eGovernment services would yield up to $50 bn annual savings for Governments globally by 2020

while increasing convenience, trust and citizen satisfaction

Secure Identity Alliance – November 2013

Agenda

Current state of play

Quantification of savings

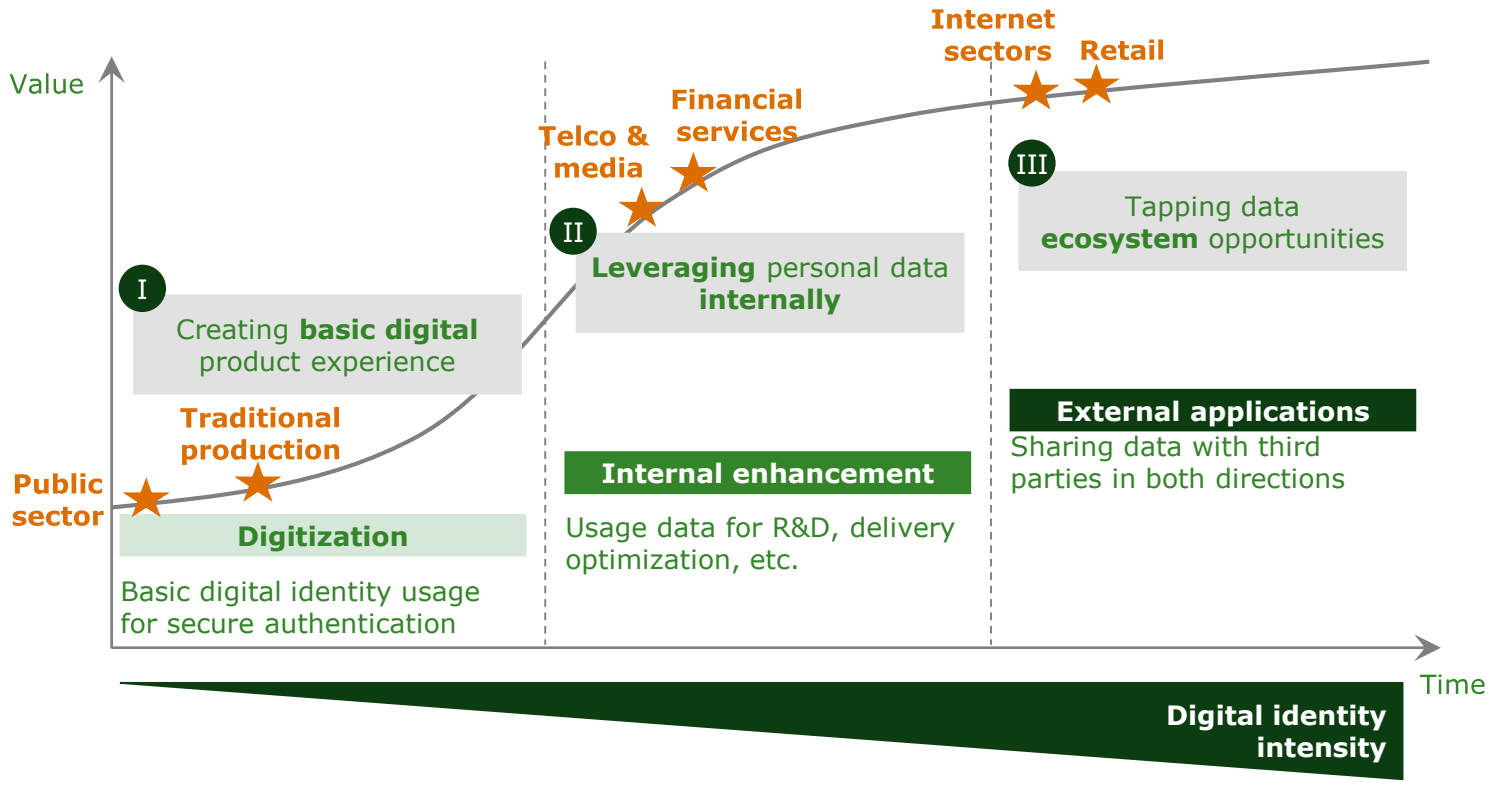
Additional benefits

Vision

Roadmap

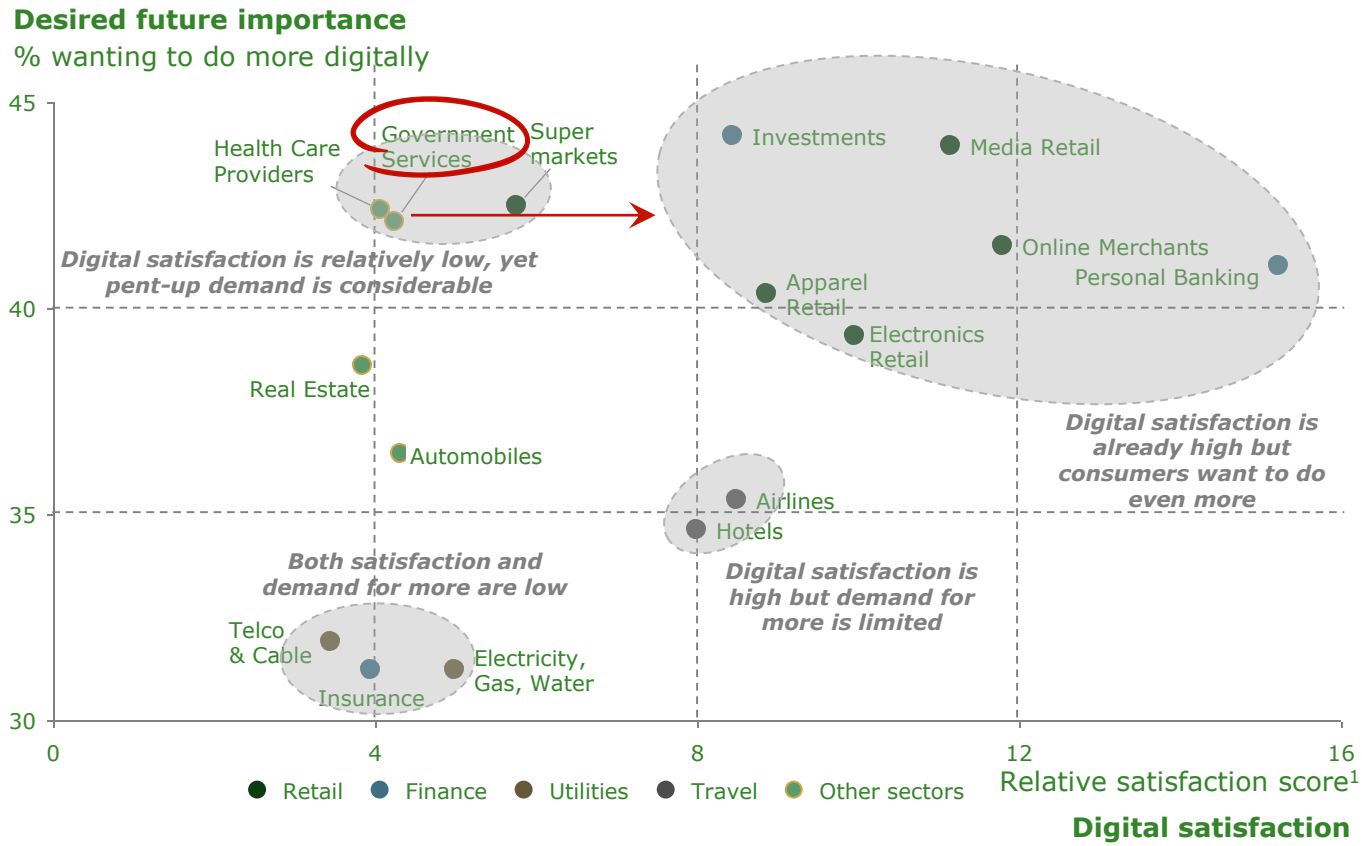
Public services with large incremental potential through digitization and trusted digital identity

Evolutionary path of digital identity value creation



Source: SIA; Liberty Global and BCG "The Value of Our Digital Identity" (2012)

Expansion of online government services would be very well received among citizens



1. Satisfaction score based on respondents allocating 100 utility "points" across segments based on their perceived digital satisfaction
Source: SIA; BCG Digital Satisfaction Survey, n=3,135, March 2013

Examples—governments are actively pushing eGov improvements with digital service delivery

Source: SIA; BCG analysis

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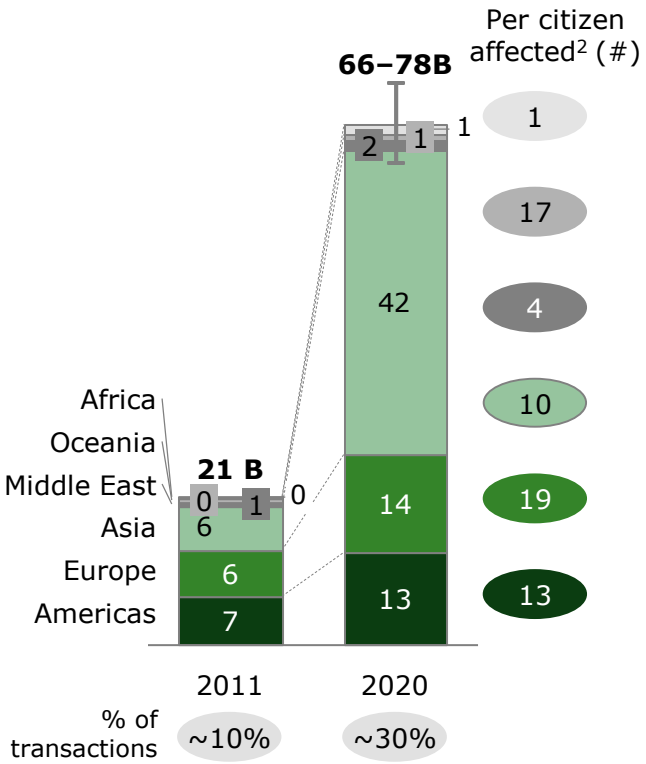
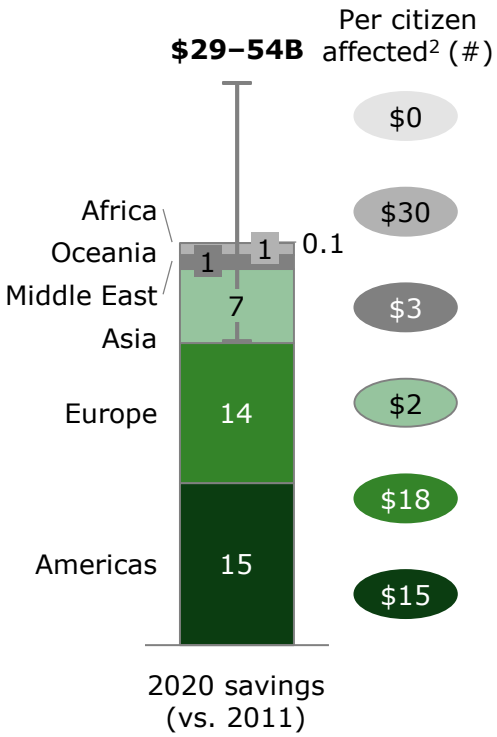
Global share of digital transactions ~30% in 2020, yielding ~$30-50B annual savings

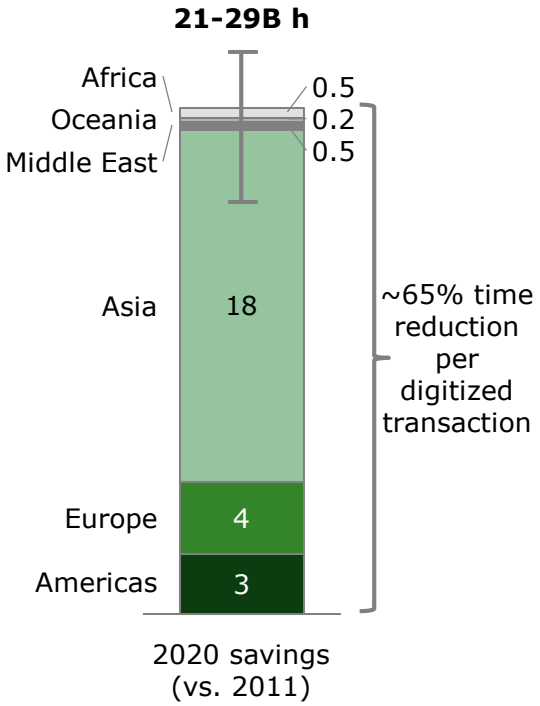
Number of digital transactions[1] (B)



Saving public admin. vs. 2011 ($B)



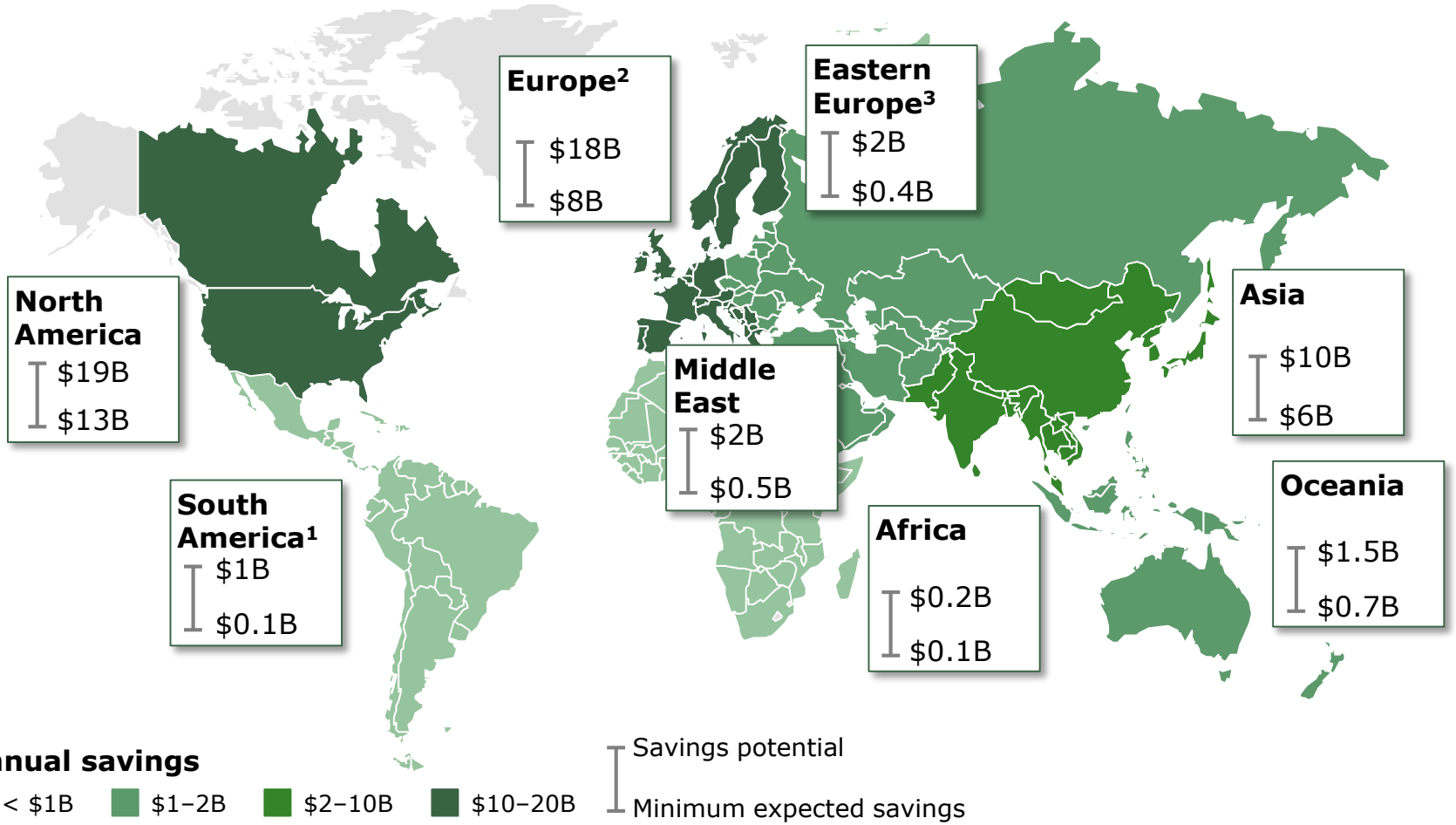
Time saving citizens vs. 2011 (B h)



Note: Savings measured vs. 2011 1. Government with citizens interactions (excludes businesses) 2. Person living in country with digitization effort
Source: SIA; BCG analysis; Economist Intelligence Unit; UN eGovernment survey 2008-2012

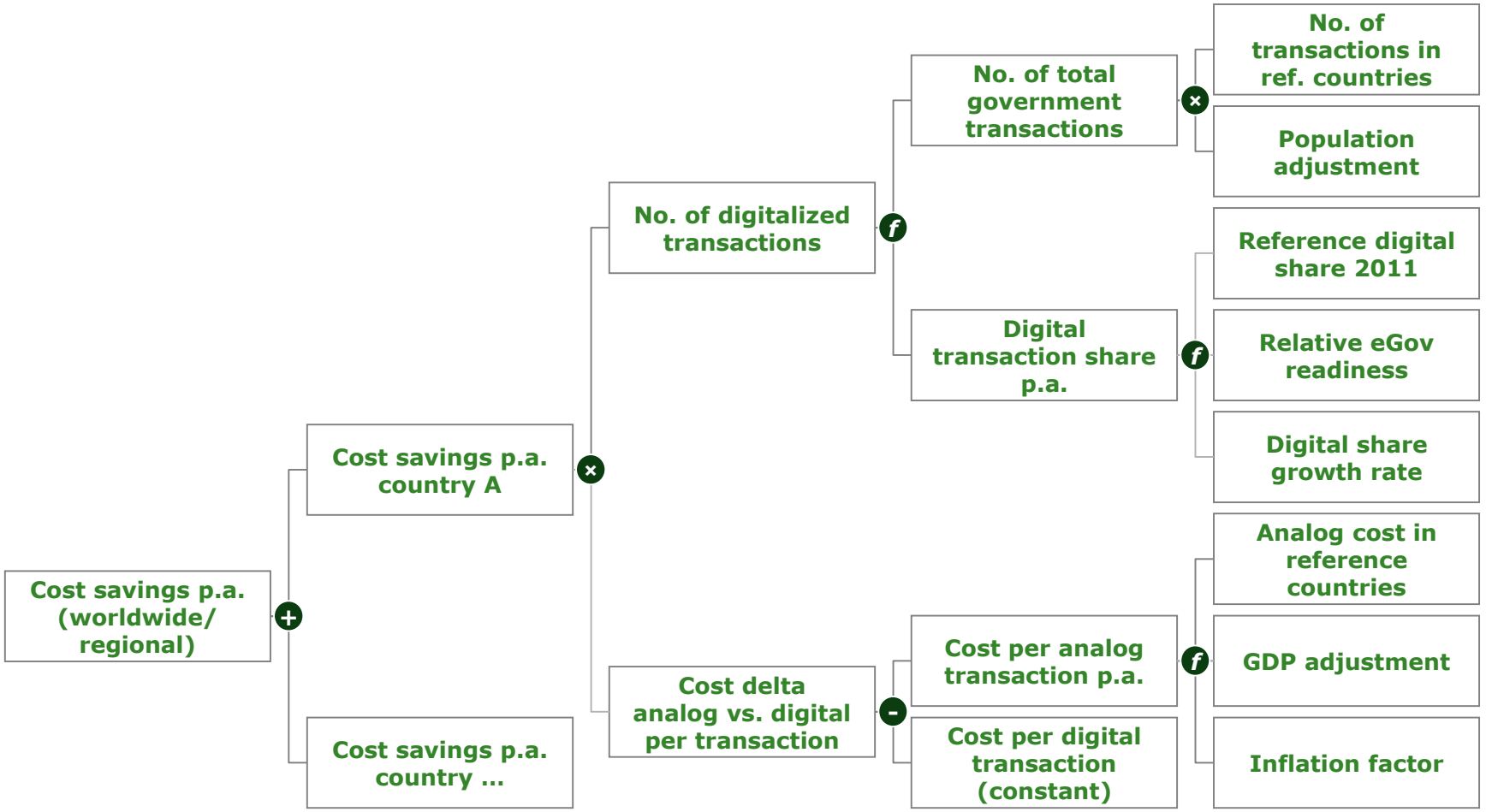
eGovernment yields $30–50B annual savings by 2020—enabled by trusted digital identity

Annual eGovernment savings by 2020 ($B)



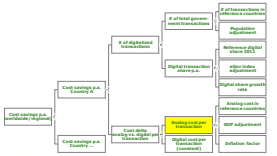
Note: Savings measured vs. 2011, include interactions between government and citizens (excluding businesses)
1. South America, Central America, Caribbean 2. Western Europe, Central Europe, Northern/Southern Europe 3. Eastern Europe incl. Russia
Source: SIA; BCG analysis; Economist Intelligence Unit; UN eGovernment survey 2008-2012

Market model developed to quantify the potential administrative savings due to eGov



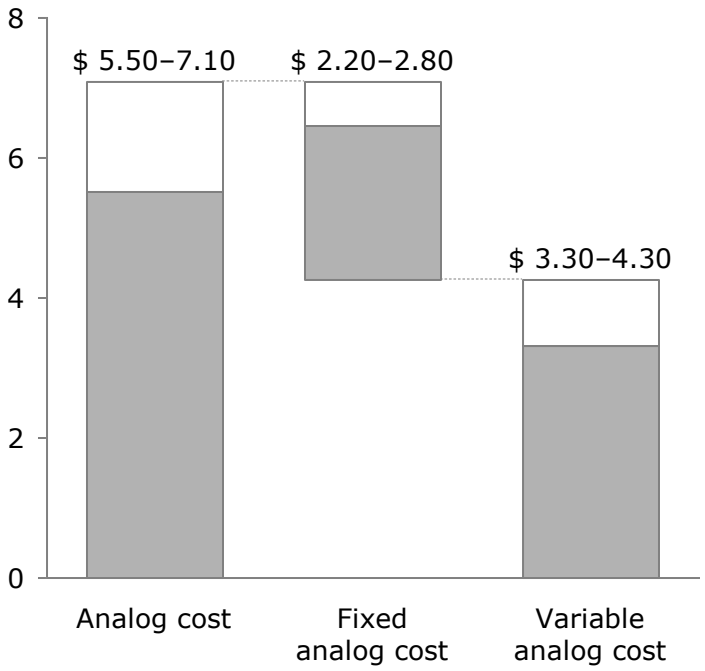
Source: SIA; BCG analysis

Cost per analog transaction



Variable analog cost of $3.30 to $4.30 in reference countries[1]

Cost per analog transaction in reference countries[1] ($)



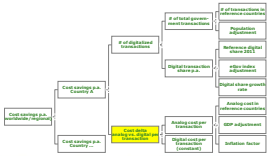
Variable cost per analog transaction extrapolated with GDP

- Calculations based on range of analog process cost in reference countries[1]
- Only variable cost part (assumed to be 60%) used for savings calculation, as fixed cost cannot be reduced easily
- Analog transaction cost is mainly labor cost, therefore can be extrapolated with GDP
- Analog process cost per country calculated based on scaling of GDP per capita for base year 2011
  - GDP per capita of country compared to GDP per capita of reference sample
- Analog process cost increases over time based on projected 2011-2020 CAGR of respective GDP

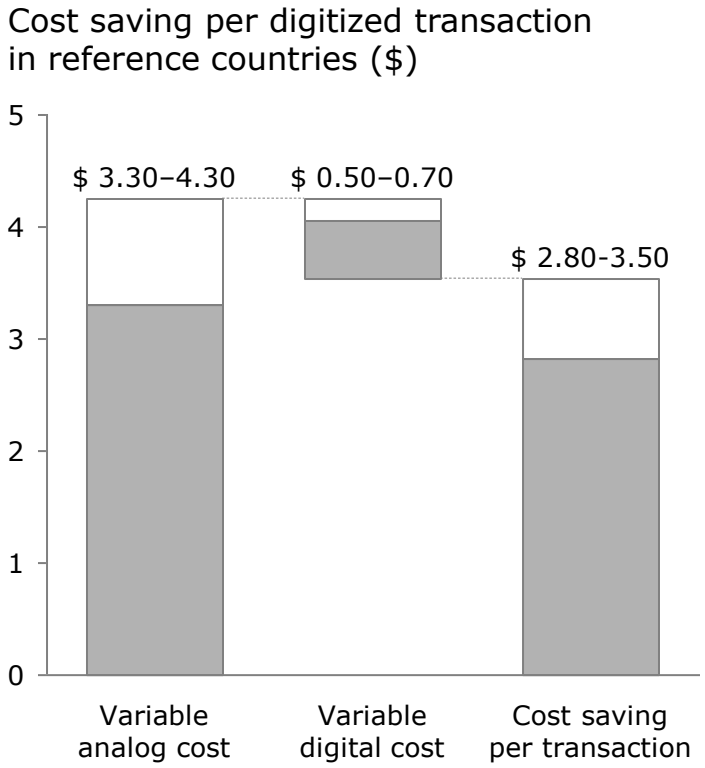
1. Reference sample includes a set of five countries with data available publicly or from BCG experience

Source: SIA; BCG analysis; Economist Intelligence Unit

Cost delta analog vs. digital transaction



Resulting saving per transaction in ref. countries of $2.80 to $3.50

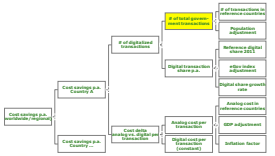


Constant digital cost compared to increasing analog cost

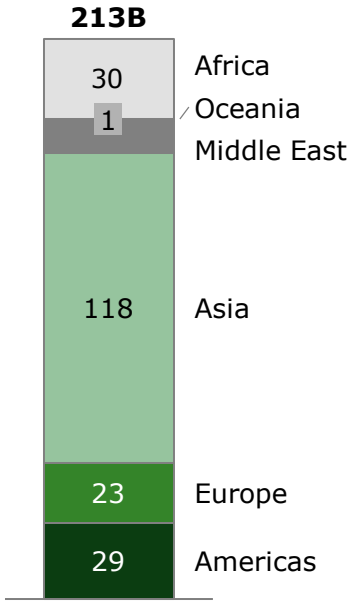
- Digital transaction cost based on reference countries
- Digital transaction cost mainly comprised of IT and highly skilled engineer labor, therefore assumed to be equal for all countries
- Digital transaction kept constant at $0.5-0.7 over time as inflation (energy, labor part) balances out with price decrease in hardware
- Digital transaction cost assumed to be 100% variable (e.g., through cloud computing)
- Analog transaction cost increases as shown on previous slide
- Cost savings thus vary by country – chart on left only shows reference countries

Source: SIA; BCG analysis; Economist Intelligence Unit

Total number of government transactions per country

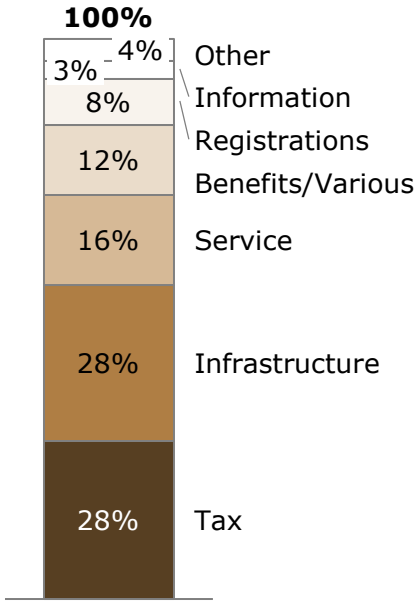


Tot. interactions govt. with citizens



Extrapolated global transaction volume 2011

Areas of interaction govt. with citizens



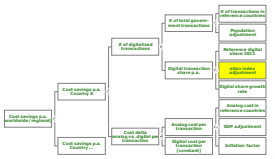
Approximate split by topic in reference countries

Transaction volume calculated by extrapolating with population

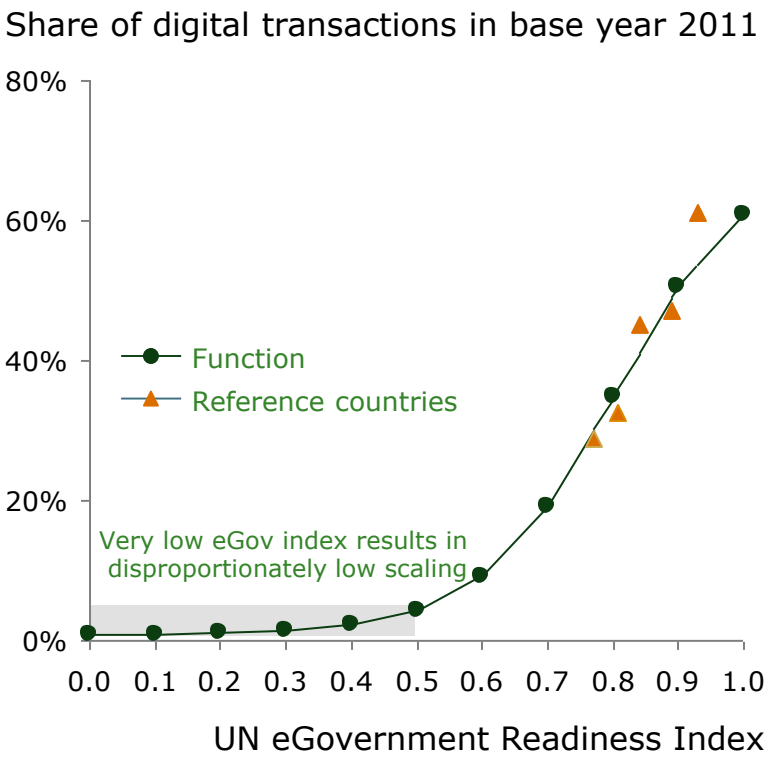
- Transactions include all interactions with government authorities (tax collection, advice, registrations, ...)
- Constant number of transactions per capita over time for all countries based on reference sample
- Number of total transactions per country calculated based on population scaling
  - Population of country compared to reference sample (2011 values)
- Reverse effect of digitization included in model
  - Number of (digital) transactions rises due to increased convenience—10% of digitization uptake is added on top of digital transaction volume
  - This causes a (small) negative effect on digitization savings

Source: SIA; BCG analysis; Economist Intelligence Unit

Digitization degree in base year



S-curve function approximates the 2011 digitization share per country

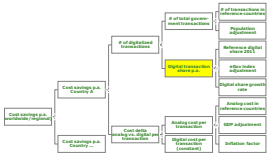


Share of digital transactions calculated via S-curve model

- Baseline used from reference countries
- Classification of transactions into digital and analog transactions
  - Internet, e-mail, SMS, electronic transfers categorized as "digital"
  - Onsite visits and phone calls (call center or automated/interactive system) designated as "analog"
- UN eGovernment "Readiness Index" used to compare countries to references
- S-curve scaling model used to calculate the number of digital transactions worldwide

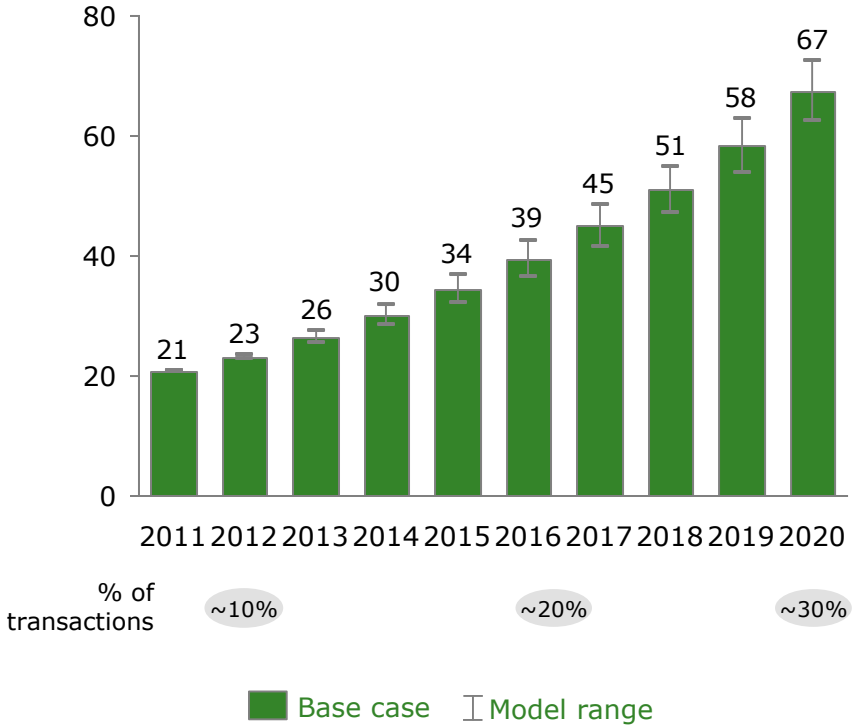
Source: SIA; BCG analysis; UN eGovernment survey 2012

Digitization growth curve until 2020



Worldwide digital transactions[2] grow to ~67B (30%) in 2020

Number of digital government/citizen transactions worldwide (B)

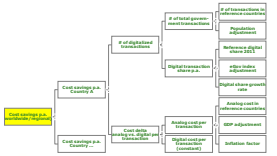


Digitization per country based on eGov index and clustering method

- Countries' growth rates of digitized transactions based on increase of eGov index from 2008 to 2012 plus manual adjustments[1]
- Digitization capped at 80% of transactions (some transactions cannot be digitalized)
- Countries clustered into categories with corresponding digitization start year based on expected local digitization uptake
  - Level of administrative sophistication
  - Economic outlook and stability
  - Size of country
  - Desire/need to control
  - Cultural features
  - BCG experience

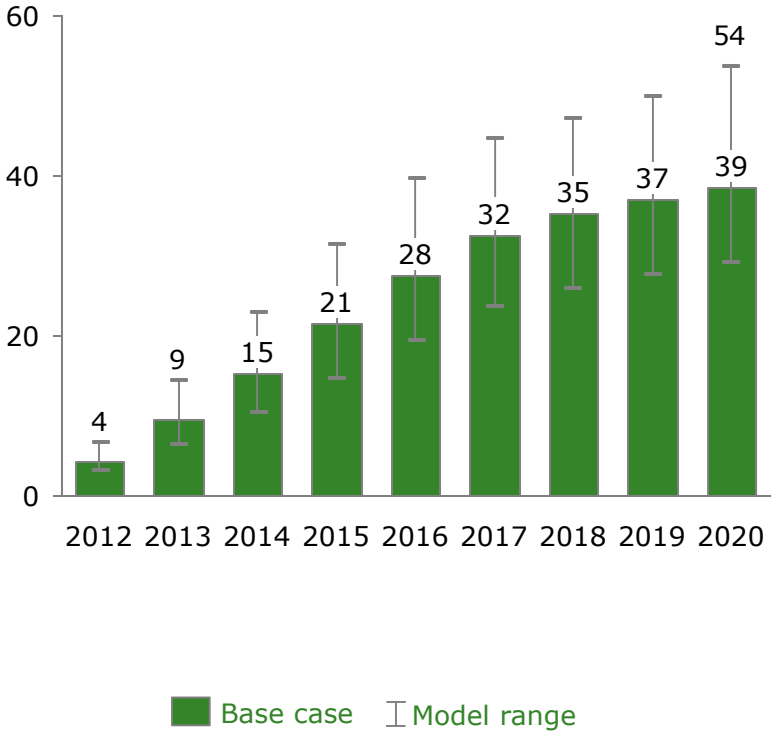
1. Manual adjustments made based on BCG experience 2. Government with citizens interactions (excludes businesses)
Source: SIA; BCG analysis; Economist Intelligence Unit; UN eGovernment survey 2012

Global eGov cost savings vs. 2011



Annual savings[1] by 2020 due to eGov between $29B and $54B

Global annually recurring savings per year vs. 2011 (B$)



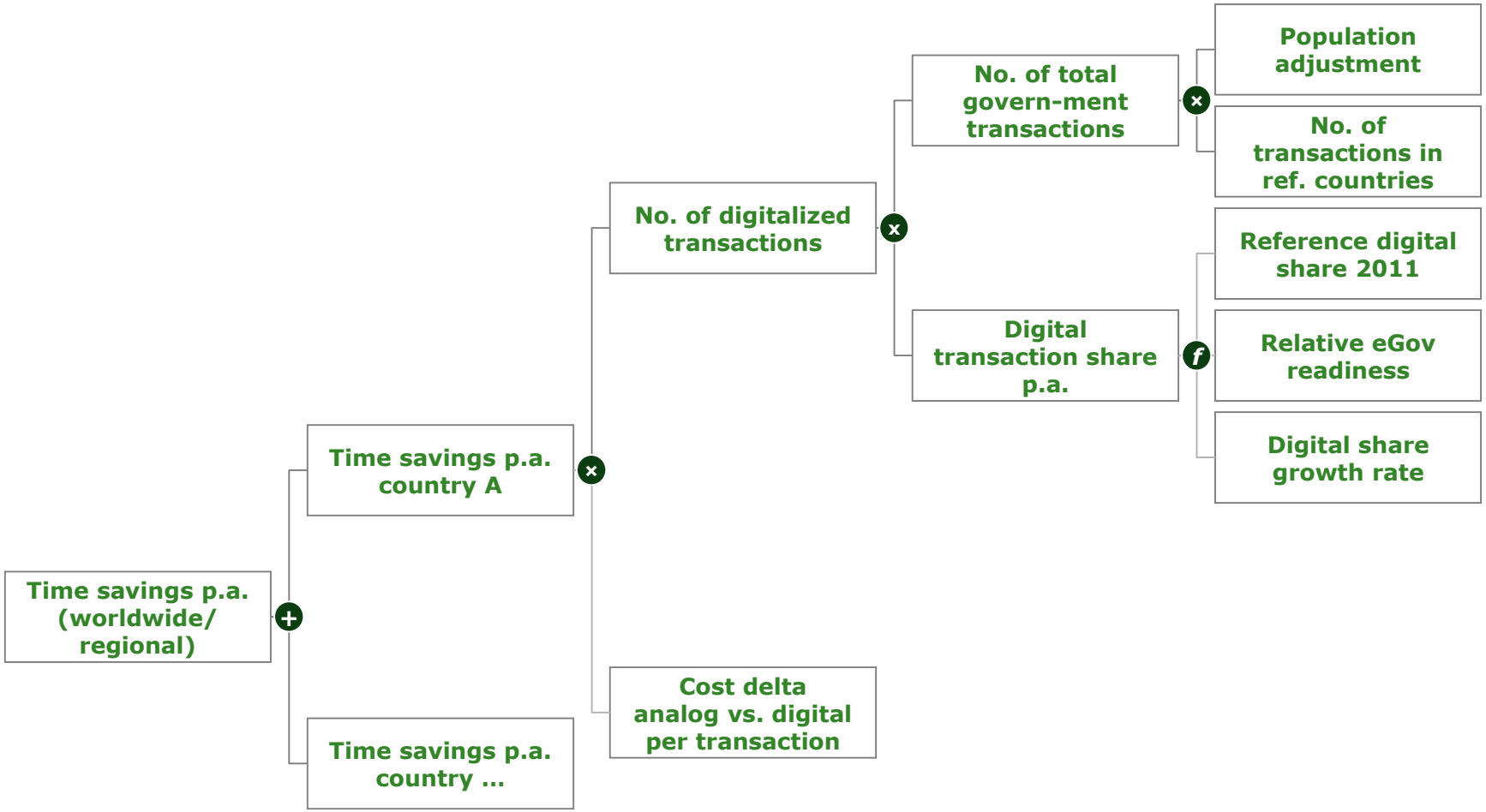
Savings calculated based on transaction cost reduction

- Savings calculated based on difference between digital- and analog transaction cost, multiplied by number of digitized trans-actions
- Reverse effect: Number of (digital) trans-actions also increases due to improved convenience of interacting with government
  - 10% of digitization uptake is added on top of digital transaction volume
  - Valued with respective cost per digital transaction at ~ $1B globally in 2020

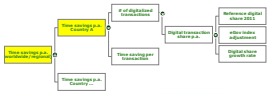
1. Compared to 2011

Source: SIA; BCG analysis; Economist Intelligence Unit; UN eGovernment survey 2012

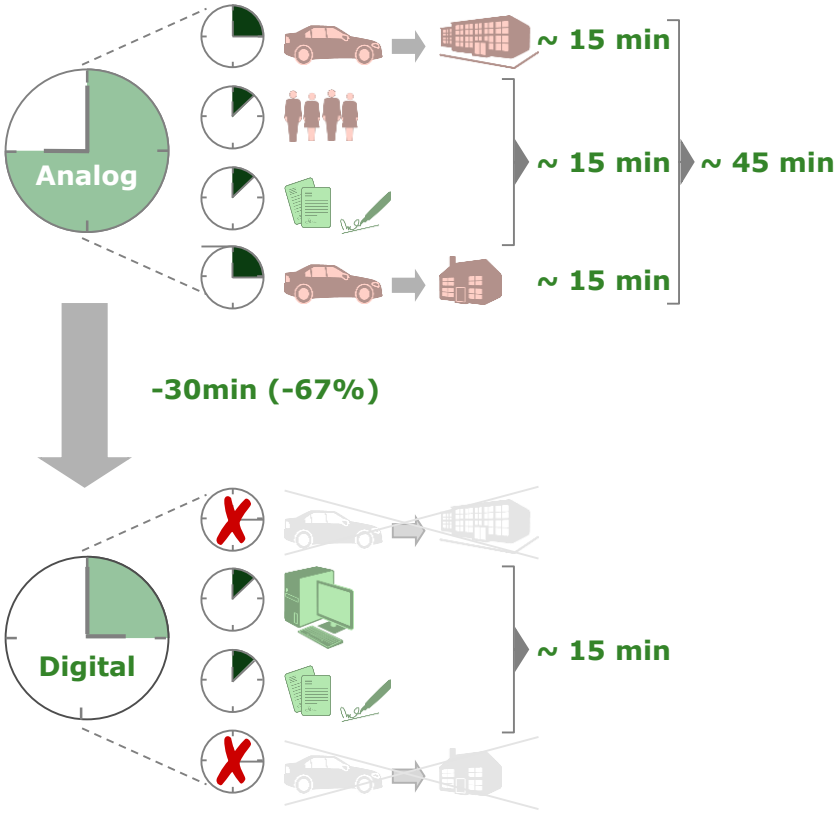
Model also applied to quantify time saving potential for citizens due to eGov



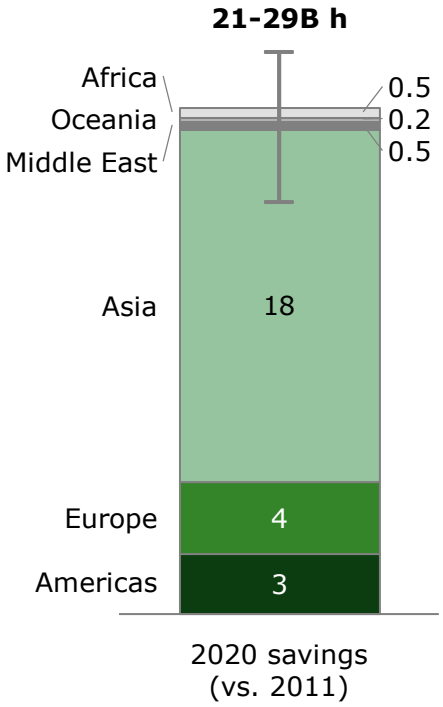
Estimated time savings worldwide



Citizens save transport and waiting time for each digitized transaction



Global annual time savings of 21-29B hours due to digitization of transactions



Source: SIA; BCG analysis; Economist Intelligence Unit; UN eGovernment survey 2008-2012

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There are substantial benefits of a trusted digital identity beyond the quantified potential

Benefits for citizens

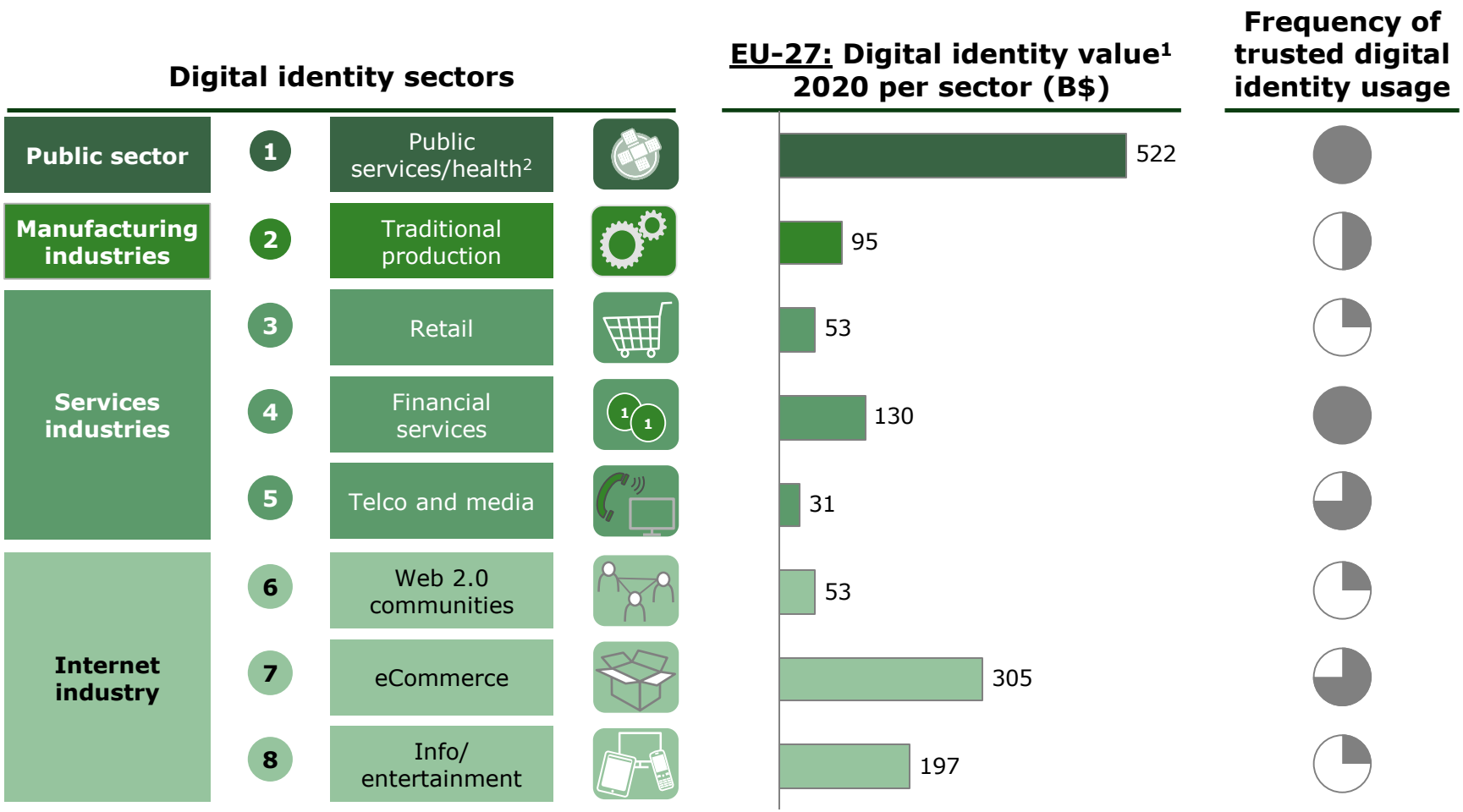
- **Increased convenience—services available 24/7 from everywhere**
- **Faster processing lead times**
- **Increased transparency of processes**
- **Improved security of transactions**

Benefits for governments

- **Monetize by selling e-Documents to private organizations**
- **Enhance growth of digital economy by educating citizens and introducing a trusted digital identity as key enabler**
- **Higher process quality and citizen satisfaction**
- **Improved data basis for decision making through detailed transaction data**

Source: SIA; BCG analysis

Governments create digital economy value by introducing a trusted digital identity framework



1. Combined value for organizations and consumers in EU-27 2. Large potential in public sector due to relatively low degree of digitization today
Source: SIA; Liberty Global and BCG "The Value of Our Digital Identity" (2012)

Governments create digital economy value by introducing a trusted digital identity framework

Digital identity sectors			Exemplary use cases for digital identity system	Frequency of trusted digital identity usage
Public sector	1	Public services/health	Self-service, automation, personalized medicine, tax collection, digital signature	
Manufacturing industries	2	Traditional production	Personalized products, consumer insight, subscription-based services	
Services industries	3	Retail	Loyalty programs, marketing, service enhancements	
	4	Financial services	Automization, personalized products, risk management, secure transaction	
	5	Telco and media	Personalized services, monetization of consumer insight, marketing, automation	
Internet industry	6	Web 2.0 communities	Service enhancements, monetization of user-generated content, marketing	
	7	eCommerce	Secure transaction, monetizing consumer insight, marketing, fraud prevention	
	8	Info/ entertainment	Personalized products, monetization of consumer insight, marketing	

Source: SIA; Liberty Global and BCG "The Value of Our Digital Identity" (2012)

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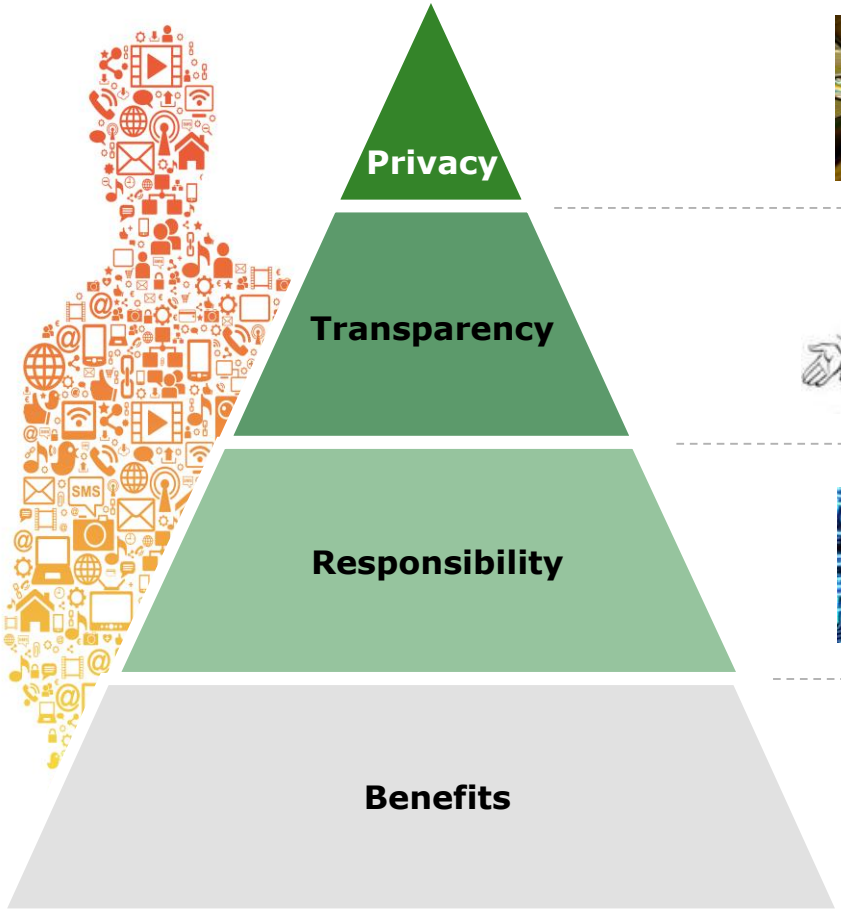
Guiding principles for digital identity value creation …



- Provide options for control regarding data sharing

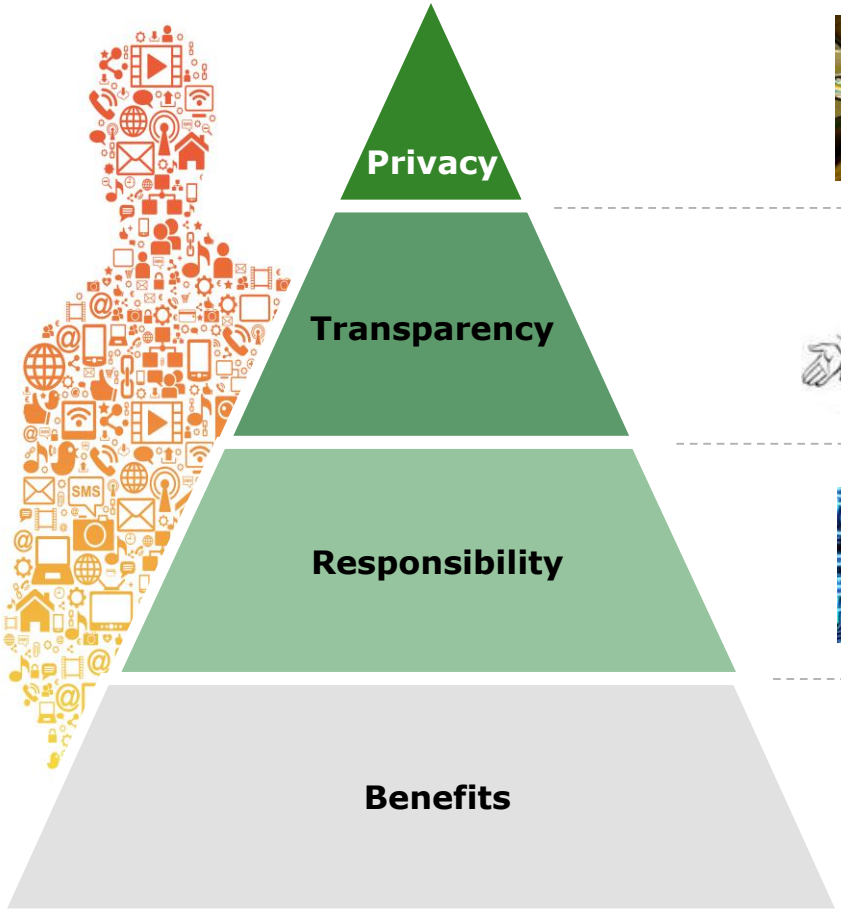
- Take accountability for a trusted flow of data

- Increase data security in order to safeguard digital identity

- Communicate benefits and engage users for sustainable data usage

Source: SIA; Liberty Global and BCG "The Value of Our Digital Identity" (2012)

... and how they apply for trusted identification solutions



Implications for trusted digital identity

- "Privacy by design"
- Dashboard that allows citizens to change usage rights and to define standard profiles for data usage

- Organizations using the system have to comply to a codex for how they treat and use personal data
- Any misuse will also impact secure identity providers' reputation

- Highest degree of protection incl. the processes of organizations
- Trace misuse and hold offenders accountable

- Communication of the secure identification solution focuses on enabled use cases rather than product features

Source: SIA; Liberty Global and BCG "The Value of Our Digital Identity" (2012)

Vision 2020: Trusted digital identity is a key enabler of everyday life

8 Maintain personal information
Update central govt. database with new home address

7 Digitally sign contract
Sign contract online using trusted digital identity

6 Receive entitlement
Get immediate cash reduction at super-market checkout

5 Use as mobile key
Unlock car from carsharing pool using trusted digital identity on mobile device

Trusted digital identity as center-piece of everyday life

1 Communicate securely
Use secure digital mailbox for communication with government

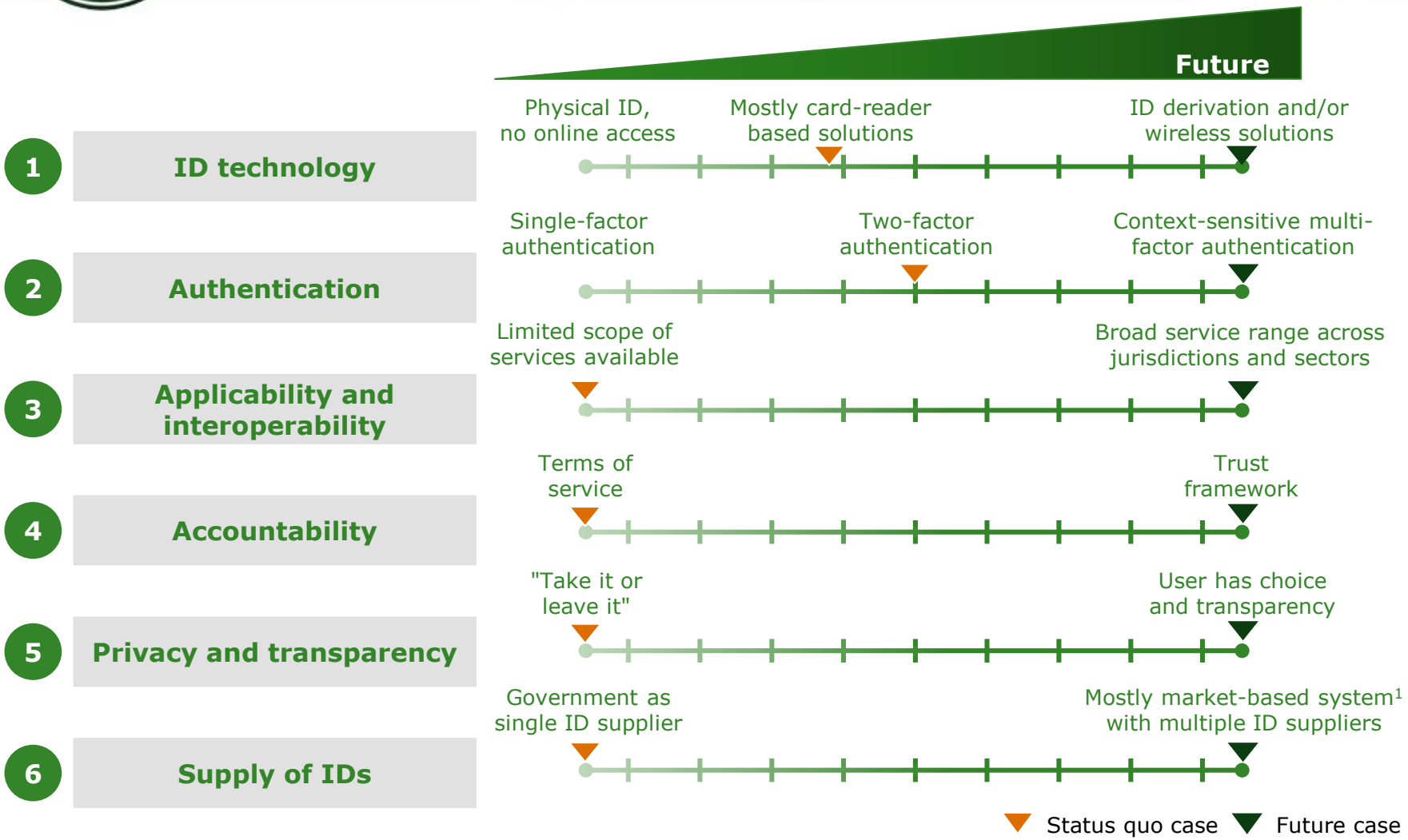
2 Consult physician online
Sign into secure video chat to remotely consult a physician

3 Vote online
Electronically vote in city mayor election

4 Edit tax report online
View tax report on tablet and send clarifying questions

Source: SIA; BCG analysis

Framework to discuss trusted digital identity use cases and product evolution towards 2020 vision



1. Some countries (e.g., with small population and already established eGov infrastructure) may still opt for a government supply model

Source: SIA; BCG analysis

Future ID technology will be based on smartcards and ID derivation method

1 ID technology

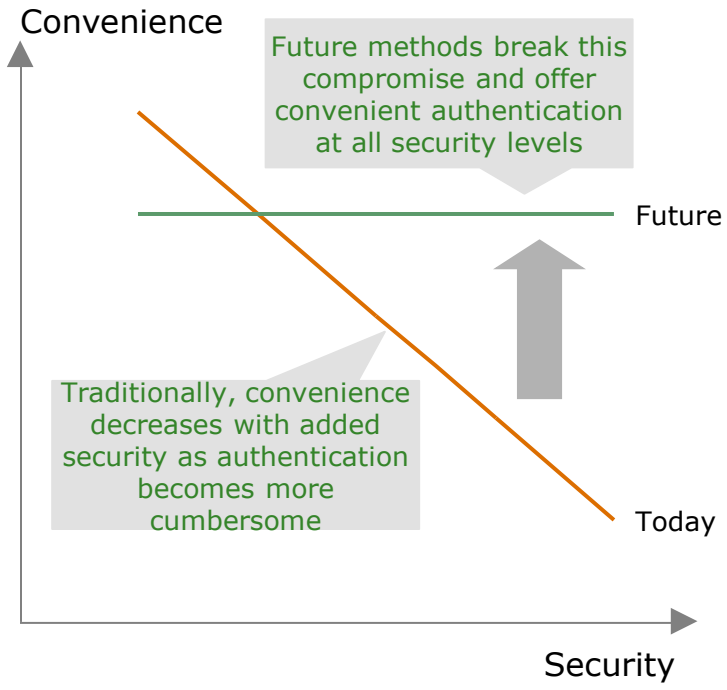
	Smartcard-based eID	eID derivation
Description	• Smartcard-based eID securely stores personal ID information • Devices (e.g., smartphones) access eID card via standard interface (e.g., NFC) • Authentication on device via available methods (see part 2 of framework)	• "Root ID" held in secure document • Additional IDs derived from root ID for end user devices and stored either locally (phone SIM, TEE[1], etc.) or in cloud • Authentication on device via available methods (see part 2 of framework)
Advantages	• Secure storage of personal ID on smartcard • Direct control over personal identity and data	• Maximum mobility • Inherent compatibility across devices
Disadvantages	• Requires standardized contactless communication interface (NFC, low-power Bluetooth, or other) • Lower flexibility compared to option 2	• Highest convenience level can be achieved through cloud-based storage of eIDs, which may be less secure than local storage in a secure document

1. Trusted Execution Environment Source: SIA; BCG analysis

Context-sensitive multi-factor ID breaks the compromise between convenience and security

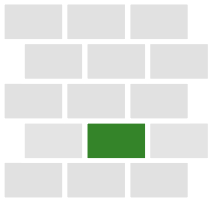
2 Authentication

Future ID methods break today's compromise of security vs. convenience



Future ID optimizes security, convenience, and cost through context awareness

- **Identification method depends on device type and features**
  - Biometric sensor (e.g., fingerprint, face, voice)
  - Non-biometric (e.g., PIN, TAN[1], password)



- **Identification method depends on security requirements of use case**
  - Simple authentication for low-stake applications (e.g., small payments)
  - Multi-factor authentication for high stake applications (e.g., access health records)

- **Identification method is economical**
  - Most economical ID solution is chosen for particular situation and application

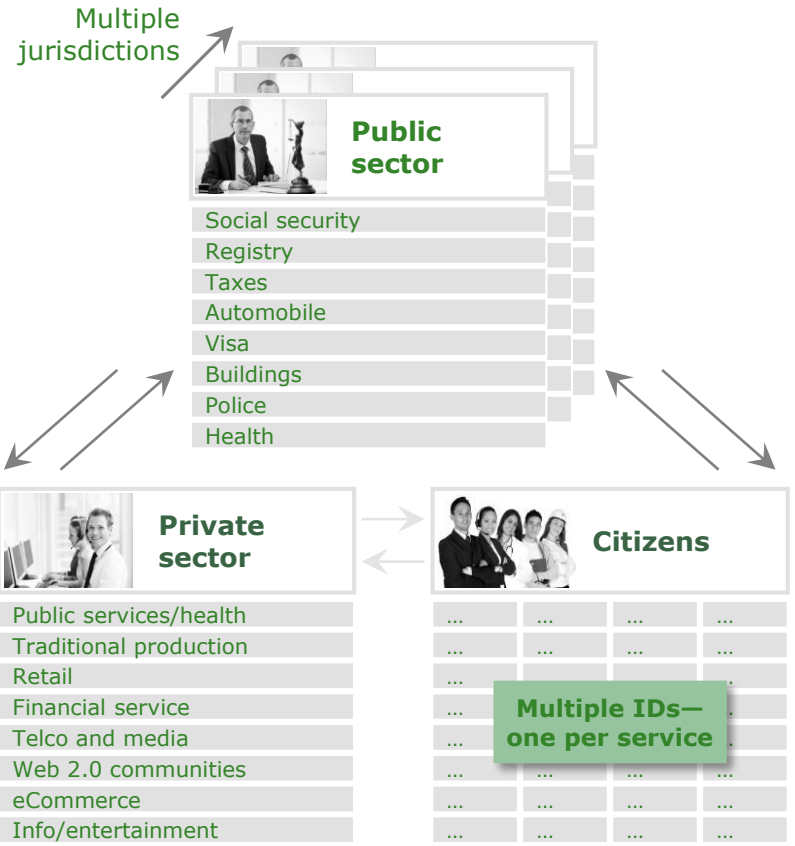
Convenience and security can go hand in hand in next-generation identification methods

1. Transaction Authentication Number Source: SIA; BCG analysis

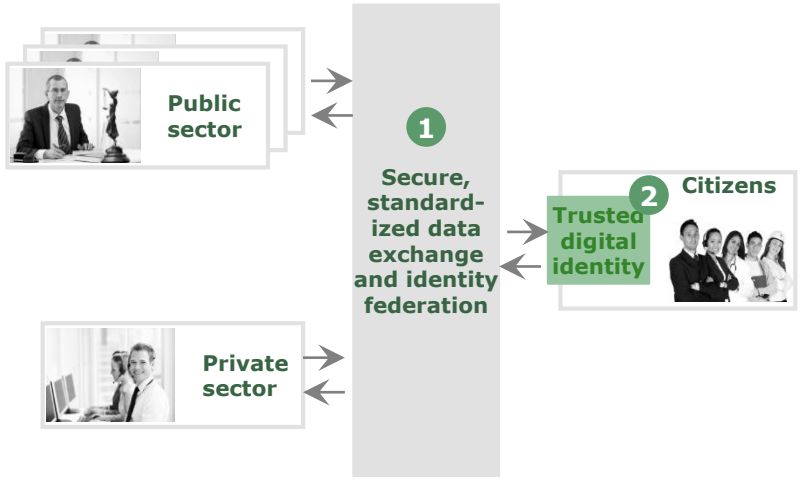
Today, trusted digital identities often limited to few use cases, preventing a broader adoption

3 Applicability and interoperability

Today: Mostly non-compatible systems, each requiring separate access ID



Future: Fully interoperable ecosystem, accessible by a trusted digital identity



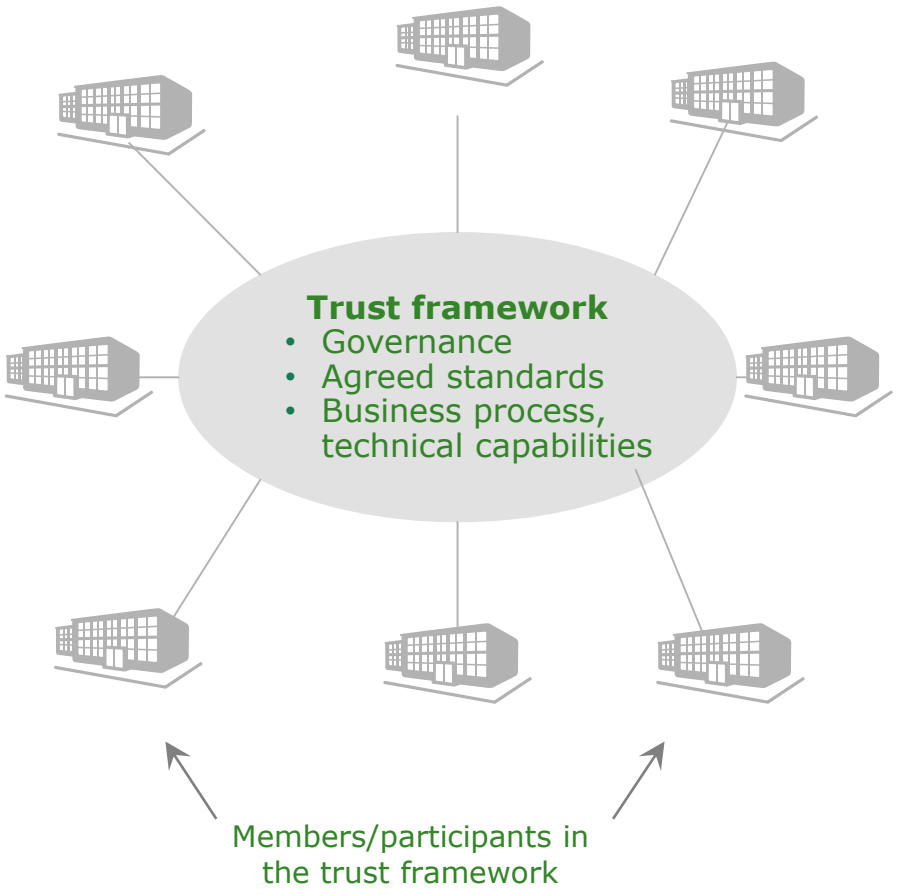
1 **Data exchange allows parties to share information in a convenient, yet secure and transparent way**
- **Increases data richness** for decision making
- **Reduces volume of (manual) data requests**
- **Facilitates information maintenance**, as each type of information is stored in one database only
- **Single sign-in** enabled by identity federation

2 **Trusted digital identity can be used by citizens to securely access public and private services**

Source: SIA; BCG analysis

Trust frameworks enable widespread realization of benefits

4 Accountability



What is a trust framework?

- **Technically …**
  - A set of policies, standards, taxonomy and infrastructure that facilitates and enables trust and confidence between members
- **… but more importantly …**
  - A way to unlock better, harmonised service delivery across government (and beyond) to better respond to the needs of customers
  - A way to take advantage of the opportunities of the emerging digital economy
- **… and practically …**
  - Enhanced discoverability
  - Summary digital credential
  - "Tell us once"
  - Information re-use/pre-filling
  - Streamlined identity and data verification
  - Central location for info. and communication (e.g., digital inboxes, vaults)

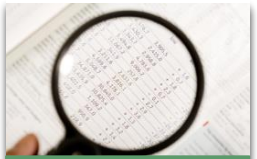
Source: SIA; BCG analysis

Privacy and transparency are important pillars of a successful eGov implementation

Information richness and degree of sharing correlate with eGov usefulness

- **Richness of available data determines type and quality of applications**
  - Use case feasibility depends on certain set of data
  - Quality and automation of decision making increases with data richness
- **Data sharing enables efficiency gains**
  - Sharing enables each set of data to be stored in one place only, without duplicates
    - Maintenance of data is facilitated
    - Data on average is more accurate
  - Sharing reduces data requests as system feeds itself
- **There are substantial benefits in generating citizen trust in the system**
  - Implementation success based on a positive perception of benefit-risk ratio
  - Speed of digitization depends on public acceptance

Relentless focus on transparency and user control required for citizen trust



Transparency

- **Make data usage highly transparent**
  - Type of information stored and rationale for storage
  - Access rights and access log
  - Legal framework for data use

User control

- **Give users degree of control**
  - Make trade-offs regarding service availability explicit
  - Give user choice to surrender more data for non-core services

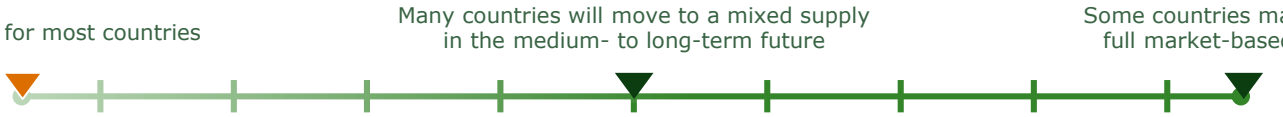
Independent audits

- **Generate credibility via regular audits**
  - Help discover and eliminate system weaknesses
  - Additional credibility from third-party assessment

Source: SIA; BCG analysis

e-Documents can be supplied by governments and/or private organizations

6 Supply of IDs



	Government as single supplier of eIDs	eID supply by government and private organizations	eID supply only by private organizations
Benefits	• **Highest trust level** in e-Documents • Direct and full **control** • Leverage of **existing govt. infrastructure** possible	• Could lead to **increased innovation** • Could **save cost** if designed well	• Could lead to **increased innovation** • Could **save cost** if designed well
Risks	• Potentially **less cost effective** • Potentially **less innovative**	• Need to **ensure sufficient trust** • Need to **manage compatibility** • Increased **coordination effort**	• Need to actively **ensure trust** • Risk of **e-Document proliferation** and resulting **compatibility issues** • **Sufficient market size required** to make it attractive for companies

Choice of e-Document supply model depends on local conditions and preferences

Source: SIA; BCG analysis

Agenda

Current state of play

Quantification of savings

Additional benefits

Vision

Roadmap

Examples of successful eGov implementations pave the way for other countries

Examples: UAE, South Korea, Estonia

...           ...

	UAE	South Korea	Estonia
Highlights	Single entry; Interoperable strategy; Open Data; eParticipation	Mobile strategy; Business collab.; Legal innovation; Process innovation	Data exchange; E-vote; Everyday use; Transparency
Success story	• Focused eGovernment effort since 2001, today one of the most advanced eGovernments • Detailed eGovernment strategy outlining priorities until 2021	• ~ 90% of govt. interactions can be performed online today • Improved data use eliminated ~ 70% of civil document requests	• ~ 400 government services fully integrated, more to follow • Great acceptance by the public

Cumulative worldwide eGov experience to guide a successful implementation in other countries

Source: SIA; BCG analysis; governments of UAE, South Korea and Estonia

Examples of successful eGov implementations pave the way for other countries

Examples: UAE, Belgium, Estonia

...           ...

	UAE	Belgium	Estonia
Highlights	 Single entry	 Interoperable strategy	 Promotion	 Child protection	 Data exchange	 E-vote
	 Open Data	 eParticipation	 Signature service	 Wide eID acceptance	 Everyday use	 Transparency
Success story	• Focused eGovernment effort since 2001, today one of the most advanced eGovernments • Detailed eGovernment strategy outlining priorities until 2021	• More than 600 services support eID • Effective public communication • Example of successful early eGov adopter	• ~ 400 government services fully integrated, more to follow • Great acceptance by the public

Cumulative worldwide eGov experience to guide a successful implementation in other countries

Source: SIA; BCG analysis; governments of UAE, Belgium and Estonia

Successful eGov implementations follow five key principles

1

Benefits and communication

- Prioritize service digitization by expected benefit
- Explicitly communicate benefits to relevant parties
- Use performance-based program mgmt. with clear goals, objectives, short- and long-term plans and deadlines
- Incentivize use of eGov solutions
- Showcase successful examples

2

Technology and infrastructure

- Ensure availability of trusted digital identity technology
- Enforce technology and data standards for interoperability
- Ensure wide availability of Internet in sufficient quality for eGov access

5

Central steering and commitment

- Chief Information Officer with end-to-end eGov responsibility
- Central eGov agency for day-to-day project management

3

Legal and process innovation

- View eGov introduction as an administrative step change, creating opportunities for large-scale change
- Adjust government processes to reflect new reality of digital environment
- Create fast track for passing eGov-related laws in order to keep momentum

4

Transparency

- Set up portal website for citizens to view their data and its use
- Regularly report on digitization effort, detailing successes, and additional improvement opportunities
- Conduct regular third-party audits to verify effectiveness and security

Source: SIA; BCG experience

Capabilities relevant for eGov services determined via key citizen journeys in 2020

Implementation mindset based on key principles

1 Benefits and communication
- Forward-looking, customer-centric
- Open for citizens' feedback
- High speed of transactions and service

2 Technology and infrastructure
- Standardization
- Ecosystem integration
- Accessibility

3 Legal and process innovation
- Innovative and integrated
- Focus on high automation

4 Transparency
- Privacy by design

5 Central steering and commitment

Re-innovation of citizen journeys

Citizen journey **Entitlements**

Citizen journey **Finding information**

Citizen journey **Permissions/ licences**

Citizen journey **…**

Resulting requirements in eGov capabilities

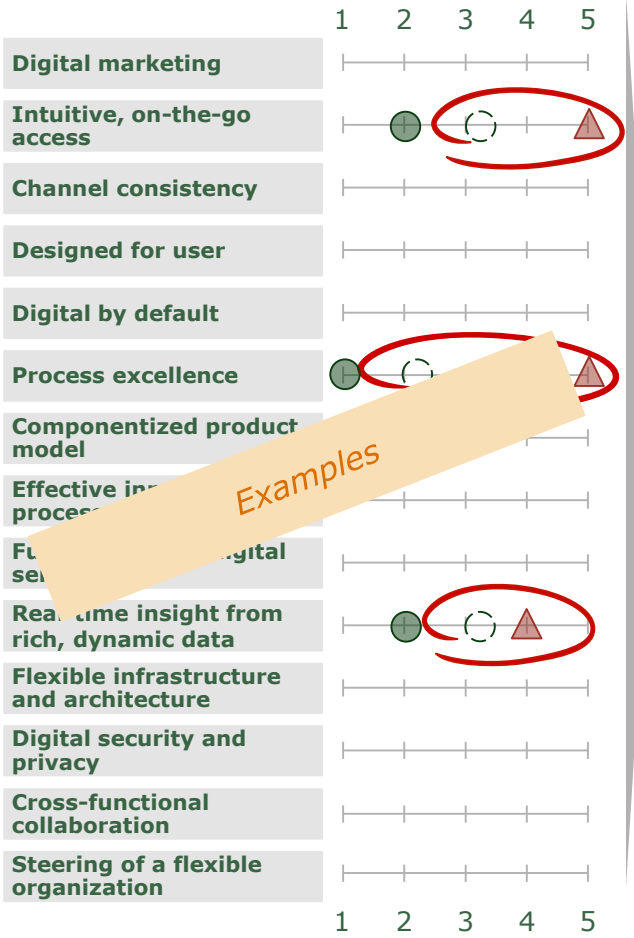
- Services **redesigned for digital**—not merely paper process online
- **Citizen-centric design** around how people use the service, not how government is structured
- Largely **instant, automated processing** of common interactions
- Detailed **tracking of service usage**
- Improvements based on **input from citizens and recorded usage data**
- **Learning effort** to prevent unnecessary claims and to detect fraud
- **…**

Source: SIA; BCG experience

Three-step process to develop digital transformation roadmap

Example

Determine fitness gaps along eGov capability dimensions



List of potential initiatives to close fitness gaps

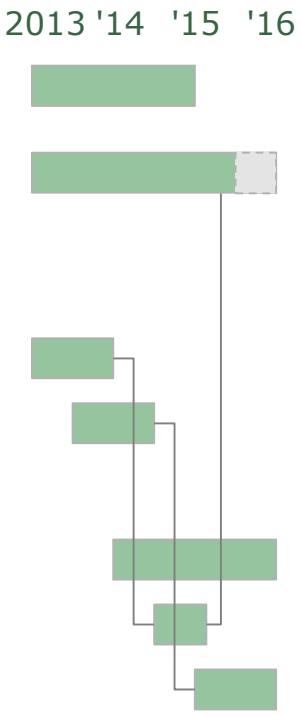
- Establish process tracking mechanisms to offer insight into progress of request handling, and integrate with outsourced processes
- Establish self-service portals with standardized back end and customizable front end, and roll out across organization

- Break down processes into standard, modular, configurable components
- Fully digitize and automate all end-to-end processes, typically supported by an ERP system

- Define data processing strategy and derive roadmap for implementation of platform
- Arrange data provisioning with partners
- Develop a holistic view on areas in which analytical insight could be useful and should be applied

Initiatives supported by business cases and time frames—see next slide for example

Sequence and prioritize initiatives in roadmap



Current status Status after implementing current programs Aspired level

Source: SIA; BCG experience

Citizen journey—entitlement process in 2020

Example

Discover need/ eligibility	Find service	Apply for service	Decision made	Set up ongoing/ next steps
Maria gets a baby Triggered by Maria updating her family details, she receives notice that she should be eligible for child support	Maria logs into the single online portal where she has already set up her account and profile She changes her family status and is directed to the appropriate form for requesting the entitlement	The application is pre-populated with her information She enters new information and sends the application Confirmation of the application is sent to her secure government inbox, if the case is simple, it will be automatically and instantly approved	In more complicated cases, it will be checked by an officer In either case Maria is sent confirmation within one business day Payments are automatically set up to Maria's default bank account	Maria is informed of the ongoing requirements to continue to receive the payment Any required appointments etc. are made automatically in her calendar The system automatically suggests other services (e.g., information about child care facilities)

Assumes a high degree of back-end standardization, automation, and integration

Source: SIA; BCG experience

Business cases to support each initiative

Example

Example: developing fully automated customer self-service portals

Dummy figures

Description

Development of self-service portals in order to reduce number of customer requests handled via customer service center and to increase speed of service

Requires a one-time design and implementation of new, fully automated back end architecture to which multiple front-end layers can connect and interact

Additionally, ongoing development costs to design portals for new devices and touch points

Timeframe

3-month project to design new back-end architecture
3-month project to design customer self-service portals
9-month project to implement design and develop portals

Cost and benefits

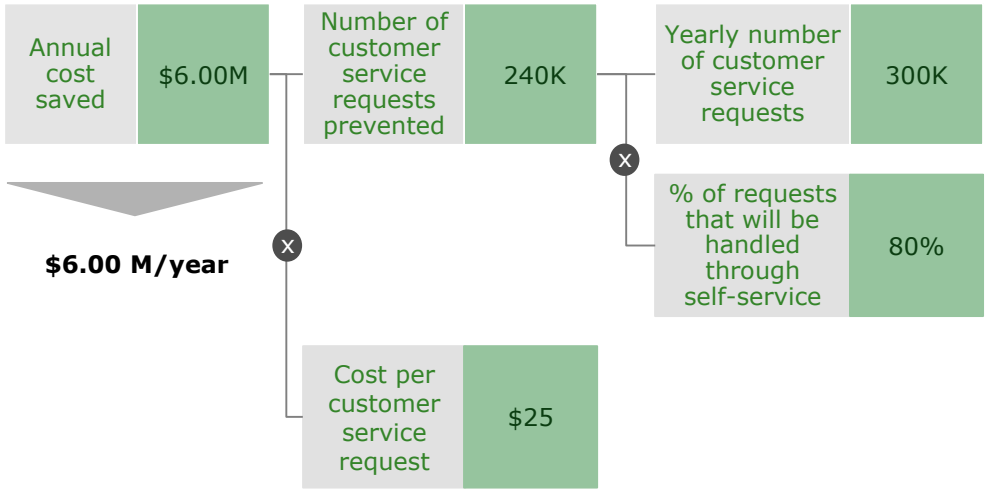
Annual cost saved	$6.00M
One-time cost, annualized over 5 years	$0.80M
Annual operational cost	$0.75M
Annual economic profit	**$4.45M**

In addition, faster speed of service and lower potential for errors lead to higher customer satisfaction, higher customer advocacy

Assumed cost

Design of a new architecture for back end	$0.50M
Design of new customer self-service portals	$0.50M
Implementation of design	$3.00M
One-time cost	**$4.00M**
Personnel cost for ongoing development team	$100K × 5
Annual hardware and maintenance cost	$0.25M
Annual operational cost	**$0.75M**

Assumed benefits



Source: SIA; BCG experience