등을 검색하고 광고나 추천서비스를 받을 수 있게 한다. 이러한 광고는 고객이 광고를 클릭하면 제품 설명 페이지로 연결되어 전자 상거래로 이어지도록 한다. 이 모델을 통해 개선된 고객 경험뿐만 아니라 지하상가의 중소기업 지원, 새로운 직업 기회, 비즈니스 모델 운영자에 대한 추가 매출 및 광고 유연성 등 새로운 가치 창출이 가능할 것으로 기대된다.

주제어 : 비즈니스 모델, 지능형광고, 위치기반 광고, 지하철, 가치 창출

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