A Model of the Critical Success Factors for the Neom Project in the Context of a Project Management Information System

Umar Ammar Altahtooh[1]

[1] College of Business Administration, Taibah University, Madinah, Saudi Arabia

Correspondence: Umar Ammar Altahtooh, College of Business Administration,Taibah University, Madinah, Saudi Arabia.

Received: November 16, 2018 Accepted: November 28, 2018 Online Published: Decemebr 4, 2018

doi:10.5430/jms.v10n1p1 URL: https://doi.org/10.5430/jms.v10n1p1

Abstract

Saudi Arabia's Vision 2030 entails huge investments into developing mega-projects. The Neom Project is totally different from any other urban project in the world. Right now, it is under construction. Neom is the first independent special area spread over three countries: Saudi Arabia, Egypt, and Jordan. This paper proposes a model of the critical success factors (CSFs) for the Neom Project in the context of a project management information system (PMIS). The researcher used case study analysis as the research methodology to develop the model. A total of four CSFs were identified from the four case studies.

Keywords: CSFs, Neom, PMIS, Saudi Arabia, vision 2030

1. Introduction

Saudi Arabia's population is young and growing rapidly, currently totalling over 30.8 million people. The country's oil revenues represent more than 90% of its government budget (Salameh, 2016). This means that the general budget of Saudi Arabia still depends on oil. The issue here is not about oil dependence: it is about the variation in oil prices over time. Moreover, an extreme drop in oil prices can be a disaster for economic growth. From this viewpoint, Deputy Crown Prince Mohammed bin Salman announced the end of dependency on oil by releasing Vision 2030 on 25 April 2016. Furthermore, he announced a mega-project to build a new city, named Neom, to be linked up with Egypt and Jordan. Before discussing Neom, Vision 2030 should be explained in detail.

Vision 2030 is a general plan and strategy that is intended to lead the country of Saudi Arabia to thrive in a post-oil era. This vision depends on three major themes (Saudi Vision 2030, 2016):

- a vibrant society
- a thriving economy
- an ambitious nation

The first theme of 'a vibrant society' emphasizes improving the life quality aspects in Saudi Arabia. Developing cities and achieving environmental sustainability are important areas of this theme so that three Saudi cities will be ranked in the top 100 cities in the world.

Second, the theme of 'a thriving economy' focuses on the economic diversification of Saudi Arabia. This theme is at the heart of the vision because it concentrates on key economic areas, as follows:

1. maximizing investment capabilities
2. improving the business environment
3. rehabilitating economic cities
4. establishing special zones
5. increasing the competitiveness of the energy sector
6. developing digital infrastructure
7. building a unique regional logistical hub
8. integrating regionally and internationally

9. supporting national companies

The third theme of ‘an ambitious nation’ focuses on increasing transparency in managing fiscal resources and increasing social responsibility.

According to the Saudi Vision 2030 report (2016), Saudi Arabia seeks to decrease the level of unemployment to 7%. It aims to increase small and medium-sized enterprises’ contribution to gross domestic product (GDP) from 20% to 35%. According to the vision, women’s participation in the workforce will rise from 22% to 30% by the end of 2030. Moreover, Saudi Arabia aims to be among the top 15 largest economies, instead of its present position as 19th in the world. Increasing foreign direct investment (FDI) is one important goal of the ‘thriving economy’ theme. Dependency on oil will drop by increasing the share of non-oil exports from 16% to 50%. The government of Saudi Arabia will increase its non-oil revenues from 163 billion Saudi riyal to one trillion Saudi riyal. In terms of social responsibility, the government will rally about one million volunteers each year, instead of the 11,000 now. To achieve the goals of Vision 2030, the government of Saudi Arabia has established the following programmes:

1. a government restructuring programme
2. a strategic directions programme
3. a fiscal balance programme
4. a project management programme
5. a performance measurement programme
6. a Saudi Aramco strategic transformation programme
7. a public investment fund restructuring programme
8. a human capital programme
9. a national transformation programme
10. a privatization programme
11. a strategic partnerships programme

According to Sanchez (2017), Prince Mohammed bin Salman declared the launch of the Neom Project, spanning an area over 26,500 square kilometres, on 24 October 2017. According to Al Arabiya (2017), the first three letters (‘neo’) are derived from the Latin word for ‘new’, while the fourth letter (‘M’) is the first letter of the Arabic word ‘mostaqbal’, which means ‘future’. This mega-project will cost more than $500 billion (Sanchez, 2017). Neom has a special location on the Red Sea coast that links Asia, Europe, and Africa (see Figure 1). The location of Neom has several advantages:

1. It is an international hub for trade: around 10% of the world’s trade moves through the Red Sea via the Suez Canal into the Mediterranean.

Figure 1. Location map of Neom

2. It has virgin beaches with several remarkable islands, and the temperature is around 10 ℃ cooler than nearby areas in Gulf Cooperation Council (GCC) countries.

3. In total, 70% of the world's population could reach Neom airport (OENN) in less than eight hours.

4. It has a perfect environment to establish renewable energy projects, such as wind and solar energy.

5. The area contains oil and gas fields, in addition to mineral resources.

Moreover, Neom has a competitive advantage in being developed from the ground up since October 2017, creating a new image and value. According to CNBC (2018), the innovative city of Neom will increase FDI into Saudi Arabia from 3.8% to 5.7% of GDP. The project aims to utilise digital technologies to make Neom a major commercial centre in the Middle East.

The investigation of Neom is new, and there is a lack of studies on this topic. In addition, no efforts have been made to deal with this mega-project in order to suggest a model of critical success factors (CSFs). Thus, this study sought to identify the CSFs that could influence the Neom Project. The study methodology was case study analysis because it was considered appropriate to answer the research question: *What are the CSFs for the Neom Project?*

The paper is structured as follows. Section 2 describes the methodology and the research model. Section 3 discusses the dimensions of smart cities. Section 4 presents a model of CSFs based on the analysis of smart city case studies. Finally, section 5 summarizes the findings and makes recommendations for the Neom Project.

2. Method

The research method of this study was a qualitative approach: case study analysis. According to Benbasat et al. (1987), data collection for case studies includes using data from documentation, archival records and direct observation. A case study is an appropriate approach to research a field in which limited prior studies have been conducted. Case study analysis was carefully chosen because it is appropriate for real, actual, and complex conditions (Christensen and Hansen, 1987). The primary written material is generally gathered from numerous sources, for example the websites of corporations, newspapers, consulting businesses, research institutions, and ministries. This study used two main methods to collect data:

1- direct observations: visual and audio observations

2- documentation: academic articles, government documents, group documents, online newspapers, technology websites, and corporate research reports

This method helped to discover the CSFs of specific case projects and to make generalizations about the CSFs of the Neom Project. The researcher selected four different smart city projects as case studies in different countries. The aim of this study was to identify the major factors that may affect the Neom Project, as shown in the following suggested research model.

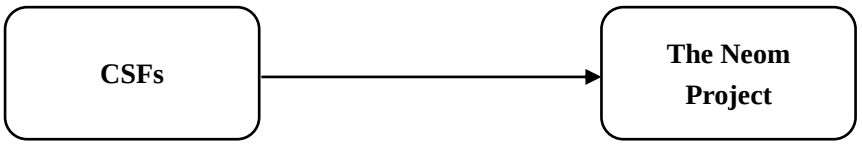

Figure 2. The research model

3. Smart City Projects: A Theoretical Study

The term 'smart city' is still ambiguous, although it was first used in 1994 (Dameri and Cocchia, 2013). According to Nam and Pardo (2011), there are three dimensions of smart city projects: technology, people, and institutions. McFedries (2014) defines a smart city as an information-technology infrastructure and an application system. Yuan and Li (2014) define a smart city as a style of city that seeks perfection through making improvements. According to Roche et al. (2013), communication is key for a smart city, including:

- information systems
- the intercommunication of energy
- resources

Thus, information and communication technologies (ICT) should play a key role in all spaces in smart and digital cities, for example facilities, buildings, traffic, and transport. From a practitioner's view, Gartner (2011) argues that a smart city depends on intelligent connections between information systems and many diverse subsystems. Moreover, Toppeta (2010) thinks that a smart and digital city must employ ICT and Web 2.0 technology to improve its liveability and sustainability. Harrison et al. (2010) state that a smart city consists of the following key elements, which create shared intelligence:

1- ICT infrastructure

2- physical infrastructure

3- business infrastructure

4- social infrastructure

According to Giffinger et al. (2007), the European Cities Project developed a six-axis model as a smart city approach. The components of the model are shown in Table 1.

Table 1. The six-axis model of a smart city

Smart mobility	Smart environment	Smart living
• ICT infrastructure • sustainable and safe transport system	• pollution • environmental protection	• housing quality • education facilities
Smart people	**Smart economy**	**Smart governance**
• participation in public life • flexibility	• productivity • entrepreneurship	• public and social services

Mulligan and Olsson (2013, p 81) suggest "a high-level system architecture for smart city applications and services", as shown in Figure 3.

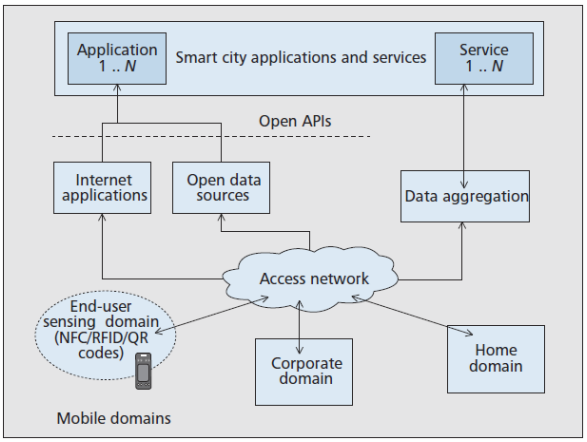

Figure 3. A high-level system architecture for a smart city (Mulligan and Olsson, 2013, p 81)

This architectural framework consists of two fundamental system architectures, which should work together:

1- mobile network architecture and ICT

2- enterprise and Internet-based system architecture

Paroutis et al. (2014) show that there are three views or perspectives of a smart city solution (see Figure 4): a strategic view, a technology view, and a systems view.

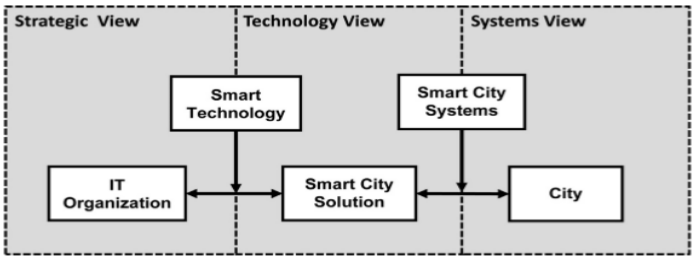

Figure 4. Three views of a smart city solution (Paroutis et al., 2014, p 9)

Pick (2017) conducted research on the role of information systems in supporting proficiency and productivity in smart cities. Hollands (2008) thinks that ICT is fundamental to the successful implementation of smart city initiatives. Cisco, IBM, and Siemens are the key suppliers providing the technological elements for smart city projects in different countries. Giffinger et al. (2007) identify four elements of smart city projects:

- industry
- education
- participation
- technical infrastructure

ICT can play a role as an expediter for developing a new category of communicative environment for smart cities. The following table displays the main dimensions of a smart city throughout the literature, as identified by Albino et al. (2015).

Table 2. The dimensions of a smart city (Albino et al., 2015, p 12)

Key dimensions of a smart city	Source
IT education	Mahizhnan (1999)
IT infrastructure	
IT economy	
quality of life	
economy	Giffinger et al. (2007)
mobility	
environment	
people	
governance	
technology	Eger (2009)
economic development	
job growth	
increased quality of life	
quality of life	Thuzar (2011)
sustainable economic development	
management of natural resources through participatory policies	
convergence of economic, social, and environmental goals	
economic socio-political issues of the city	Nam and Pardo (2011)
economic-technical-social issues of the environment	
interconnection	
instrumentation	
integration	
applications	

innovations	
economic (GDP, sector strength, international transactions, foreign investment) human (talent, innovation, creativity, education) social (traditions, habits, religions, families) environmental (energy policies, waste and water management, landscape) institutional (civic engagement, administrative authority, elections)	Barrionuevo et al. (2012)
human capital (e.g. skilled labor force) infrastructural capital (e.g. high-tech communication facilities) social capital (e.g. intense and open network linkages) entrepreneurial capital (e.g. creative and risk-taking business activities)	Kourtit and Nijkamp (2012)
management and organizations technology governance policy context people and communities economy built infrastructure natural environment	Chourabi et al. (2102)

In the last six decades, there have been various smart city initiatives and projects in a range of nations in the world. Most of these projects have been in the United States of America (USA), Europe, Brazil, South Korea, the United Arab Emirates (UAE), and Japan. This paper uses and analyses four different smart city projects as case studies in different countries. By analysing these cases, this study identified and derived four CSFs for the Neom Project.

4. The Analysis of Smart City Projects by Examining Case Studies

Every smart city project has objectives and goals based on its condition and position. Some European smart city projects have had the aim of becoming hybrid hubs for clean energy technologies, such as Copenhagen. Japanese smart city projects have focused on the concept of a green city and environmental sustainability, such as Kitakyushu. This study analysed four case studies of smart city initiatives and projects, which were selected from the literature review. These cases were considered suitable to generalize the CSFs for the Neom Project based on ICT facilities and services.

4.1 Case Study 1: Barcelona

ICT plays a key role in making Barcelona a model smart city. Such technology changes the rules of the game in smart city strategies regarding competition (Bakıcı et al., 2013). As a smart city, Barcelona has more than 400 research centres for innovation and the use and creation of knowledge. The project Barcelona as a People's City was launched by Barcelona's council to employ new technologies to encourage economic growth and the happiness of its residents. According to Capdevila and Zarlenga (2015), this project consists of five axes:

1- open data initiatives

2- sustainable city growth initiatives

3- social innovation

4- the promotion of alliances between research centres and the public

5- smart services based on ICT

The main goal of the Barcelona smart city initiative is using ICT to make public administration more effective, efficient, transparent, and accessible. The conceptual model of Barcelona includes three layers: 1) a smart city, 2) a knowledge economy, and 3) a knowledge society. Barcelona's smart city model depends on three elements (Bakıcı et al., 2013):

- ubiquitous computing infrastructures
- information
- human capital

This smart city model provides four main services:

- a corporate fibre-optical network with connections
- Wi-Fi mesh network nodes
- wireless sensor networks
- a public Wi-Fi network

In 2014, Barcelona was awarded the iCapital prize by the European Commission as the first European Capital of Innovation (Capdevila and Zarlenga, 2015).

4.2 Case Study 2: Copenhagen

According to Carlsen (2014), the goal of Copenhagen as a smart city is to be carbon neutral by 2025. Copenhagen was awarded the Smarter Cities Challenge grant in 2013 by IBM. Copenhagen Connecting (CC) is one project intended to make Copenhagen a smart city. It was launched in 2013 to cover the whole city by establishing a huge digital service infrastructure in order to use big and open data. Thus, Copenhagen seeks to build an environment of transparency and access to information. However, privacy is a pillar issue in the success of the CC Project.

According to a report of the City of Copenhagen (2017), its smart city strategy has three layers:

1- foundation (data platform and privacy, smart city infrastructure, and co-creation and partnership)

2- focus areas (health, mobility, energy and climate, smart citizens, and smart learning)

3- goals (quality of life and growth in a green city)

This strategy is shown in Figure 5.

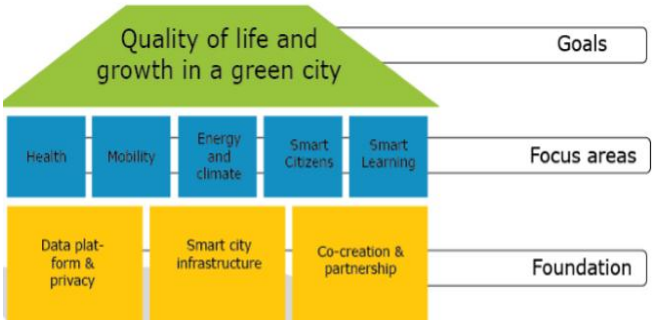

Figure 5. Copenhagen's smart city strategy (city of Copenhagen, 2017)

Copenhagen is sharing data to achieve efficiency, innovation, and transparency for citizens and tourists. The welfare-technology project is intended to create collaboration between the Municipality of Copenhagen and the Copenhagen Care and Innovation Centre. The aim of the project is to employ welfare technology in municipal homecare to:

- enhance citizens' self-sustainability
- enhance employees' working conditions
- reduce municipal time

Moreover, the Intelligent Traffic System is a Wi-Fi-tracking project used to gather addresses from the smartphones of citizens and tourists. In 2014, Copenhagen was appointed the European Green City Capital by the European Commission.

4.3 Case Study 3: Dubai

Today, Dubai is an important city in the Middle East as part of the UAE in the GCC. Dubai has become a good

reference case for smart city initiatives. Dubai's smart city initiative, launched in 2014, depends on both traditional ICT systems and state-of-the-art technology systems. According to Khan et al. (2017), Dubai employed an ICT strategy in 1999. Then, after one year, an e-government project was launched in 2000. The UAE is ranked first for "Importance of ICT to Government Vision" and second for "Government Success in ICT Promotion" in the world by the World Economic Forum.

The higher aim of the Dubai smart city initiative is to make Dubai "the happiest city on earth" for citizens, residents, visitors, and tourists. To achieve this aim, ICT and the IoT (the Internet of things) have been adopted across particular dimensions, such as the economy, the environment, and mobility. Dubai has launched new technology initiative projects as follows:

- blockchain technology
- mobile health technology
- a hyperloop train
- paperless technology

The Dubai Data Initiative is a project to help the exchange of data and information between all involved stakeholders, including the public and private sectors. According to Khan et al. (2017), this project has four principles:

1. open data
2. shared data
3. big data
4. rich data

Smart Dubai 2021 is a new initiative to achieve certain digital revolution objectives by 2021. The transformation agenda of Smart Dubai 2021 is shown in Figure 6. Dubai will host Expo 2020 as a smart city to show the newest technologies and applications.

Figure 6. Agenda of transformation (smart Dubai 2021)

4.4 Case Study 4: Manchester

Manchester had a network of e-village halls to provide access to ICT and Internet services in 1992. In addition, in 1993, it was one of the first UK cities to have a website. In 2008, Manchester developed its Digital Strategy, which concentrated on three key subjects (Carter, 2013):

- digital inclusion
- digital industries
- digital innovation

The Manchester Digital Development Agency was established in 2003 to launch several projects:

- Fibre to the People
- Manchester Internet Hub
- Green Digital Charter
- Digital and Creative Skills

Manchester City Council (2016) declared the aim of its smart city programme as being to achieve "better outcomes for the city and its citizens". CityVerve is a project for the Manchester smart city. It aims to use IoT technologies to restate the meaning of 'smart' in the structure of a contemporary city. CityVerve is being implemented by a consortium of 21 organizations, such as Manchester City Council, the University of Manchester, Cisco, the government, and Innovate UK. The project has a clear vision and picture of the future of Manchester regarding healthcare, transport, energy and the environment, and culture and community (see Figure 7).

Figure 7. The vision of cityverve (smart gateways)

The stakeholders and team of CityVerve have a higher aim to generate a scheme for smart cities worldwide.

5. A Model of the CSFs for the Neom Project

This study attempted to develop a model of the CSFs based on a PMIS for the Neom Project as a smart city. PMISs help project managers to make optimal decisions regarding planning, organizing, executing, and controlling projects. According to Light et al. (2005), Gartner estimates that 75% of large IT projects supported with PMISs will be successful. According to Raymond (1987), the role of a PMIS in the context of a project system is to achieve project goals and to implement project strategies (see Figure 8).

A PMIS supports stakeholders in completing their project tasks and meeting deadlines. It assists communication between project members and supports the project lifecycle, programmes, portfolios, and project management offices. Moreover, a PMIS can be used as a tool to evaluate and monitor a project's progress. The four case studies of smart cities (Barcelona, Copenhagen, Dubai, and Manchester) presented in the previous section are mainly theoretical.

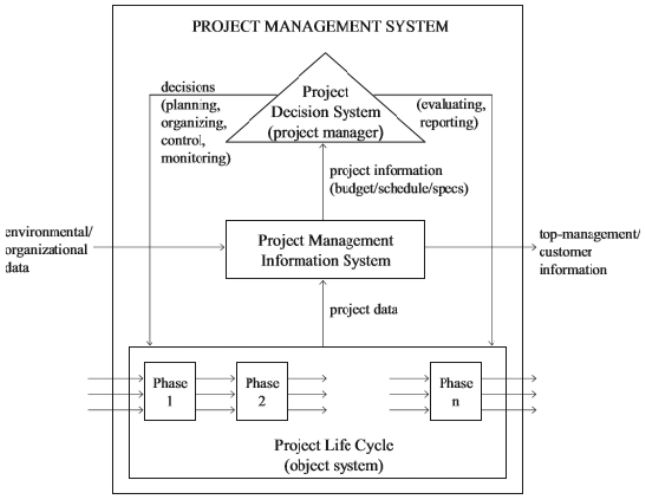

Figure 8. The PMIS within the project management system (Raymond, 1987)

According to Dyrhaug et al. (2003), the CSF method has been employed across various industries, fields, and services. This method is a way to identify the important elements of success for a project based on cases. However, Neom is a private zone that includes a future city. As shown in Figure 9, the proposed model involves four factors that may affect the success of Neom's future.

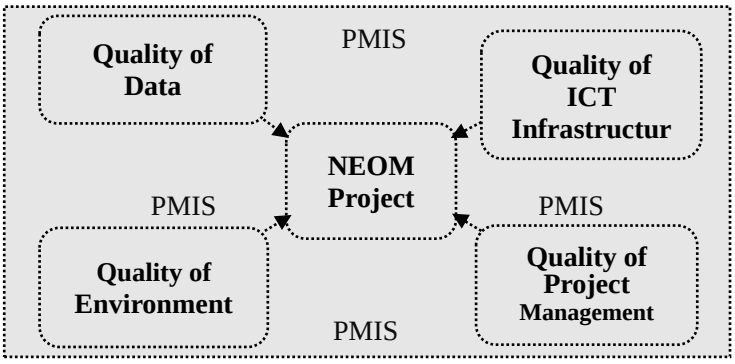

Figure 9. A Model of the CSFs for the Neom project

Based on the four case studies, the model shows the four CSFs in the context of a PMIS, as follows:

1. Quality of Data:

This is important in any software and applications using data and may be considered in line with characteristics such as consistency, accuracy, efficiency, validity, and impact.

2. Quality of ICT Infrastructure:

This will be a critical factor in the development of the Neom Project. It is defined as the ICT systems' proficiency to provide a service anytime and anywhere, such as the quality of the Internet network and connection.

3. Quality of Project Management:

This is necessary to project success in all industries, and it is improved by reducing project time and deviations and by increasing stakeholder satisfaction.

4. Quality of Environment:

The quality of the environment is significant in forming a sociable and healthy atmosphere for human safety and life. The improvement of the environmental quality leads to an improved quality of life.

This model could help the project managers of the Neom Project to increase the probability of the project's success. In addition, it could help decision-makers to understand the different quality factors that may affect the Neom Project in the short and long term within the context of a PMIS. All the above factors will play a significant role in implementing the following technologies:

- the IoT
- artificial intelligence
- e-commerce
- e-government
- data centres

6. Conclusions

A smart city is an environment in which ICT infrastructure is used. Although there is no agreed definition of a smart city, the Neom Project is a completely new kind of smart mega-city. This study is the first effort to propose a model of the CSFs for the Neom Project in the context of a PMIS. This research studied four case studies of smart city initiatives (Barcelona, Copenhagen, Dubai, and Manchester) to derive the CSFs that may affect the Neom Project's success. The model consists of four CSFs: quality of data, quality of ICT infrastructure, quality of project management, and quality of environment.

A key limitation of this study was the use of a convenience sample of cases, rather than a random sample. Another limitation of this study was the adoption of the case study methodology, as the final results cannot be entirely generalized to a wider smart city assessment. However, the findings can be partly generalized to the Neom Project. Despite its limitations, the study extends previous research on smart city projects to develop a model of CSFs for the Neom Project in the context of a PMIS. The findings could help decision-makers to realize the factors that could increase the chance of success of the Neom Project. Further research is recommended to follow up the Neom Project's achievements, milestones, progress, and success until 2030.

References

Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart cities: Definitions, dimensions, performance, and initiatives. *Journal of Urban Technology*, *22*(1), 3-21. https://doi.org/10.1080/10630732.2014.942092

Bakıcı, T., Almirall, E., & Wareham, J. (2013). A smart city initiative: the case of Barcelona. *Journal of the Knowledge Economy*, *4*(2), 135-148. https://doi.org/10.1007/s13132-012-0084-9

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 369-386. https://doi.org/10.2307/248684

Capdevila, I., & Zarlenga, M. I. (2015). Smart city or smart citizens? The Barcelona case. *Journal of Strategy and Management*, *8*(3), 266-282. https://doi.org/10.1108/JSMA-03-2015-0030

Carlsen, L. (2014). The Location of Privacy - A Case Study of Copenhagen Connecting's Smart City. *Master's Thesis*, Roskilde University.

Carter, D. (2013). Urban regeneration, digital development strategies and the knowledge economy: Manchester case study. *Journal of the Knowledge Economy*, *4*(2), 169-189. https://doi.org/10.1007/s13132-012-0086-7

Christensen, C. R., & Hansen, A. J. (1987). *Teaching and the Case Method.* Harvard Business School, Boston, MA, USA.

City of Copenhagen (n.d.). Copenhagen Smart City. Retrieved from https://www.niras.dk/media/1585/kimspiegelbergsteltzer.pdf

Dameri, R. P., & Cocchia, A. (2013). Smart city and digital city: twenty years of terminology evolution. In *X Conference of the Italian Chapter of AIS* (pp. 1-8), ITAIS.

Dyrhaug, Q. X., Andersen, E. S., & Rolstadås, A. (2003, June 2-6). A Generalized Critical success factor process model for managing offshore development projects in Norway. In *17th IPMA world congress on Project Management* (pp. 1-7). Moscow, Russia.

Ellyatt, H. (2018). *Saudi's $500 billion mega-city NEOM is attracting 'overwhelming' interest from investors.* Retrieved from https://www.cnbc.com/2018/05/10/saudis-500-billion-mega-city-neom-is-attracting-overwhelming-interest-from-investors.html

Gartner. (2011). Retrieved from http://www.gartner.com/ newsroom/id/1731916

Giffinger, R., Fertner, C., Kramar, H., & Meijers, E. (2007). City-ranking of European medium-sized cities. *Cent. Reg. Sci. Vienna UT*, 1-12.

Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. *IBM Journal of Research and Development*, *54*(4), 1-16. https://doi.org/10.1147/JRD.2010.2048257

Hollands, R. G. (2008). Will the real smart city please stand up? Intelligent, progressive or entrepreneurial?. *City*, *12*(3), 303-320. https://doi.org/10.1080/13604810802479126

IBM. (2013). *Copenhagen Report.* IBM's Smarter Cities Challenge.

Khan, M. S., Woo, M., Nam, K., & Chathoth, P. K. (2017). Smart City and Smart Tourism: A Case of Dubai. *Sustainability*, *9*(12), 2279. https://doi.org/10.3390/su9122279

Light, M., Rosser, B., & Hayward, S. (2005). Realizing the benefits of project and portfolio management. *Gartner, Research ID G, 125673*, 1-31.

McFedries, P. (2014). The city as system. *IEEE Spect., 51*(4), 36. https://doi.org/10.1109/MSPEC.2014.6776302

Mulligan, C. E., & Olsson, M. (2013). Architectural implications of smart city business models: An evolutionary perspective. *IEEE Communications Magazine*, *51*(6), 80-85. https://doi.org/10.1109/MCOM.2013.6525599

Nam, T., & Pardo, T. A. (2011). Conceptualizing smart city with dimensions of technology, people, and institutions. In *Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times* (pp. 282-291). ACM. https://doi.org/10.1145/2037556.2037602

Paroutis, S., Bennett, M., & Heracleous, L. (2014). A strategic view on smart city technology: The case of IBM Smarter Cities during a recession. *Technological Forecasting and Social Change*, *89*, 262-272. https://doi.org/10.1016/j.techfore.2013.08.041

Pick, J. B. (2017). Smart cities in the United States and worldwide: A rich arena for MIS studies. *Journal of Information Technology Case and Application Research*, *19*(3), 133-144. https://doi.org/10.1080/15228053.2017.1363597

Raymond, L. (1987). Information systems design for project management: A data modeling approach. *Project Management Journal*, *18*(4), 94-99.

Roche, S., Propeck-Zimmermann, E., & Mericskay, B. (2013). GeoWeb and crisis management: Issues and perspectives of volunteered geographic information. *GeoJournal*, *78*(1), 21-40. https://doi.org/10.1007/s10708-011-9423-9

Salameh, M. G. (2016). *Saudi Arabia's Vision 2030: A Reality or Mirage.*

Sanchez, R. (2017). *Saudi Arabia's crown prince promises to lead his country 'back to moderate Islam'*. Retrieved from https://www.telegraph.co.uk/news/2017/10/24/saudi-prince-promises-lead-country-back-moderate-islam/

Saudi Vision 2030. (2016).

Smart Dubai 2021. (n.d.). Retrieved from https://2021.smartdubai.ae/

SmartGateways. (n.d.). *Cityverve: Innovate UK IoT City Demonstrator*. Retrieved from http://www.smartgateways.co.uk/html/news-cityverve.php

Staff writer, Al Arabiya English. (2017, October 24). *What does Saudi Arabia's mega project 'NEOM' actually stand for?*. Retrieved from http://english.alarabiya.net/en/business/economy/2017/10/24/What-does-NEOM-mean-.html

Toppeta, D. (2010). The smart city vision: how innovation and ICT can build smart, "livable", sustainable cities. *The Innovation Knowledge Foundation*, *5*, 1-9.

Yuan, Y., & Li, Y. (2014). Research on the construction of innovation-driven smart cities. In *ICCREM 2014: Smart Construction and Management in the Context of New Technology* (pp. 1719-1726). https://doi.org/10.1061/9780784413777.204