A Cross Country Analysis of Digital Transformation Initiatives

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***Abstract*— The Internet has shaken the foundations of business entirely. It has also pressured governments to offer significant amount of their process, transactions and data online. More broadly, digitization means relying more on computer systems and less on paper trails. Governments around the world are exploring initiatives to steer a transformation towards digital government beyond merely e-government or government portals. In this work, we compare these initiatives in terms of timeline, vision, programs and challenges for five selected countries. It can be seen that Singapore and the UK are the forerunners of such initiatives by focusing on data and innovations through experimentation. Australia's digital initiative is more concerned with improving government services and transactions. Malaysia's initiative is lead mostly by the planning agency and thus is focused on improving the countries' ranking in various UN (United Nations) ranking of e-governments. Some countries such the UAE although they started latter than others are catching pace quickly via strong central government and abundant resources.**

Keywords—Digital transformation, E-government, IT Management.

I. INTRODUCTION

Digital technologies have disrupted how business operates (in sales, marketing, procurement, customer service, investments, management, human resources, etc.). Governments are no exception. Coupled with citizen demands, cost reduction mandates, political pressure[1] and private sector's needs governments are required to change the way they operate, provide services and deliver data to meet the demands of urging problems and be at the forefront of digital trends in order to be able to provide and monitor data and technology. Broadly, Digital Transformation (DT) can be defined as an "evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes and customer experiences to create value" [2].

Deloitte, a digital consulting agency, reports from a survey of digital transformation programs in governments that digital mature transformation programs can be characterized in terms of strategy, workforce skills, culture, leadership, user focus and procurement practices [1]. Moreover, Deloitte survey identifies too many competing priorities, insufficient funding, security concerns and lack of an overall strategy and understanding of digital trends [1] as the top barriers to digital transformation while workforce skills and culture change [1] are seen as the top challenges that face governments in digital transformation efforts.

Digital transformation helps governments meet the regional, financial and technical challenges and facilitates communication between them and their enterprises and citizens. DT aims to provide service to the citizen through technology in an easier way, shorter time and efficient manner. It also provides services in a more transparent way (to minimize corruption and combat rumors). Many countries use 'citizen first' as a slogan of DT initiatives which points to setting the citizen as the first priority in order to increase trust and engagement in the provided service.

Globally, governments aim to improve productivity, enhance their process and support innovations to become more efficient and able to meet technical and democratic challenges[3]. DT is no easy task. To reach the final stage of DT, it requires massive changes to the whole government structure and institutions. There are many factors that governments should focus on in their DT initiatives:

- Change the service from paper to electronic [3], [4].
- Change the process and structure to meet the technology needs [3], [4].
- Citizens acceptance [5].
- Public sector employee adaption[3], [4].
- How to execute process [3], [4].
- How to evaluate the performance [3], [4].

The role of leadership can't be overlooked in DT initiatives and programs. Leaders of DT programs need to work with public agencies, the private sector and citizens to formulate policies and set priorities. When leaders at the top who manage digital agenda understand digital trends they become aware how technology impacts government business and gather necessary resources (human capital, training, technology vendors, etc.) to implement required change [1].

In this paper we examine different DT initiatives in five selected countries. We describe these initiatives and compare between them.

II. RESEARCH METHODOLIGH

In this paper we will present a comparative analysis among five countries. Some of the chosen countries are at the top of digital transformation, while others are just at the beginning stage in order to detect patterns of similarity and unique features. We will compare the countries in terms of timetable, strategies, Achievements, challenges, Final goal.

III. United Kingfom

The UK government is led by the prime minister whom appoints all the other members of the government (ministers) in the cabinet after being approved by the parliament. The parliament is stated the legal legislation and initiator of strategies for digital government.

The UK is the first country in government transformation over the world according to United Nation survey 2016[6]. The government transformation will be transforming all the service provided to enhance the experience of citizens and companies with the public sector, change all organizations departments to be more flexible and more efficient to enhance the service through the various digital channels.

The change in the internal government as a result of DT is not only in the policy or outcome, it is also in aiding the government to collaborate better and to carry the services to be more efficient. The aim of DT to (1) understand citizen needs (2) the service will be faster and costs less (3) continuous improvement, use and sharing of data (4) to improve trust between the citizen and the government through the security of services and the privacy process [7].

A. DT aims in UK [7]*:*

- Continue to deliver digital services in world-class service quality and transfer the operation from the front-end to the back office in modern and efficient way.
- Develop technical skills among citizens and public employees.
- Provide better work environment to enhance the service.
- Use the data in efficient way not only for transparency, it's also for more cooperation between government and private sectors.
- Establish sharing platform to operate, iterate, embed the data and service and enhance the business ability to accelerate the transformation.

The Government has established many positions for DT [7] :

- Chief Data Officer: to lead use of the data.
- Data Advisory Board: to agile efforts to use data in efficient way.

B. Background [7]*:*

- The Government Digital Service GDS is created in 2011 as digital center if government.
- GOV.UK was created in 2012 and it contains almost all government departments and agencies. It contains 25 full-fledged digital services.

IV. Australia

The Australian government consists of the democratic legislature which states the law and supervises the activities. The bicameral Parliament of Australia consists of:

- Queen of Australia.
- Two houses of Parliament.
- Senate.
- Hose of representative.

Australia focus in DT is to enhance service by enabling 24/7 hours' service for beneficiaries, and enable to do transactions at any time. To apply DT, Australia provided high speed broadband network and expand mobile network service, use cloud computing, and enhance use smart devices and tablets. Australia applied the UK strategy in DT especially in transforming the service to e-service and unified website to whole government service [8].

To enhance the transformation in austral the Australian government provide new technology carrier to encourage citizen to participate. Also provide programs, courses and events to improve citizen skills in technology[9]. To provide excellent service , they put some criteria [9]:

1. Understanding user need: Identifying users' needs not government needs, not assuming the needs, but finding the real users' needs.
2. Establishing multidisciplinary team to build, design, operate the service. (led by product management)
3. Using the agile approach.
4. Understanding all required tools and system which help to build, operate, and measure the service.
5. Using shared platform.
6. Building open source code service by default.
7. Evaluating the service.
8. Making the work simple and easy to understand.
9. Everything we build should be as inclusive, legible and readable as possible.
10. Applying simple and clear language to be understood by everyone.
11. Making the service to serve people and not only the websites.
12. Approve the same design pattern to make it familiar to user with the services and also make sure the service will be consistent.

V. Singapore

Singapore is the one of the most advanced countries in DT in which the broadband networking and smart digital service are widely available. In 1990, they established one of the world's first nationwide broadband networks, and in 2000 the have covered the country with free Wi-Fi hotspots. Singapore

was ranked 4th on the E-Government Development index according to United Nation Survey 2016 [6].

This state of the art telecommunication infrastructure made DT easer to implement in Singapore. Singapore always tries to be the first in world in technology. The Singapore government sees using the technology not enough to provide digital service to the user. It must be fast, reliable, secure, connect with other service and must be easy to understand and easy to use [10]. In 2011, Singapore started the 'eGov2015' master plan to provide post-government services [11].

The government of Singapore consists of ministers and statutory board. The ministries are led by members of the cabinet and deal with state affairs, that need direct political supervision.

The Prime Minister's Office is the responsible for leading the DT in Singapore and the Smart Nation and Digital Government Group (SNDGG), which contain the implementing agency[10]:

- Smart Nation and Digital Government Office (SNDGO).
- Government Technology Agency (GovTech).

GovTech is focused on building six Centers of Excellence (CentEx) to execute the DT plan [12] :

- Application Development (Software Design & Development, and Solution Architecting).
- Cybersecurity (jointly with Cybersecurity Agency of Singapore).
- Data Science.
- Government ICT Infrastructure.
- Geospatial Technology (jointly with Singapore Land Authority).
- Sensors & IoT.

They put many standards to be sure the service will be efficient and effective, applying some tools to help them analysis the solution [13]:

- Web Interface Standard (WIS):

Set standard to generate the consistent, usability level and accessibility. All public sectors in Singapore must meet WIS.

- Whole-Of-Government Application Analytics (WOGAA).

VI. MALAYSIA

In 2009, Najib Tun Razak became the Prime Minister of Malaysia; he introduces a reform plan called the Government Transformation Program (GTP)[14][15].

The GTP is a new policy agenda (1 Malaysia: People First, Performance Now). It's a way the government enhances the efficiency and effectiveness of the performance of public sectors (PS) [14][15].

A. GTP is divided in 3 Phase[16]*:*

- GTP1: The First Horizon:

start at 2010, it was play an important role that help to achieve the target. In this phase the GTP established the Performance Management and Delivery Unit (PEMANDU).

- GTP2: Enhancing Change:

Start at 2013 to enhance all the improvement of GTP1

- GTP3: To the Future and Beyond:

will be running from 2015 to 2020.

B. Strategies To apply the DT to find best performance[17]*:*

- Online service management:

Plan, manage and monitor the implementation of

1. online services in the public sector.
2. community / cashless facility in the public sector.
3. e-payment public sector.
4. life-event delivery in the public sector.
5. surge-rated sovereign rating in the international digital.

- Open Data:

Plan, manage and implement and use in the Public Sector Open Data.

- Big data:

Plan, manage and coordinate the implementation of

1. analytic data
2. IOT:

- Information Sharing Service:

Plan, manage and coordinate the strategy implementation program management and data sharing across :

1. multiple agencies through the Centralized Data Exchange (CDX).
2. A range of public sector agencies.
3. multiple public sector agencies.

To evaluate the performance and improve it to achieve the target, GTP established the Performance Management and Delivery Unit (PEMANDU), led by Idris Jalal as CEO and Delivery Task Force (DTF) led by Deputy prime Minister. The PEMANDU evaluates the performance every month to check and solve problems [14][15].

VII. UNITED ARAB EMIRATIS

UAE lunched the 'VISION 2021' in 2010 by H. Sheikh Mohammed bin Rashid Al Maktoum- the current Vice-President. The Vision aims to make the UAE among the best

countries in the world by the Golden Jubilee of the Union. In order to translate this vision into reality, they divided the visions' element into six national priorities to be the key focus sectors of government operation in the coming years [18].

The main 4 elements of 2021 vision are[18]:

- United In Responsibility[18].
- United In Destiny[19].
- United In Knowledge.
- United In Prosperity.

On 22 May 2013, H. H. Sheikh Mohammed bin Rashid Al Maktoum, launched the smart Government initiative to provide service available 24/7 [20].

A. Stages of transition to smart government [18]:

The move to smart government focuses on the strategic use of the latest information and communication technologies, With the aim of making a qualitative shift in the way government institutions work to achieve user satisfaction, and in effective collaboration with all relevant entities. This is done by providing seamless, interactive and intelligent communication tools that work at anytime and anywhere, across many devices.

- Smart government includes significant improvements in at least two areas of public sector.
  - Structural improvements to the work procedures and working methods of staff.
  - Providing the most appropriate services to the public according to their needs.
- Although smart service classification is not a simple process, it can be presented as follows:
  - G2C (Notification, SMS, Nearest hospitals, etc.).
  - G2B (registration of companies, inquiries about fees, etc.).
  - G2G (Patient's Medical History Sharing).
  - G2E such as "Bring your device with you" (BYOD), and sharing method Office space (desking hot, etc.).

The smart government applies the latest technology to transform e-government into a government with:

- Available 24/7 anywhere, across any platform or smartphone.
  - Utilizes the latest intelligent technologies such as location based applications and services.
  - Smart government is more effective when partnerships are established between government institutions on the one hand and private sector institutions, Non-governmental organizations and civil society institutions on the other, where common objectives are available [18].

B. Prioritizing the Services [18]*:*

- Define and identify smart service components.
- Identify appropriate services that can be converted to smart services.
- Determine the target audience for each service.
- Determine the criteria for selecting the services to be transferred. Some of these criteria are as follows:
  - Public needs (identified through questions and opinions surveys.
  - Value added (i.e. increased efficiency of task completion).
  - Transaction volume.
  - Usage rates.
  - Easy conversion.

VIII. COMPARISON BETWEEN THE FIVE COUNTRIES:

Country	Timetable	strategies	Achievements	challenges	Final Goal
United kingdom	2010-2020	Provide the efficient platform with security property and transparency. Provide service simultaneous with back office to ensure perfect service. Enhance skill and culture in technically part Establish shared platform to perform efficient service [21].	Establish GOV.UK ,it contains 25 digital initiatives: e.g.: Register to vote Student finance Carer's Allowance Civil claims Prison visit booking Lasting power of attorney Registered Traveler Visas Find an apprenticeship Your tax account Rural payments Agent Online Self-Serve. Passports[21].	Fear of change Bureaucratic organizational structure The lack of effective leadership Confusing between process Information fragmentation Data sharing in security channel. The legacy system is incompatible and inflexible .	Transform the relationship between the citizens and state –putting more power in the hand of citizen and being more responsive to their needs[21] .
Australia	2015 -2020	Improve the government way in use technology. Using agile method. improve digital skills. Improve government platform and agencies. enhance transparency and security in the services . Provide service in low cost [22].	Establish many e-service , e.g.: Single Touch Payroll, My Health Record, Health Payments, Trusted Digital Authentication and Verification, cloud.gov.au Govpas. myGov [9].	Bureaucratic organizational structure The lack of effective leadership Confusing between process. make service more flexible and resalable. The security issues Culture issues [8][23].	provide service to be simple and fast to get things done with government, through any channel [9].

Singapore	2011-2020	Government restructuring of the digital economy to align with rapid change. Provide electronic service focused around customers' needs. Improve technical skills. Support innovation through experimentation. Management and evaluate the service. Focus in stockholder to improve them skills [10].	Establish many e-service, e.g.: SingPass MyInfo Data.gov.sg OneService Ask Jamie eCitizens ideas! Community CorpPass Business Grant Portal InnoLeap TransGrant National Trade Platform WOGAA Nectar APEX [24].	civil trust on government e-service. provide high level of service that match technical skills of citizens. Provide the high level of transparency and security. Improve self-motivation for public sector stockholders to keep up with new service system instead of bureaucratic systems [25][26].	To be a Collaborative Government that Co-creates and Connects with Our People [10].
Malaysia	2009-2020	Establish online service management and recognition of initiatives ICT section Establish open data section Establish big data section Establish information sharing service management section [17].	GAMMA (Gallery of Malaysian Government Mobile Applications) 1 MOCC (Malaysia One Call Centre) GOS Government Online Services Gateway [27].		provide services that satisfy citizens needs [16].

united Arab Emiratis	2010-2021	Strategy 2008-2010 [28] Includes 21 topics in six main sector. Strategy 2011-2013[28] enhance coordination and effective integration between the federal and local governments and among federal agencies. Providing government services that meet the needs of customers. Enhance skill and culture in technically part Enhancing transparency and security in federal agencies. Enhancing transparency and security. Follow the performance by National Key Performance Indicators.	Provide all government service in www.government.ae as website . Also create application for smart phone to make the service ease to use ,e.g. DubaiNow app for Dubai government [29] .	Ease to use. Security issues [30].	Make a qualitative shift in the way government institutions procedure to achieve best satisfy the needs of the citizens and working effectively with all relevant stakeholders. This is done by providing seamless intelligent and interactive communications that work at any time, anywhere and with any devices [30].

IX. Conclusion

We selected different countries to compare their initiatives in digital transformation. Some countries were fairly well developed and mature while others are still in the initial stages.

Singapore was at the forefront. The UK began the digitization efforts after Singapore but thanks to its intensive efforts and support, it ranked as the first state in UN index of e-governments. Because of this s Australia and Malaysia adopted UK's strategy of digitalization. The UAE has occupied a decent position in digital transformation as it has improved its ranking compared to developed countries in e-services. This is reflected in the recent appointment of the first Minister of State for Artificial Intelligence in UAE. Malaysia is still facing problems with their digitization efforts.

The Kingdom of Saudi Arabia has the potential to be among the top tier of digital transformation initiatives. Through its vision of 2030, the country has contributed great resources to the digital transformation. By borrowing form the UN index, Saudi Arabia needs to improve in the telecommunication infrastructure (which is happing now through the fiber optic program), and the scope and quality of online services provided. More importantly, the strategy to implement the digital transformation element of 2030 is missing. Also we think there is a shortage of workforce skills in Saudi Arabia's government able to carry out the digital transformation initiative and thus new hiring policies should be drafted to acquire talents, develop them and keep them engaged.

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