

Quality Investment Decisions in Building Sustainable Smart Cities in the United Arab Emirates

Hala AL Yousfi^a, Badariah Haji din^b, Rusdi Omar^c, ^{a,b,c}Universiti Utara Malaysia, ^{b,c}Supervisor

In light of rapid development, many changes are sweeping the world as the phenomenon of smart government becomes more urgent with increasing applications and artificial intelligence. This has greatly contributed to pushing most organisations to respond quickly and smartly to the changes that occur and confront institutions, whether at the internal level of the organisation or at the community level, and investing in targeted innovations and increasing reliance on information technology. Hence, hundreds of research studies have been conducted on this phenomenon in these accelerating areas to keep pace with new technological development and to build organisations based on their structure. Studies have also been made on the vision and system of smart cities in line with creative thinking and innovative expectations. These have become a vital element indispensable for the continuation and prosperity of an organisation's activity. The main challenges of this study are to build an integrated smart city run by leaders who are able to make investment decisions for the city, and to provide insight into industries in various sectors. Large cities need to build an integrated automated system to increase the efficiency and effectiveness of crisis and disaster management and risk management represented in identifying risks and disasters according to the classification of the risk profile. In addition to the possibility of linking with all operational systems in the relevant organisations. Therefore, the purpose of this research was to study the relationship between the quality of investment decisions and the objectives of building. Analysing motives for building a smart city and to clarify the technologies that support the city are also important. As is how to face problems and challenges in smart cities and how to apply leadership practices as the mainstay of development and the true wealth of the nation to bring about change and development. This mission can only be achieved under conscious leadership based on sophisticated strategic foundations that support a culture of innovation and new practices, and work to attract enormous potential for investments. From here came the idea of adopting smart cities initiatives and developing a road map for city management with an

integrated and sustainable methodology, with the use of capable expertise efficiently and supporting investment decisions, and to be an example to follow. It constitutes best practices and standards at the global level.

Key words: *smart city, leadership skills and practices, digital city, quality of investment decisions.*

Introduction

Since the emergence of the Fourth Industrial Revolution, the government of the United Arab Emirates has continued to emphasise the adoption of a smart city strategy (UAE Strategy, 2016). Noting that this strategy does not only mean that the country is on the right path to developing smart cities, but there is a need for leadership skills to manage the city efficiently and effectively by involving citizens in development processes, innovations and investment decisions.

This practice led to the development of a roadmap to study the effectiveness and efficiency of the investment decision-making process for the transition to smart, sustainable, technically integrated and planned smart cities, and, in essence, advanced technologies (Chaudhuri et al., 2011). Increasingly allowing actors to integrate heterogeneous sources of data and extract data ideas from their mix is also important.

Within the framework of the five-year plan the United Arab Emirates developed for the year 2016 to the year 2021, the UAE is a vivid example of a country that uses the smart city approach.

According to the opinions of experts and academics, the Emirati investment in artificial intelligence, as one of the pillars of the "Fourth Industrial Revolution" which is a major driver of economic growth and diversification, has grown by about 70% during the past three years since 2015 (IDC Information Technology Research, 2017).

Thus, for us, science, technology and innovation is a roadmap for building a better future for future generations (His Highness Sheikh Muhammad Al Maktoum).

This explains the state's relentless tendency to invest in activating the technologies of the fourth generation of the industrial revolution, and in particular, the smart city initiative to achieve its ambitious development goals, as it is the language of the future that is indisputable from realising its ABCs and eliminating illiteracy.

In addition to the dependence of many economic sectors such as the health sector, trade, services and other vital sectors on technology, as well as the great economic opportunities it

provides to many economic sectors in the country, and the ability to achieve huge profits with the application of use and reliance on providing accurate information and advice, which contributes to the positive effects. There is a need to reduce dependence on the human element and labour, which raises the quality of products and reduces spending and promotes the development and acceleration of big data applications at all levels of government and the private sector (Anthony Feves, CEO of City Transformation Agency).

Creating a culture of artificial intelligence among segments of society is paramount to facilitate the spread of the use of applications that depend on these technologies and to create a digital citizens capable of dealing with them, and to strengthen the concerted efforts of government and media institutions to raise awareness of the fundamentals of this field. The UAE strategy was launched within the state's government in 2017.

Work to create expert systems that can perform tasks in a manner similar to the method of experts and help to make decisions accurately based on a set of logical operations to reach a correct decision or a set of logical options, and this is the most important concern of smart cities in the present and the future.

Problem statement

The main study problem is; in transforming cities into smart and digital cities, drawing inspiration from solutions and best practices, and working to attract a huge amount of investments, and expanding the horizons of strategic thinking; To keep pace with the developments in the world, therefore, a revolutionary intellectual shift must take place (Zuboff, 2015) by creating advanced devices in the smart city that will enable many unprecedented capabilities to provide innovative new services for smart cities.

However, the increased complexity of information technology will also increase the vulnerability of a smart city systems to both intentional and unintended attacks aimed at disrupting services in cities or unauthorised access to information (Dinh D. V, et al., 2018).

Therefore, it is necessary to design systems to protect information and to ensure continuity of services and safety with the continuous flow of information (Davenport, 2006). The scope of the challenge is large, given that the security of critical infrastructure and services is at risk. There is no doubt that disrupting the systems in the city or at least part of it will negatively affect the functioning of the smart city (Pal D, et al, 2018).

This scenario may appear abstract or unrealistic, but it is in fact very plausible given the wide range of technologies used in the current urban infrastructure and the lessons learned from previous cases of such attacks (Yaqoob I, et al. 2017).

Technical solutions that enable strong encryption to protect systems and data should be deployed in conjunction (McAfee & Brynjolfsson, 2012), with appropriate backup and recovery techniques put in place in order to ensure the resilience of the systems involved and the continuity of the services they support (Diaconita V, 2018).

In addition, perhaps most importantly, leaders should initiate the development of a culture of security and protection among smart city management employees and develop technical measures with their safe positions (Chen et al., 2012), and provide a platform for cooperation between many stakeholders in the field of smart cities (Ahmed E, et al. al, 2017).

Therefore, it was necessary to understand the context and the interconnected conditions that govern finding new advanced technologies, building capacity in (Peppard & Ward, 2004), raising readiness for innovation, (Ekbia et al., 2015), and investing in a smart city, which provides new opportunities for knowledge processing for researchers in the future (Gaber et al., 2005).

In addition, it helps support investment decisions, and the Future Research Department (Philip Titlock). However, opportunities always follow some of the challenges facing these government entities, especially large-scale applications (Clarke, 2016)

Indeed, even when technology eliminates the need for routine work (Constantiou & Kallinikos, 2015), it will also open entirely new opportunities, in industries that foster creativity and innovation (Madsen, 2015).

Study questions

The study attempts to answer the following study questions:

- What is the reality of smart cities in the United Arab Emirates?
- What is the impact of the quality of investment decisions on building smart sustainable cities?
- What are the obstacles facing the quality of investment decisions in building a sustainable smart city?

Objectives of the study

The aim of this study is to examine the relationship between the qualities of investment decisions in building sustainable smart cities. The following objectives of the study aim to answer the above study questions:

- Learn about the reality of smart cities in the United Arab Emirates
- Identify the impact of the quality of investment decisions on building sustainable smart cities

- Illuminating the obstacles facing the quality of investment decisions in the smart city.

Significance of the study

From a methodological perspective, the importance of the study lies in investigating the context of the topic that addresses challenges and future trends in an increasingly complex work environment, (Aaltonen & Tempini, 2014). This is represented in the role of decision-makers in the investment decision-making process in smart cities (Bholat, 2015), to maintain Economic and social security to build an integrated security and compliance project. In addition, this study will contribute significantly to bridging security gaps and addressing all types of non-security breaches.

Study scope

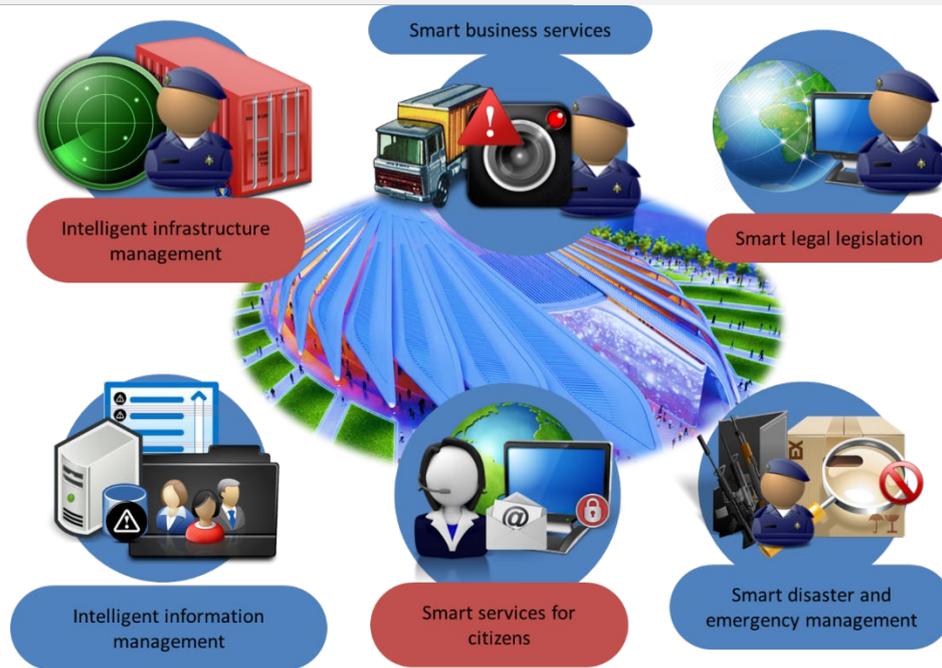
The study was limited, to the reality and decision-making of investment decisions for a sustainable innovative city in local government departments and federal ministries. Based on the use of information and communication technologies to create environmentally friendly, technically integrated, and carefully planned urban cities to crystallize employee skills development plans, to make the most of these technologies, digital transformation, and the theory of economic development based on circular flow, (Joseph Schumpeter, 1883- 1950, American political economist).

Then, to propose an infrastructure, based on the concept of a digital city, computing technologies, thus achieving automatic control, and artificial intelligence in addition to that, providing the basic framework for computing platforms (Anthony Vives, CEO of City Transformation Agency in Barcelona).

Smart cities

An integrated city operates in an innovative way, covering all areas of the economy, governance, society and health, (Moir et al, 2014), with a focus on support and effective participation, for the government sector, and the role of decision makers in making investment decisions for the purpose of implementing the organisation's strategy in the shortand long-term. The short-term aims to generate new production capacities and that decisions are made after studying the economic feasibility and knowing the risk and competitors, (Flyverbom 2016). It also involves measuring the expected rates of return from it and the safety margin and profitability of the investment.

Smart cities are an integrated portal that is the digital reproduction of the city, accessing it remotely from the context of a single application for use in other contexts Lycett, 2013.



“Smart city concept”

There are strong economic and security motives for building smart cities, working on the flow of investment capabilities on a large scale, which helps to pave the sustainable smart city market. To this end it is necessary to feed information and check entry barriers, (Tamm et al., 2013), which limits the development of the smart city ecosystem, thus proposing a practical approach to expanding the scope of work within a high-level description system, embodying the self-sustainability method (Caprotti et al., 2016), to establish city economies on the basis of smart city infrastructure.

The smart city is linked with the physical city, with a computing platform (Albino et al., 2015), to process and store information and analysis. This leads to the decision-making processes (Işık et al., 2013), and the automated control rule which is based on the results of those analyzes, (Constantiou & Kallinikos, 2015). Digital and physical cities can be linked by the internet of things (Alshboul et al., 2015), thus shaping integrated space (Chris Finn, Partner at PWC San Francisco).

In addition to developing models to define the dynamic nature of representing the diversity of those elements and becoming the number one strategist in the world (the urban rainmaking program). Viable smart city models should be multidimensional and include different aspects of intelligence (Ekbia et al., 2015) and stress the importance of integration and interaction across multiple fields.

At this pace, changes will take place in the real world, (City Center, 2014), for both people, and logistics, (Zuboff, 2015) being sensed automatically in real time through mega, complex

computing (Newell & Marabelli, 2015) and control, to become a public service (John McCarthy: Professor at Stanford University) with a simple formula as follows:

The transit gate for making the future (smart city) = digital city + internet of things + electronic computing.

A smart city provides a variety of applications and smart services (Van den Broek & Van, 2015) in these four regions, thus promoting coordinated developments in smart applications, (Tiefenbacher & Olbrich, 2015), that a smart city offers within the dimensions of reproduction, economic development and social interaction.

A smart city depends on the infrastructure of a digital city, and information is liberated through the internet of things (Kennedy & Moss, 2015) (Weber et al. 1996). Where massive maths is performed in real time through computing, and provides feedback on console, using the internet of things thus making city smart.

Strategies and technologies of smart sustainable cities

Sustainable smart city strategies (Azamat, 2011), are a set of financial and human resources and strategic plans in government organisations and departments responsible for preparing information, in addition to information resulting from critical security data processing and analysis by experts, consultants and decision makers. This is in order to build an integrated system for smart management that combines components, programs and visions for planning and control purposes and then measuring the application of basic technological standards and strategies (Herland. M, Khoshgoftaar, 2014).

The goal is to transform cities into more sustainable, smart, resilient and resilient living environments (Komninos, 2008), taking into account disaster resistance, mitigating manipulation of documents, protection from crime and ensuring community security and safety while protecting the economy.

In addition to, developing communications infrastructure and building an advanced network to provide effective services based on digital indicators, it is necessity to provide a legal, legislative and investment environment to attract international investments. It is also necessary to develop smart technologies, develop and prepare human frameworks by training employees (Kung et al., 2015) and to crystallise ideas into practical steps.

At the same time, with the support of researchers (YouGov, Arqiva: 2016) in the United Kingdom the smart city needs a new initiative to build a good system consisting of several independent projects (Cosgrave et al. 2014). These projects are centered around developing the

skills of leaders and gaining knowledge (Jiang & Gallupe, 2015), experiences and capacity for investment decision making; (Wang et al., 2014) for future security policy.

The complexity of smart city deployment is twofold, on the one hand, the scarcity of resources to stimulate investments in infrastructure, (Stein et al). On the other hand, (Raise, 2013) the level of the model and making it self-sustainable so that citizens become the main users and consumers and participate in the development of work systems (Lycett, 2013). So cities can benefit from information that improves work quality through the dynamic service delivery system (Tamm et al., 2013) and for the purposes of smart city development, (Zegras et al., 2015) cities must pass the information phase crossing map (Sharma et al., 2014) the digital phase and the intelligence phase.

Smart systems methodologies

The main engine for the management of work in smart cities, (Talon et al. 2013-2014) is an important part in the decision-making and strategic planning of smart cities (Marabelli & Galliers, 2017). It is also useful to adopt the latest quality standards to keep up with the latest trends, solving problems that users and beneficiaries may face, which allows easy retrieval. Information integration, (Konsynski & McFarlan, 1990) and user sharing of information through online registration, (Gao et al., 2015) disseminating this information in the form of services, (Seddon et al., 2017) on digital city spatial framework platforms, (Gillon et al., 2014). Adopting strict governance practices (Tallon et al. 2013) in the interest of government and industry, and the public and other users can easily access relevant information, (Tamm et al., 2013) as computing promotes resource integration, information sharing, and program collaboration (Moore's Law, Gordon Moore 1965)

This methodology of ethics, (transformational leadership and vision), shares some common characteristics so as to be fair and apply transparency (Newell & Marabelli, 2015), to be accountable and understandable, safely harnessed in the service and protection of humanity that are consistent with human values. In the short and long term inclusiveness benefits all members of society (Madsen, 2014), and global governance should adhere to it (Lin et al., 2011) while respecting individuals' dignity and rights.

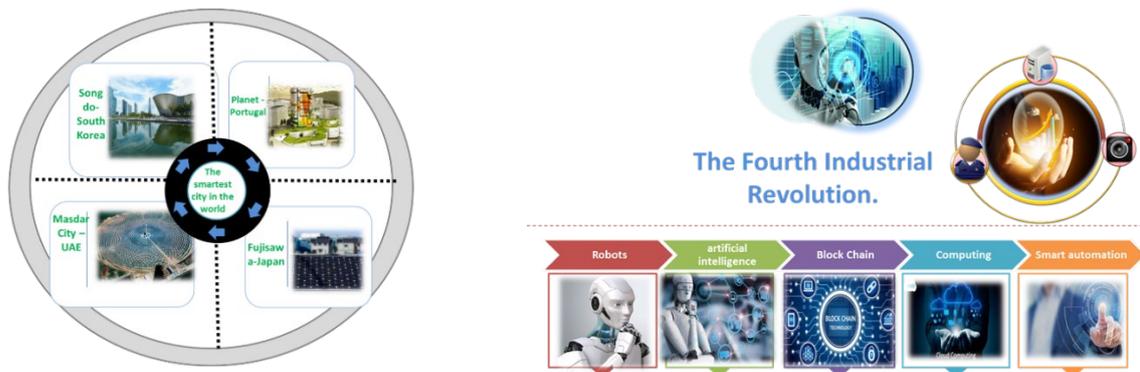
The sustainable smart city model

Most of the previous research focused on sustainability models, by examining the characteristics of smart cities as one of the innovations of the information technology era (Sharma et al., 2014) perceptions of input and output (Ekbja et al., 2015).

In addition to linking the characteristics of these cities with sustainable cities and devising mechanisms that can be applied in the transformation of existing cities into smart sustainable cities (Holsapple et al., 2014).

In addition, CN Traveler has identified “the world's smartest sustainable cities” to lead the revolution in smart urban planning, which has been able to integrate green technology and practices on a large scale (Laney & Jain: 2017).

According to (Lee et al., 2014), there were 143 'smart city' projects globally in 2012, divided between Europe (47 projects); North America (35 projects); Asia (40 projects); South America (11 projects); Middle East / Africa (10 projects), EU-28 and Liu & Peng China Smart City Forum, 2013.



‘The typical picture of cities governed by network technology’

The relationship between the strategies of investment decisions in building smart sustainable cities

The Future Journey program for building sustainable smart cities focuses mainly on building a smart city, and this is achieved through the quality of investment decisions (Yoo 2015). This involves the effective use of infrastructure networks, whether data from the government or federal ministries, to improve the effectiveness of the economy and politics that include structures and the infrastructure of the state related to technological perspective (UAE Vision 2021).

In addition to providing insights and a strategy for achieving a competitive city and taking advantage of the opportunities it offers to increase local prosperity and competitiveness (Ross et al., 2013) which is a strong catalyst for formulating policies and strategies adopted in the process of transforming the city into a smart city with big confidential data (UAE Vision 2021). Providing and supporting the perspective of government sectors and federal ministries has an important role in competitiveness and sustainability. This effective, participatory policy must



be effective and tangible to ensure the city's success in transforming into a smart city, (UAE Vision 2021).

In recognition of this development, the study has concluded the comprehensive role that legislation and investment decisions can play in establishing a comprehensive smart cities project. It caters to the aspirations of the various stakeholders who live in the city (Glameier & Christopherson, 2015).

Time plays an essential role in the effectiveness of investment decision-making (Sharma et al., 2014), for the development and growth of organisations, and its importance lies in being based on clear foundations, such as setting priorities, proper planning, budget management, which increases the effectiveness of performance and achieving the goal.

In addition to the skill of problem analysis, creative solutions, and a unique approach, this concept appeared in the early twentieth century through psychologists Thorndike and Kohler. This skills that develops the leader's abilities, to use new skills, to solve problems, and make the right decisions, or find alternative solutions to increase the idea of investment.

The Pareto model was one of the most important tools for decision-making, using the 80/20 rule. Its idea is based on doing 20% of the work and getting 80% benefit.

For example, actors can be restricted by their structural and organisational boundaries (Sharma et al., 2014). This calls for the inclusion of different roles and perspectives in order to reach new and valuable insights (Jagadish et al., 2014), (Gao et al., 2015) for building sustainable smart cities.

Moreover, there are a few alternative secondary markets (Batty et al., 2012), for financing large smart city projects, that are an increased risk for investors, who find it difficult to aggregate individual, small-scale, projects into large-scale investment vehicles that are unable to address stakeholder concerns (Clarke, 2016), and limit exposure to risk (Tharukiah et al, 2015), by building stronger deposit bases that limit available cash flows. (Van den Broek & Van Veenstra, 2015).

This contributes to slowing down private investment (Clarke, 2016), (Gao et al., 2015) and translates into a certain immaturity in the private sector, which in turn strengthens the complexity of relations with the public sector, supports innovation and improves transparency (Martin Stewart, Thinking Leader In societal digitization).

Nor should we lose sight of the concept. Which was popular in the beginning of the seventies of the twentieth century, in both the United States and Britain, and it is the skill of governance (Nasreddin, 2015, 7).

As Guillasme believes governance is not just comprehensive management of an organisation, but is a broader and more general scope and concept to include overall management, transparent management, cultures (Weber et al., 1996). Which is based on strengthening the rule of law through accountability, and oversight and by developing a future vision eager to achieve strategic goals, (Constantio &Calinicos, 2015).

The most prominent obstacles facing the building of a smart sustainable city

Experts say that there are many challenges facing the concept of smart cities such as security, privacy and electronic threats. Van den Broek and Van Veenstra (2015) point out that these challenges must be addressed before the actual implementation of the smart city concept.

Macmilan and Tampoe (2005) indicate that strategic decisions are taken to determine the organisational response to the crisis, the possibility of anticipating and anticipating risks and crises before they occur (Gao et al., 2015), and taking the necessary essential decisions in the event of a risk.

Methodology and method of study

Because of the nature of the study and based on the objectives that the study seeks to achieve, this study used the descriptive approach and the analytical approach in collecting data to describe the study variables and analyse its relationships using a statistical package for Social Science. This helps to identify the problem and its analysis and finally formulate recommendations to take future decisions to solve the problem (Melhem, 2000, 55). In addition to that the approach depends on describing the phenomenon subject of research, analysis, linking and interpretation to reach conclusions.

Study population

The tool used in this study is considered as planning to predict and prepare for the future based on analysing the present, expectations and future trends, and identifying appropriate methods and means to achieve these goals efficiently and effectively in accordance with priorities and a specific timetable and an accurate identification of responsibilities. Accordingly the study included 10 governmental and non-governmental departments and private companies. In trade in the United Arab Emirates, where the study focuses on collecting data related to the demographic characteristics of respondents from statistical departments and information technology departments such as the Ministry of Economy, Federal Customs Authorities and the Ministry of Health throughout the United Arab Emirates, so that the number of employees in this study includes (500) employees.

The concerned directors were counted in the Dubai Customs Department, and the total number of directors and experts in the economic field was (100) leading employees, and the same is true for the Ministry of Economy, with approximately (100) leaders. As for the remaining departments, which number (8), approximately (300) employees to cover the different axes. From the questionnaire, by providing a database containing the names of the employees in the departments, to communicate with them for the purposes of the study, highlight the main improvements, and evaluate weaknesses.

The study obtained data through the survey in Arabic and English within a link on personal phones, as this method is considered more cost-effective and easy to reach the concerned persons. Studies have shown a large response compared to other survey situations.

Data sources

Two primary sources of information were used:

1. **Secondary sources:** they are obtained in literature and previous studies published in various scientific books and journals. Through Arab and foreign books and references, articles that dealt with the subject of study, and various Internet sites.
2. **Preliminary data: Primary data:** The field study, which is the main pillar of this study, was obtained with the questionnaire that was developed for this purpose and on some demographic characteristics of the study sample and the factors that are likely to affect investment decisions to build smart sustainable cities.

What distinguishes this study from others?

This current study was distinguished from previous studies as unique, and it is the first study conducted in the United Arab Emirates, which dealt with the economic and industrial sectors and its relationship with most government institutions and federal ministries. It also related to the field of import and export, and the study relied on the results of previous studies. As the information characteristics were divided, this division helps greatly to clarify the effect of effective investment decision-making in smart sustainable cities.

In general, artificial intelligence is very important in promoting and sustaining development, as is the new wave of smart government on which services, sectors and future infrastructure will depend. A future that is not limited to the foreseeable future, but envisages what the region and the world will be like after more than half a century, (Hopkins J, & Hawkin P, 2018).



Concluding remarks:

In conclusion the primary purpose of this study was to investigate building an integrated platform that is considered a sustainable smart city under the umbrella of the economy and trade exchange process to support investment processes in the United Arab Emirates. Therefore, this study was conducted to develop and verify the correctness of the theoretical framework with more supportive information. Thus, this study highlights the Emirati experience and the importance of building an integrated city supported by optimal strategies, issues of future foresight, aspirations and visions for future research. Finally, many proposals have been proposed for future studies, adding new variables, and shedding light on the future generation so to provide a set of tools that enables policy makers to develop electronic services and systems based on modern technologies, each according to its priorities and contexts.

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