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Digital transformation and the role of enterprise architecture

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Executive Summary

Digital Transformation is becoming increasingly a focus of strategic thinking and planning of many public and private organizations. It is about putting the emphasis on how digital services and applications will change and "transform" citizen's experience and the way we do business in a way that will lead to improvement in quality of life and wellbeing and the attainment of Sustainable Development Goals (SDG).

This paper provides an introduction on how digital services and applications are to be shaped and delivered to induce this transformation for government public services and other sectoral areas and the central role of enterprise architecture to reach this.

Digital services need to be personalised, paperless, cashless, presenceless, integrated and consent-based to be transformational. Countries and organizations need to develop specific capabilities to be able to deliver such transformational digital services. The paper identified eight first level building blocks – digital strategy, digital platform, value delivery ecosystem, digital service attributes, digital enterprise architecture, institutions and governance, citizen insights and delivery capabilities that are required as foundation to ideate, plan, design, deploy and operate citizen-centric transformational digital services.

All those building blocks are interrelated and depend on each other. Every building block plays a critical role in the journey towards digital transformation.

A central building block is the **digital enterprise architecture**, which is the whole-of-government approach to support government ecosystems by transcending boundaries to deliver services in a coordinated, efficient and equitable manner. It is the critical component that translates transformation needs into specific functional and technical requirements that can lead to the deployment of transformation digital services.

A digital platform is the result of enterprise architecture. A **digital platform** is a repository of business, data, application and technology components (reusable building blocks and distinct interfaces) that allow for rapid design, development, deployment and delivery of digital services. With the use of standard and open interfaces, the digital platform is available to all the key actors in the value delivery ecosystem to build and use components. It will accelerate innovation in integrated and interoperable digital solutions, enabling government to achieve its goals in a more predictable, efficient and cost-effective manner—and with reduced risk.

Missing investment to develop such architecture and consequently the digital platform will lead to fragmented, siloed and duplicative digital services, which is one of the main impediments against leveraging digital services that can induce desired transformation.

The paper presents also some country examples that managed to set the required foundations for change and an enabling ecosystem with the enterprise architecture at its core and a set of principles as the basis for digital transformation of governments.

There is still significant lack of expertise and awareness in many countries that prevent them from investing to build such critical capabilities. This paper aims to address some of those gaps by emphasizing where countries need to invest and why to advance in their digital transformation journey.

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I Digital transformation

Digital transformation is now an essential part of strategic thinking for the public and private sectors. Factors driving digital transformation range from technology ubiquity, to demand for newer business models and delivery excellence. The imperative for transformation has never been greater and the reality for many is to move with, if not lead, the change or be left behind.

From a digital services perspective, digital transformation is a continuous process of multi-modal adoption of digital technologies that fundamentally change the way government and private sector services are ideated, planned, designed, deployed and operated such that they are personalized, paperless, cashless, presenceless, frictionless, and consent-based.

The construct of digital services is critical because governments and other public or private organizations interact with citizens, businesses and other entities through those services.

Digital transformation in government has the potential to modernize both government and public services, and vastly improve citizen experience. Digital technologies are penetrating government economic, social and political mandates in unprecedented ways, accelerating transformation.

If digital transformation is more about strategic thinking and change, and less about technology, then successful transformation efforts depend on two critical dimensions: **ubiquity** and **change**. These two very distinct dimensions reflect digital transformation maturity, each playing a role:

- ubiquity is the degree to which digital services support the multiple requirements of stakeholders and harness enterprise architecture for government and private sectors;
- change is the degree and the pace at which government and private sector stakeholders deliver digital services to meet citizen or customer expectations, especially in the interdependent ecosystems of regulation, policy, strategy, structure, systems, skills, shared goals, staff and style of governance.

II Four levels of digital transformation maturity

The combination of ubiquity and change yields four distinct levels of digital transformation maturity:

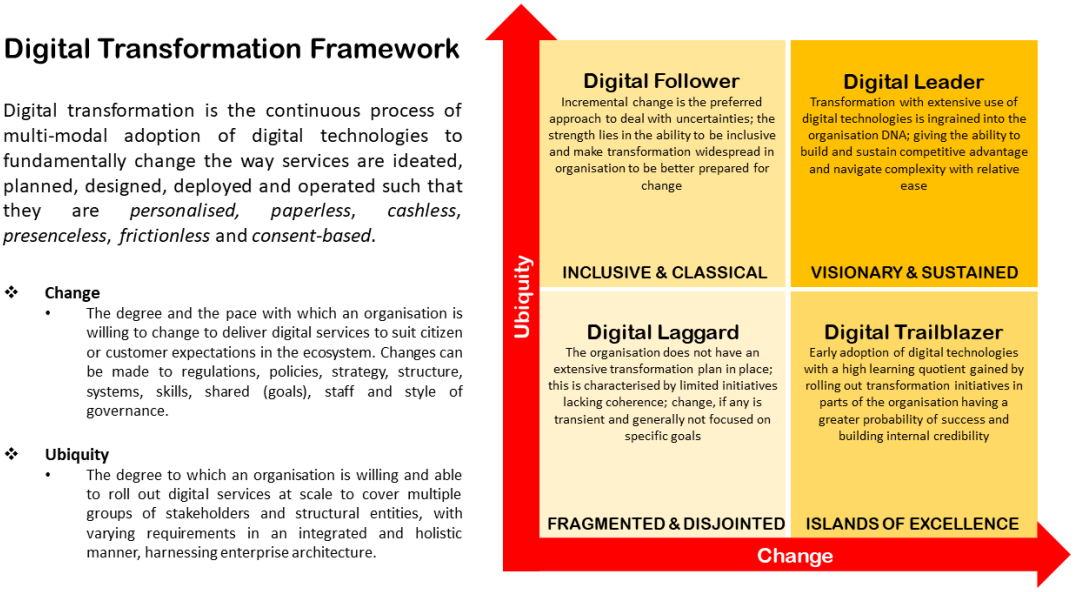
- digital trailblazer;
- digital leader;
- digital follower;
- digital laggard[1].

Public and private sector 'digital laggards' are weak in both ubiquity and change, often leading to a fragmented and disjointed approach to services, a lack of whole-of-government or whole-of-enterprise strategic thinking, characterized by information siloes with limited exchange, a significant amount of duplication and redundancies, and a lack of focused, well-directed effort. For this group, change initiatives are few and often unsustainable. There is tentativeness in what they do and often, good

[1] Refers to slow adopters, such as the elderly, who use friends and neighbours as information sources, dislike change, and accept new things only when forced to.
In diffusion of innovation theory every market has groups of customers who differ in their readiness and willingness to adopt a new product, that an innovative product spreads (diffuses) through a market not in one straight course but in successive, overlapping waves. Most populations show the following pattern in the adoption of new consumer goods: innovators (2 percent of population), early adopters (14 percent), early majority (34 percent), late majority (34 percent), and laggards (16 percent). http://www.businessdictionary.com/definition/diffusion-of-innovation.html

results (if any) are attributable to chance rather than design. Unable to establish the real purpose of transformation, members of this level of digital transformation maturity do not create enablers nor orchestrate success factors to their advantage.

Figure 1: The four levels of digital transformation maturity



Digital followers are more traditional and classical in their approach. These entities prefer to change in incremental steps with minimal disruption to ways of doing things. Followers are inclusive by design, taking all parts of the organization along the transformation initiative. The premise is to make transformation more widespread and ensure that everyone is part of the journey – no one is left behind. Followers are usually not the first to embrace transformation, and when they do, they may lack the political and operational capability to pull off a big change. This is attributed to not having enablers and success factors in place at the start, and taking incremental steps is to build these. Followers are slow movers for multiple reasons, and if they face impediments, followers may reverse the gains from digital transformation.

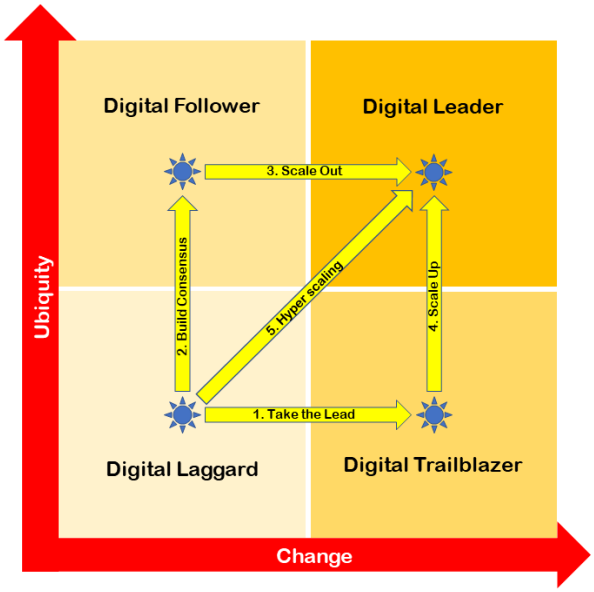
Digital trailblazers exhibit characteristics that are in stark contrast to digital followers. With an understanding of the enormity of digital transformation, trailblazers accept that it is not practically possible to move every part of the organization at the same pace. Trailblazers acknowledge that there are always parts of the organization that are more forward thinking, and willing and able to move more quickly than others, creating islands of excellence. Trailblazers adopt digital technologies quickly and the islands of excellence build internal credibility before being scaled up.

Digital leaders do well across both dimensions and combine traits of both digital followers and digital trailblazers. Digital leaders are visionary in their approach and understand how to manage change and recognize it as a critical success factor to digital transformation. The ability to apply transformation across multiple cycles is a digital leader hallmark, and success supports a strong reinforcing cycle bringing in further change. Leaders accept and factor in complexity, setbacks, and failures when embracing widespread and breakthrough transformation. Leaders like to experiment, learn and move ahead. In most scenarios, leaders do not wait for examples, instead they create examples for others to emulate.

III Pathways to success

Most countries and organizations begin their digital transformation journey in the lower left quadrant, i.e. as digital laggards due to the speed at which digital technologies are available, but transformation is slow due to slow take-up and a lack of success.

Figure 2: Pathways to digital transformation maturity



Once a country decides to engage in the digital transformation, there are three basic options, it can support the pathway to becoming a trailblazer, it can build gradual consensus and internal capability before pressing ahead, and it can directly move into the leader level, bypassing the transition levels, which softens the disruption of digital transformation. Without sustained effort it is also possible to move back and forth between levels. This happens when the obstacles and challenges become unsurmountable and negate all progress.

IV Digital transformation value chain

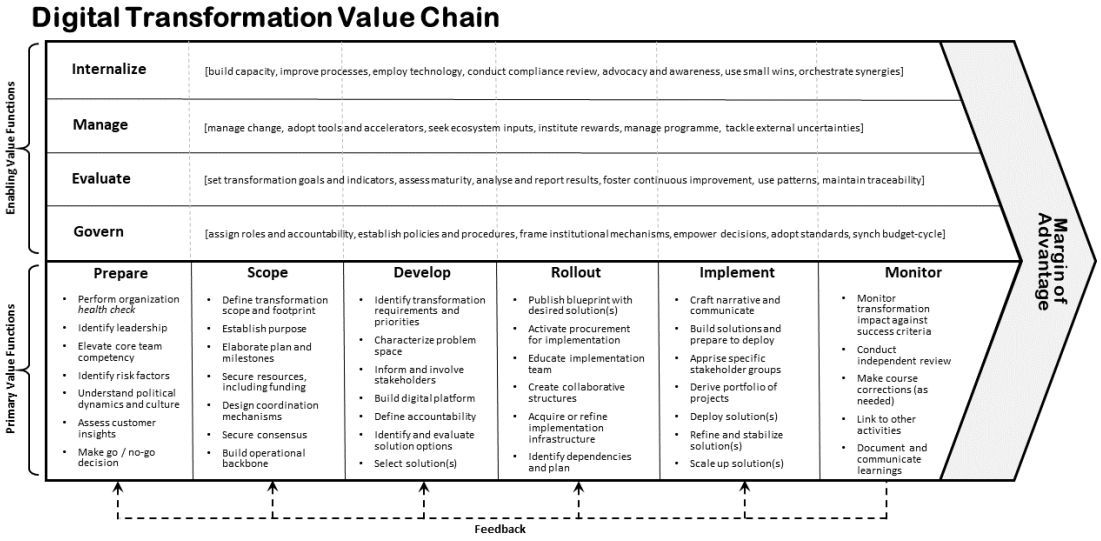
Almost every country has or at least claims to have a digital transformation initiative. The six fundamental attributes of services that make them digital are:

- **Personalised** services are designed and delivered to suit the specific requirements of those who consume them. Personalisation is generally achieved by way of giving citizens a great experience that augurs to their needs and expectations.
- **Paperless s**ervices are automated by adopting widespread automation. Paperless services are a consequence of extensive business process reengineering and significant fundamental rethinking.
- **Cashless** services are a key aspect of digital economy. Cashless transactions for services that have monetary dimensions in cashless economy requires an integrated ecosystem of regulators, financial institutions, banks, payment mechanisms to work in tandem.
- **Presenceless s**ervices are designed with the underlying premise that human interventions would be kept to the minimum. A presenceless service is enabled by insights into citizen behaviours, creation of interaction patterns and encoding them into service design and delivery.

- **Frictionless** services are designed and delivered end-to-end. This means that citizens are not exposed to all the internal coordination and exchange of information that takes place between different ministries and departments, but what they receive is an integrated experience. Frictionless (or seamless) services are enabled by a boundaryless flow of information.
- **Consent-based** services refer to **s**ecurity and data privacy, two imperatives that have to be focused on with utmost priority. In the digital era, people share huge amounts of information, citizen consent has a hugely significant impact on the effectiveness of digital services. People must know what data is being collected, who is collecting it, and for what purposes is it going to be used.

If leadership inertia to change is proving to be the biggest challenge, it is important to project digital transformation as a value creating activity. The digital transformation value chain structures the initiative as a series of value functions working in synergy.

Figure 3: Digital Transformation Value Chain



The bottom-half of the value chain illustrates the various successive stages (prepare to monitor) of transformation initiatives. The output from each stage forms the input to the next stage in the flow. In the top-half of the value chain are horizontal functions that enable the stages and value functions of the bottom-half. The enabling value functions in the top-half are generally ongoing activities that are continuous in nature, amplifying the effectiveness of value functions in the bottom-half.

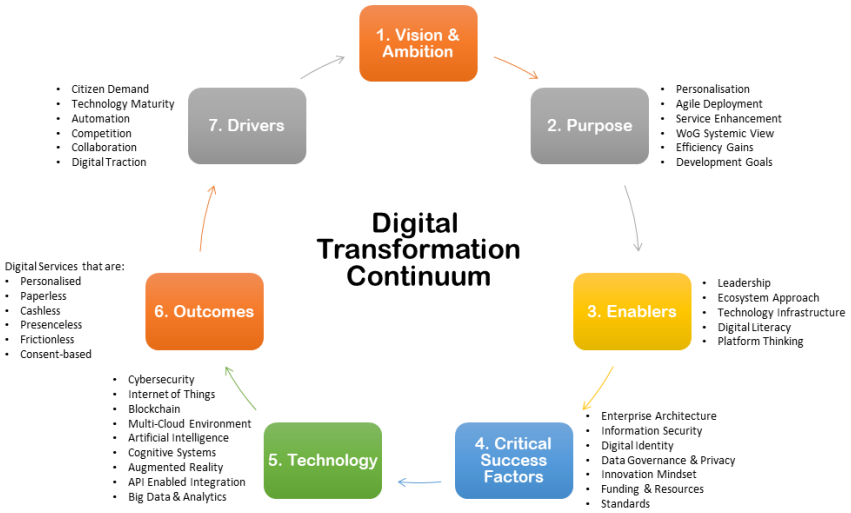
The digital transformation value chain provides a high-level process to be followed. In traversing the value chain, key issues that need to be asked and re-asked include:

- **Vision and ambition:** To what do we aspire? Do we have the determination to get there?
- **Purpose:** Why are we doing this? How will it improve what we are already doing? What keeps us motivated?
- **Enabler:** What will give us the means to achieve? What will support our capacity to deliver?
- **Success factor:** What must we get right for us to succeed? What could impede success?
- **Technology:** What digital technologies should be use? What is our level of expertise to adopt specific technologies?
- **Digital Service (Portfolio):** Which services should be digitised? Are these new or existing services? How will we make a smooth transition with minimal disruption?

- **Drivers:** What are the critical elements that are aiding this initiative to progress and succeed? Are these drivers working in tandem?

These seven issues are the components of digital strategy, which are put together to form the digital transformation continuum. These are in a continuum as they are distinct yet interrelated, sequenced and persistent.

Figure 4: Digital transformation continuum



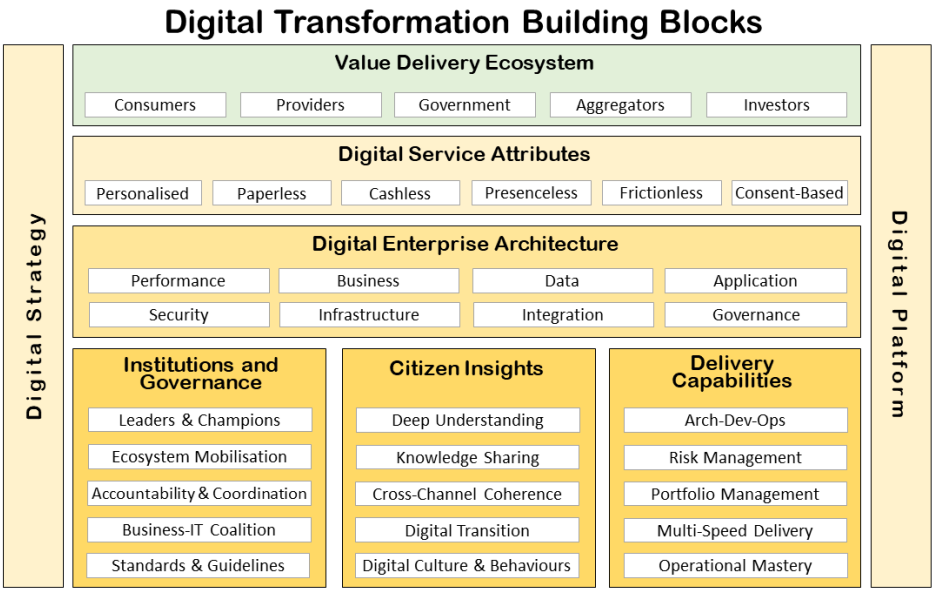
V Digital transformation building bocks

Digital transformation places a premium on speed and agility, but demands such massive organisational changes that it takes a long time with sustained efforts to become a digital leader. It is therefore important to identify and understand the various components of digital transformation that must work synergistically. These are called the building blocks, which are capabilities that countries will need to succeed. These building blocks establish a foundation to ideate, plan, design, deploy and operate citizen-centric digital services.

There are eight first level blocks – digital strategy, digital platform, value delivery ecosystem, digital service attributes, digital enterprise architecture, institutions and governance, citizen insights and delivery capabilities.

The **value delivery ecosystem** consists of key stakeholders who are actors in the digital service lifecycle (ideate, plan, design, deploy and operate). In this ecosystem, the emerging role of aggregators cannot be overemphasised. Aggregators are organisations that collect information on goods and services from several competing sources (providers) and make that information available in a more consumable form to potential users (consumers) via a digital platform. The aggregator value lies in the ability to create an environment that attracts consumers to the platform and enable delivery of the goods and services.

Figure 5: Digital transformation building blocks



The **digital enterprise architecture** is the whole-of-government approach to support government ecosystems by transcending boundaries to deliver services in a coordinated, efficient and equitable manner. The aim is to establish best-in-class architectural governance, processes and practices with optimal utilisation of ICT infrastructure and applications to offer **one** government experience to the citizens and businesses through digital services enabled by Boundaryless Information Flow™[2]. The enterprise architecture consists of eight second level building blocks covering the eight architecture domains. These are:

- **Performance:** The mission, goals and measures to guide priorities, decisions and outcomes. For digital transformation, it is recommended that the UN Sustainable Development Goals form the foundation for performance domain.
- **Business:** The services, capabilities and processes to operationalise and realise performance.
- **Data:** The way data and information are described, stored, exchanged and treated to gain actionable insights.
- **Application:** The software and IT systems that enable business and operations with automation.
- **Technology:** The physical ICT infrastructure that enables / restricts the ability to act.
- **Security:** The way information is protected and made available for all legitimate reasons.
- **Integration:** The way in which all aspects converge and harmonise to work together towards common goals.
- **Governance:** The decision rights and accountabilities required for architecture to function smoothly.

Several countries have expended significant efforts towards development of national enterprise architectures[3]. In the United States of America, the Republic of Korea, and Estonia, government enterprise architecture is mandated by law, and India is working towards the same end.

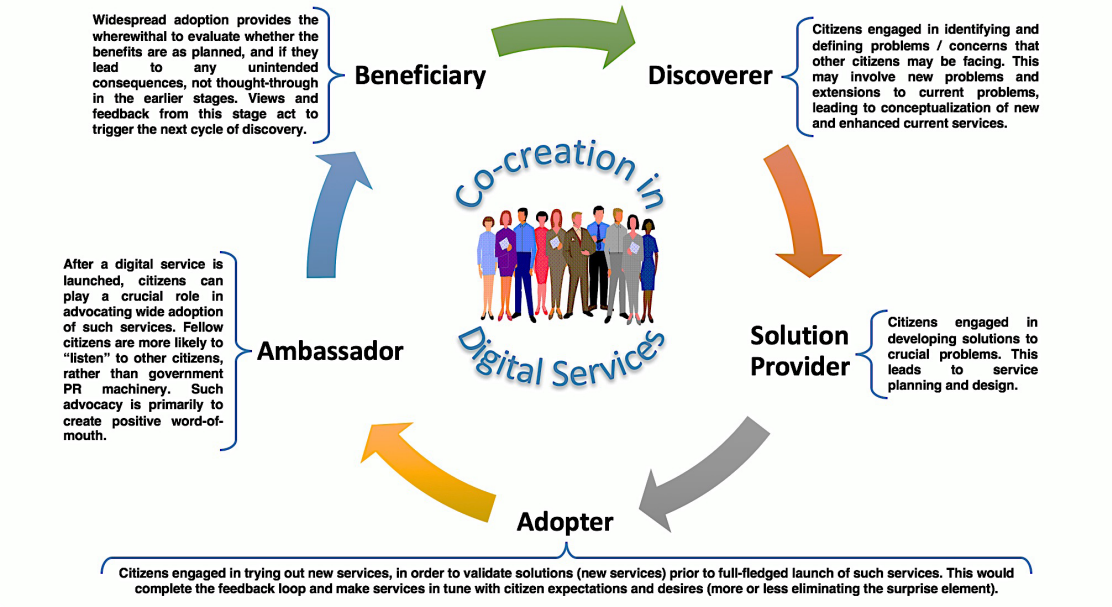
A **digital platform** is a repository of business, data, application and technology components (reusable building blocks and distinct interfaces) that allow for rapid design, development, deployment and

[2] The Open Group. (2019).
[3] Enterprise Architecture for Connected E-Government – Practices and Innovations; Pallab Saha; IGI Global, PA United States. (2012).

delivery of digital services. With the use of standard and open interfaces, the digital platform is available to all the key actors (in the value delivery ecosystem) to build and use components. A digital platform is the result of enterprise architecture.

Digital transformation stands on the three foundational pillars of institutions and governance, citizen insights, and delivery capabilities. These are absolute imperatives.

Figure 6: Role and Involvement of Citizens in the Digital Service Lifecycle



Knowing and understanding the citizens for whom the digital services are being developed and deployed is paramount to effective transformation. **Citizen insight** is at the heart of digital transformation. Digital technologies are changing the way citizen interactions are happening, with new rules and opportunities that were unthinkable a few years ago. Government services delivered via multiple channels need to be coherent and provide a consistent experience. Adoption of such digital services requires a change in citizen behaviour and habits. Digital interactions force the evolution in culture, decision-making methods and rules, which may run counter to traditional ways of doing things. It is this transition that takes time to internalise.

Establishing the right **institutions and governance** mechanisms provide the necessary teeth to push through the transformation agenda – a case in example being the Australia Digital Transformation Agency[4]. First and foremost is the identification of leaders and champions who drive the transformation initiative, which is also apparent in the digital transformation value chain. Without leaders and champions digital transformation remains a non-starter. The second part of this pillar is to ensure that the vision and benefits of digital transformation are sufficiently understood by all the ecosystem actors. This creates momentum and encourages the correct behavioural changes that are so central to success. A coalition of the business and IT groups with clear accountability and decision rights is critical. The role of standards and guidelines in scaling up and scaling out cannot be overemphasised. Standards focus innovation and allow countries to target the things and issues that matter, such as improving service quality and citizen experience.

Excellence in **delivery capabilities** ensures that there is enough internal capability to take on and successfully accomplish the goals of digital transformation. This level of transformation demands an entrepreneurial and innovation oriented mind set. The ability to experiment and learn is very

[4] Digital Transformation Agency, Government of Australia (https://www.dta.gov.au/). (2018).

important and requires an agile approach which integrates architecture, development and operations (Arch-Dev-Ops), an extension from DevOps.

Digital transformation results in multiple projects, which have to be handled as a portfolio with adequate risk management capabilities that come with operational mastery. Usually there is a lot of attention to 'new things' when discussing digital transformation. However, even with the adoption of digital technologies, certain portions or segments will continue to operate in their traditional ways and such diversity has to be absorbed. This is catered by building the capability to deal with multi-speed delivery and yet maintaining overall coherence.

Every building block plays a critical role in the journey towards digital leadership. One or more missing building blocks have a very significant impact and can be the reason for derailment of the digital transformation initiative. Underlining the importance of each building block is as important as maintaining a balance between them while navigating the transformation journey, and digital leaders are expected to manage all building blocks concurrently in situations often characterised by volatility, uncertainty, complexity and ambiguity.

Figure 7: Impact of missing building blocks

A consideration of the building blocks leads a country or an organisation to identify factors that are useful to evaluate whether they are ready to embark on the digital transformation journey. These factors are shown in the table in Figure 8, and is consistent with first value function in the digital transformation value chain. Each factor will require multiple questions to make an assessment. These questions will need to be put together to develop and administer a readiness assessment survey.

Figure 8: Digital transformation readiness assessment

Ser	Readiness Factor	Urgency	Readiness Status	Degree of Difficulty to Fix
1	Vision			
2	Desire/willingness/resolve			
3	Need			
4	Business case			
5	Funding			
6	Sponsorship and leadership			
7	Governance			
8	Accountability			
9	Workable approach and execution model			
10	IT capacity to execute			
11	Departmental capacity to execute			
12	Ability to implement and operate			

VI Digital Transformation@Work

Done well, digital transformation can bring immense benefits. But it will demand a massive cultural change (a paradigm shift in culture) to make it successful. Digital transformation needs a strategy and a connected and holistic view, not a piecemeal approach. A system is a set of things—people, cells, molecules, or whatever—interconnected in such a way that they produce their own pattern of behaviour over time. The system may be buffeted, constricted, triggered, or driven by outside forces[5]. This is the central core of systems thinking, which is used to understand and analyse the dynamics of digital transformation in governments using causal loop diagrams. Information holds systems together and plays a great role in how they operate and behave. However, information-based relationships are hard to see.

Many governments are experiencing the transformative power in revitalizing public administration, overhauling public management, fostering inclusive leadership and moving civil service toward higher efficiency, transparency and accountability. This creates the need to:

1. change the way services are delivered and consumed;
2. change the way internal back office operations are executed; and
3. change the way resources and processes are sourced and combined.

It is in this context governments are looking at digital technologies to bridge policies and outcomes, leading to more government services being offered electronically. Factors like service delivery innovation, distributed governance and data driven policies and decisions contribute to the complexity of government operations, which raises citizen expectations and demand for digital technologies as a means to address such expectations. There is enough evidence that adoption of technology minimises corruption, which in turn raises trust in government. This trust aids the country to look towards building future-ready government, thereby creating a strong reinforcing cycle (see **Figure 9: R1: Government Competiveness as Genesis**).

ICT is increasingly a central part of national competitiveness strategy and is a key enabler of socio-economic progress and development, productivity enhancement, modernisation, economic growth and even poverty reduction. Digital government focus and capability provides the raw material to improve the overall ICT capability by way of greater resources, access to talented and trained people, attracting investments, expertise in research and development, supporting policies and governance

[5] *Thinking in Systems*; Donella H. Meadows; Sustainability Institute, London. (2009).

among other enabling inputs. Greater ICT capabilities provide the necessary impetus to the emergence of the ICT industry. There are several countries that have utilised their foray into digital government as an entry point to build their national ICT sector leading to a digital economy **(see Figure 9: R2: ICT Investment Growth** and **R3: Multiplier Effects of Digital**, which feeds into R1 to strengthen the need to build the future tech-enabled government).

Government enterprise architecture provides a business-centric view of government operations and usually organises government operations through components like business areas, lines-of-business and business functions. Such standard approaches tend to discourage and overlook the need for operational diversity that is needed at the department level. Governments (and their departments) are under pressure to retain and even enhance operational autonomy. The trend of ministries and departments operating with a high degree of autonomy leading to diverging agendas is common and instrumental in putting breaks on government-wide transformation activities, and suspicion about the role of digital technologies can become an impediment **(see Figure 9: B1: Diverging Agendas)**.

The emergence of the ICT industry, in general, drives adoption of ICTs. As societies embrace digital technology, the inclusion and participation of citizens into the digital landscape improves e-participation. This creates demand for online services, as a tech-savvy society appreciates the benefits of online services. This further contributes to enhancing the online service index **(see Figure 9: R4: EGovernment Readiness)**. In itself, this reduces the digital divide aided by the fact that technology is largely affordable. Technology acts as an accelerator to digital government. As this maturity improves, the ability of governments in designing and delivering online services improves, which further make it attractive for ICT investments **(see Figure 9: R3: Multiplier Effects of Digital)**.

The impact of operational diversity amongst ministries and departments leads to the emergence of businesses that operate in their own silos. Amplified by diverging agendas, business silos are instrumental in creating and abetting feudal forms of governance. Government information officers operate with negligible interactions both with the business (domain) side and IT organisations of other ministries or agencies **(see Figure 9: B2: Tech Empires)**. The silo mindset is even more ingrained on the business side of operations. Government departments like and demand to operate in their respective areas of influence in the name of operational autonomy. The concept of government as a single coherent enterprise is new, transformational and disruptive **(see Figure 9: B3: Business Empires,** which further strengthens the diverging agendas resulting from the need to maintain operational autonomy feeding into B1).

As fragmented and disjointed thinking becomes ingrained, it further drives the need for federation as a solution to deal with larger cross-departmental issues. Federation drives collaboration and requires coordination, and creates receptiveness to adopt a whole-of-government approach for the benefits it provides. The benefits of a federated approach are all too visible. Federation keeps disjointed silos and piecemeal thinking in check, while balancing the need for operational autonomy **(see Figure 9: R5: Federated Connected Government)**. As the pressure to provide online services increases, there is a tendency (and pull) to skip holistic coherent architecture. Certain sections of the industry lobby also act to undermine the whole-of-government thinking **(see Figure 9: B4: Industry & Vendor Dictated)**.

Federation leads to two consequences – on the one hand, it positively impacts the availability of resources and leadership attention towards a holistic approach, making it attractive to potential agencies, while on the other hand, it heightens anxiety and brings on obstacles and challenges as it is perceived to diminish authority **(see Figure 9: B5: Political Landmines)**. In a landscape of multiple government ministries and departments, there are always those that are forward thinking and are more open to change **(see Figure 9: R6: Forward Thinkers, First Movers)**. This group becomes the allies and supporters of the digital transformation initiative and contribute by creating success stories **(see Figure 9: R7: Bandwagon)**. In the public sector, where aversion of risk is the primary operating principle, success stories and examples act as magnets to other ministries to embrace digital transformation. Over time this reinforces itself, unless there are unsurmountable challenges. A critical mass of success provides the perfect antidote to cynicism **(see Figure 9, R8: Success Breeds Success)**.

As the adoption of enterprise architecture becomes widespread, the experience will multiply the chances of further and future success. This will lead to expansion in the scope and footprint of digital transformation. The derived benefits will be more visible and impacting. The initiative will have better integration with policy design and implementation.

Better experience leads to greater propensity for internalisation **(see Figure 9, R9: Internalisation)**. With an expanding coverage and scope, the programme costs will go up and so will the expectations from the core team, at times burdened with stretch targets **(see Figure 9, B7: Burden of Stretch Targets)**.

Ballooning costs and stretch targets can potentially impact the quality of the programme implementation **(see Figure 9, B6: Programme Costs)**. Meanwhile, the value of government-wide enterprise architecture in embracing a holistic, integrated connected government will have a positive influence to the digital transformation initiative **(see Figure 9, R10: Government-wide Architecture)**.

All of these building blocks operate in such a way that each supports the other, creating a group of reinforcing factors, leading to better value and return on investment for digital transformation. Putting all the above partial system models together, the full system model is shown below depicting a confluence of factors that impact digital transformation. Patterns (and anti-patterns) of adoption and diffusion are clearly visible in the model.

The full system model, capturing its dynamics, can be used to identify interventions that can push digital transformation by strengthening the enablers (the reinforcing / positive loops) and weakening the impediments (the balancing / negative loops). In all, there are ten positive loops (R1 through R10) and seven negative loops (B1 through B7), and to cover all multiple concurrent interventions would be required to produce more of what is required and less of what is not.

Interventions may include changing numbers or constants, changing rules, minimising delays, channelling information flows, modifying goals and adopting newer paradigms. Each of these is increasingly difficult to achieve, but also has greater positive impact in the system.

That said, impediments add 'friction' into the system that cannot be completely eliminated, and these impediments also have some benefits in terms of providing a reality check from time to time. Through interventions, the aim is to ensure that the **combined impact of impediments** does not exceed the **combined impact of enablers**, else the digital transformation initiative derails. As countries mature from being a digital laggard to becoming a digital leader, the impact of impediments reduces, while the impact of enablers increases. It takes mastery to know the inflection point. The boxes in yellow in Figure 9 are factors from UN eGovernment maturity assessment that have been integrated into the overall system model.

In conclusion, digital transformation is a systemic change initiative (not a technology initiative) and an advancement in thinking that requires a massive cultural shift. We ought to take an integrated view of the transformation paradigm with situational awareness, without getting dazzled by all the hype and rhetoric.

Identifying and understanding the impact of interventions gives the ability to calibrate and control to get to the desired state. The skill is to get the combination right. In order for countries to move across and up in the digital transformation maturity levels (discussed earlier), the initiative needs to be carefully strategized and executed. Digital transformation brings a seismic shift with its benefits, but such a shift comes with its share of pain as well, and the best was to mitigate this, is to have a strategy.

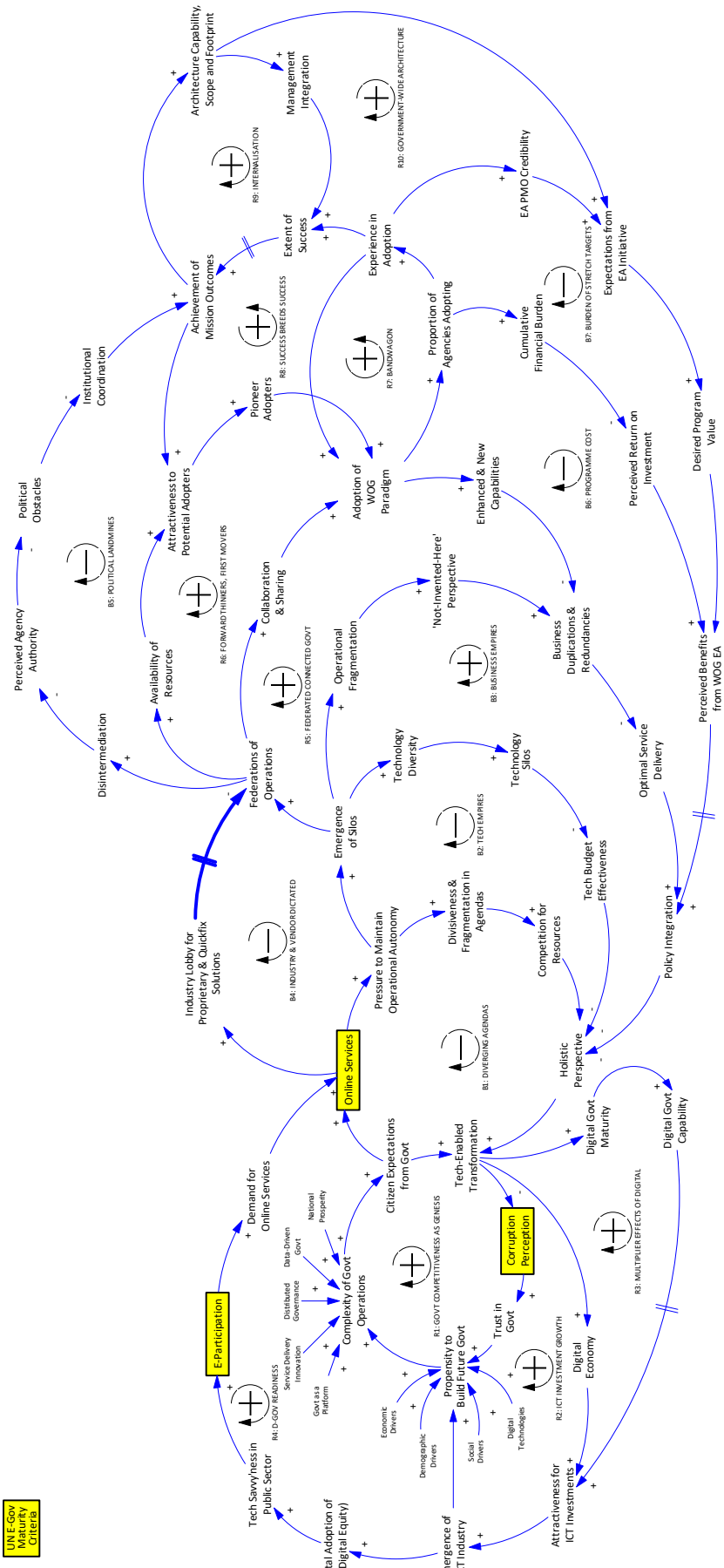


Figure 9: Digital transformation dynamics in governments

VII Digital transformation maturity assessment

Digital transformation has many inter-related building blocks and components. For a country or an organisation to fare well on the maturity assessment, it is imperative that these building blocks are in place, providing positive influence and working in harmony towards a shared vision.

Digital transformation impacts countries administratively, economically, technologically, politically, legally and socially. Therefore, any tool developed for maturity assessment should be multi-dimensional, a combination of self and independent external assessment, with scale being an important parameter.

VIII Digital transformation in selected countries

This section presents brief summaries of digital transformation in governments from selected countries, including the Republic of Korea, India, Finland, and Malaysia.

Republic of Korea[6]

The Republic of Korea started its e-governance initiative in 1980. In this ensuing period, its journey can be segmented into five phases. In the first phase (1980–1995), the national basic information system was put in place. This included establishing administrative networks, and creation of core citizen and vehicle databases. In the second phase (1996–2002), with the foundational elements in place, the e-governance programme was expanded in scope to incorporate the national broadband network and completion of eleven major high priority e-government projects. In the third phase(2003–2007), the focus and direction was to further the use of ICT for enhancing and automating more than thirty major thrust areas such as tax, e-procurement, establishment of government-for-citizen services and implementation of systems to share administrative information. In this phase, the country also embarked on the development and implementation of government-wide enterprise architecture, which was logical as the three phases of e-governance initiatives led to replacing piecemeal thinking with a more integrated and holistic approach. In the fourth phase (2008–2012), the focus was on integration and collaborative management of information across government agencies and linking of government services to provide end-to-end experience with the adoption of cloud computing and hyper connected networks. In the fifth phase (2013 onwards) the aim is to improve citizen experience by co-creation of services and their maturation.

Recognising that services can transcend the entire ecosystem, the government is trying to include the private sector in delivering digital services. The Korea e-governance journey can be broken down into three generations – the first focusing on efficiency, the second on effectiveness and the current one on creating and sustaining a nationwide digital economy. Korea has won many accolades over the years and is undoubtedly a leading example.

The seven key learning points include:

1. The essential foundation for successful digital transformation is high-level leadership and support across the political spectrum.
2. Adoption of digital technologies leads to change in bureaucracy from being a hierarchical structure with generalists to being modern, agile, specialist based and outcome oriented.
3. The ability to change with the needs to reorganise and embrace inter-organisational coordination mechanisms is a key success factor.

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6 *Bringing Government into the 21st Century – The Korean Digital Government Experience*; Karippacheril, Tina George, Soonhee Kim, Robert P. Beschel Jr., and Changyong Choi; Directions in Development. Washington DC. The World Bank. (2016).

4. Making the transition from input oriented efficiency focused operations to becoming more outcome centred requires delegation of authority and decision making to local government agencies.
5. The operational foundation with the underlying IT architecture should be established and used, coupled with extensive adoption of standards.
6. Government services must be planned and designed with the citizens, and integrated across regional and local governments.
7. Widespread digitalisation must include entities and organisations across the government sector and extend to the private sector.

India

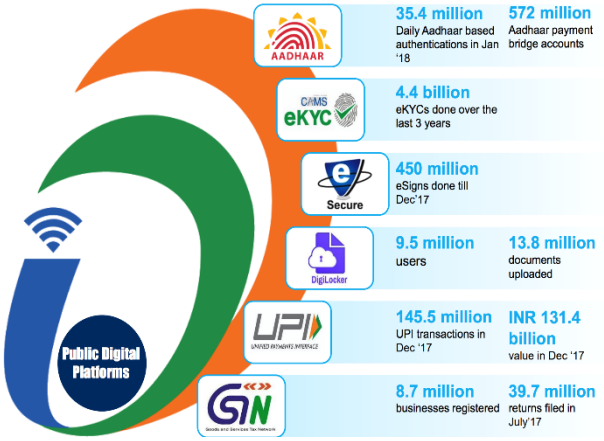
India started its e-governance journey in the late seventies. It can be segmented into four phases. Phase 1 (1977-1998) can be termed as pre-e-governance era because here the aim was computerisation, rather than specifically e-governance. Nevertheless, in this phase prerequisites to e-governance were put in place and the national informatics centre was established. Phase 2 (1999-2005) is when e-governance was earnestly pursued with the aim of enhancing efficiency through automation. This was also when certain regulations were established, and there was a national roll-out of electronic services and such capabilities were extended to local governments in the rural areas as well. Phase 3 (2006 – 2013) was when the first national e-government plan was put in place. This directed the efforts towards adoption of standards for enhancing effectiveness and the aim was to enable better citizen outcomes through the use of ICT. In Phase 4 (2014-Present), the Digital India programme was created and focuses on fulfilling three vision areas through nine focus areas, which lay down objectives in areas such as skill development, e-governance, and mobile / broadband connectivity.

Figure 10: Longitudinal journey of eGovernance in India leading to Digital India

Pre e-Governance Period	e-Governance Journey		
	Information		
		Interaction	
		Transaction	
			Transformation
1977- 1998	1999 till 2005	2006-2013	2014-Onwards
NIC	MoCIT	NeGP	Digital & NeGP 2.0
NICNET - State HQs	NICNET - District HQs	SWAN - Block level	NOFN - Panchayat level
Computerization - Banks, Rly. Reservation	Department Websites	Department-specific Applications	Integration (Aadhar and APIs)
	Use of email	Use of email plus SMS	Use of Social Media (FB& Twitter)
	Digitisation of Acts, Rules, Circulars	Department Databases	State Resident Data Hubs
	Focus on hardware-driven projects	Focus on citizen-centric services	Focus on Citizen Engagement (MyGov and Twitter)
	Translation of Processes, No BPR	Focus on BPR (Dept. Specific)	Focus on Transformational BPR
	Champion driven Projects	Institutional, Strategy driven Projects	Enhanced Focus from Political Leadership
	No Standardization - Focus on Replication of Successful initiatives with one-size-fit-all approach	Focus on Standardization - Infra, Policies, Tools, Training & CB - and also on State-specific customization	Further Consolidation of Infra using cloud and use of applications using AppStore
	No use of Standards and no focus on interoperability	Extensive Focus on Standards & Interoperability	Focus on Enterprise-wide (Whole of Govt) Data and Meta Data Standards
	Single Channel Service Delivery	Multi-Channel Service Delivery	Multi-Channel, Choice based Service Delivery
Computerization	Efficient	Standards Based	Collaborative
	Automation	Effective	Flexible
		Output Focused	Personalized
			Outcome Driven

Caveat: The maturation is inconsistent.

Already one of the largest digital transformation initiatives in the world, the Digital India[7] programme is working on enhancing the digital infrastructure, providing governance and services on demand and enabling digital empowerment of citizens. The Digital India programme, with an ambitious agenda to "transform India into a digitally empowered society and knowledge economy", is projected to cost ₹113,000 crores (or around USD 17.5 billion). It comprises three main pillars. The first is creating a digital public infrastructure, which includes high-speed Internet access, cradle-to-grave digital identity; digital financial inclusion; and secure cloud storage for personal documents. The second is the digitisation of government services and the improved use of digital technologies and data to support decision-making. The third is the digital empowerment of citizens, which focuses on universal access to digital services, and universal digital literacy. India is well on the way to becoming a trillion-dollar digital economy, fuelled by an ever-expanding digital infrastructure, rapidly growing heterogeneous consumption class driving digital demand, widespread adoption of emerging technologies further aiding digitisation and data explosion, and emergence of new sources of data creating newer digital interactions.



Moving forward, the role of enterprise architecture to achieve digitalisation is gaining momentum. The development of the India Enterprise Architecture Framework (IndEA)[8] along with the Digital Service Standards points to increased adoption of architecture and standards. The main conclusions from the efforts so far are:

1. Digitalisation is well underway, and India ranks amongst the leaders globally, adjusted for its size, diversity and complexity.
2. For reasons of reach, coverage and economics the penetration and adoption of mobile technologies has outpaced other technologies.
3. Despite the development and deployment of underlying mobile technology infrastructure, certain government services are still silo-based and fragmented.
4. Mobility as an information-driven initiative, requires a shared platform, is citizen-centric, affects security and privacy, enabled by devices, connectivity and personal choices. M-Services (i.e. digital services on mobile devices) require multiple parameters.
5. People use technology they trust, therefore building trust and maintaining privacy is paramount.
6. Digital transformation in the government focuses on the *five-Ps*:
    a. People-centred: Delivering citizen centric, trust based services derived through life stage events.
    b. Proactive: Pre-empting services citizens need or are eligible for and trigger service delivery proactively.

[7] National eGovernance Division, Ministry of Electronics and Information Technology, Government of India. (2018).
[8] *India Enterprise Architecture Framework – Parts 1 and 2*; Ministry of Electronics and Information Technology, Government of India. (2019).

c. Predictive: Using analytics to develop innovative services consistent with intended outcomes.

d. Participative: Activating and leveraging pan government, multi-channel feedback, with results integrated into policy decisions

e. Partnership-based: Delivering services through ecosystem of collaborating partners, including those in the private sector.

In 2016 and in 2018, India was ranked first globally in the Digital Transformation Maturity Index by Dell and Intel. Starting 2019, Digital India v2.0 will be launched. This will consist of thirty digital transformation themes organised into nine focus areas.

Finland

Like in many other countries, digital transformation in Finland has flowed from the e-government initiatives undertaken in the past five decades[9]. Finland has long embraced technology in many aspects of its economy. From the 1970s onwards, adoption of ICT in Finland has focused on improving public service delivery and outcomes. Finland became one of the most advanced countries in the use of ICT in the 1990s, with the highest adoption of Internet connection per capita in the world. Digitalisation has always been high on the government agenda, and Finland has published a series of national action plan to this end. The country follows a digital first policy when it comes to public services. The current Digital Finland programme targets digital transformation of industries and society as a key element for growth, entrepreneurship, job creation and welfare. Digital transformation is designed to enable speeding up the development of innovative responses not only to local economic and societal challenges, but to reach the UN Sustainable Development Goals.

> *Digital Finland Framework supports effective coordination of sustainable digital transformation in Finland. The Framework combines key perspectives together:*
>
> *1) The digital innovations exploiting the benefits of platform economy and the transformation of the spearhead industry sectors*
>
> *2) Seamless support for sustainable digital transformation*
>
> *3) Responses to global megatrends and sustainable development goals*[1]

[1] Digital Finland Framework – A Framework for Turning Digital Transformation to Solutions to Grand Challenges; Ministry of Economic Affairs and Employment, Government of Finland. (2017). https://www.businessfinland.fi/globalassets/julkaisut/digital-finland-framework.pdf

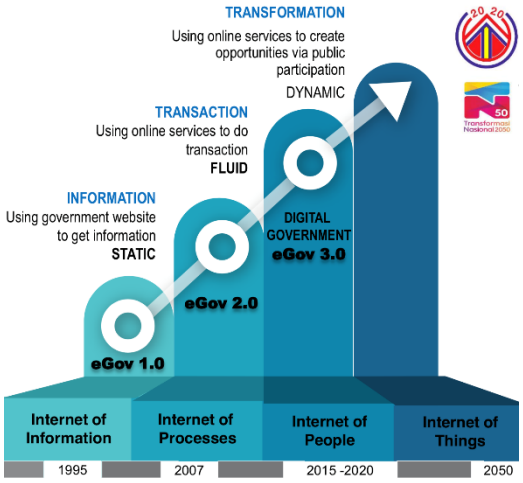
Key areas where digitalization has been adopted in public service provision include health care provision, social service provision, security service provision, integration service provision, and election and citizen participation services (e.g. e-voting, e-democracy, and e-participation).

Finland has been ranked as one of the leading countries in several digital transformation related assessments. For example, in Digital Economy and Society Index 2017 and 2018, Finland ranks 2nd with particular strengths in digital skills and digital public services. According to the Global Competitiveness Report, Finland has the best availability of scientists and engineers in the world combined with a highly digital-oriented population.

[9] *eGovernment in Finland*; European Commission. (2015). https://joinup.ec.europa.eu/sites/default/files/inline-files/eGovernmnent%20in%20Finland%20-%20February%202016%20-%2018_00%20-%20v2_00.pdf

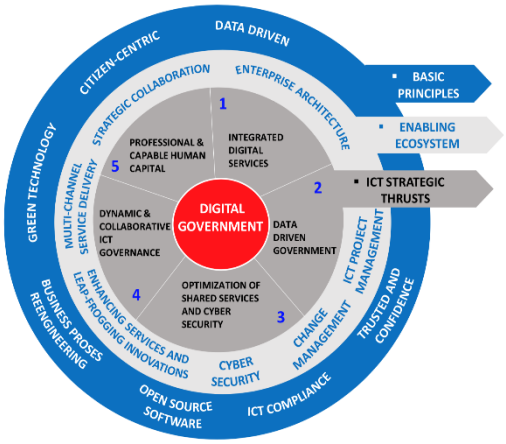
Malaysia[10]

Malaysia's journey towards digital government is similar to other countries. It started in the 1970s with focus on computerisation and data processing. The 1980s ushered in an era of development and deployment of management information systems, which primarily enabled automation of certain processes for efficiency gains and continued through the 1990s. Starting 1997, the country matured to have full e-government services covering G2C (government to citizen), G2B (government to business), and G2G (government to government) services. This was enabled by rapid nationwide spread and adoption of the Internet and intranet. As a natural progression, the need was felt to focus on integration so that citizens have a seamless experience when dealing with end-to-end business processes. This led the government to concentrate on delivering services through an integrated and connected government starting in 2010. The Public-Sector ICT Strategic Plan for the period 2011-2015 aimed to enhance service delivery, enhance capacity and capability, enhance performance measurement capability through a connected government built on a resilient and sustainable ICT infrastructure. In 2015, as part of the Eleventh Malaysia Plan, the country put significant emphasis on digital transformation aiming to transform its public service delivery. The drivers for its digitalisation initiatives are greater and more sophisticated citizen expectations, emerging technology trends and an economy based on digital technologies.



The current Public-Sector ICT Plan (2016 – 2020) contains three main layers, the innermost being the strategic thrusts that the country aims to focus on, followed by a layer of enabling ecosystem with enterprise architecture at its core, surrounded by a set of principles providing the contours of digital transformation in government. Malaysia adopted government enterprise architecture called the 1GOVEA is a core enabling factor in its digitalisation journey[11] and views enterprise architecture as a structured approach to define an organisation across different domains. Based on TOGAF®[12], it is often used to help transform the organisation through understanding, reconciling and planning across the business, data, application and technology domains. The 1GOVEA is designed to improve delivery processes to raise responsiveness, reduce bureaucracy, leverage data to enhance outcomes and lower costs, expand outreach of services and increase accountability through transparency.

[10] Malaysian Administrative Modernisation and Management Planning Unit, Prime Minister's Department, Government of Malaysia. (2018).
[11] Malaysia's Digital Economy – A Driver of Development; Washington DC. The World Bank. (2018).
[12] The Open Group Architecture Framework Version 9.2; The Open Group. (2019).



The current plan consists of six thrusts, thirteen strategies, twenty-nine programmes and ninety-three activities. The six thrusts are:

- Integrated, inclusive and secure digital services.
- Data driven digital service delivery.
- Digital service branding, publicity and promotion.
- Legislations and governance.
- Capability and capacity building.
- Digital service delivery system outcome optimisation.

Moving forward, with its current digitalisation plan, Malaysia aims to build an ecosystem of collaborative and engaged stakeholders who enable cross-agency commitment to mission productivity to provide personalised services driven by business insights running on a secure and resilient ICT infrastructure. According to the Asia Digital Transformation Index (Economist Intelligence Unit), Malaysia has been ranked sixth in 2018, which the indicates that the digital transformation is starting to show results.

IX Concluding thoughts

Digital transformation is a systemic change not a technological modernisation programme. Countries are committing significant resources, but there is ambiguity in understanding what digital transformation actually means. This paper takes an outside-in view and anchors the discussion on the key aspect that citizens experience – *digital services*. From a citizen perspective, it is the transformation of services (enabled by digital technologies) that matters the most.

The role of enterprise architecture is pivotal to transformation. Digital transformation requires a balancing act between political, economic, social, technological and legal factors. Countries that get this right, will flourish and improve the lives of their citizens, while the rest will have to work smarter to keep up with citizen expectations and demands.

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