Plenary Session IV:Use of AI in Governance
Topic: AI in Governance for Public value creation.

Prof Prashant Salwan , Professor and Dean IIM Indore
psalwan@iimidr.ac.in
4th September 2024

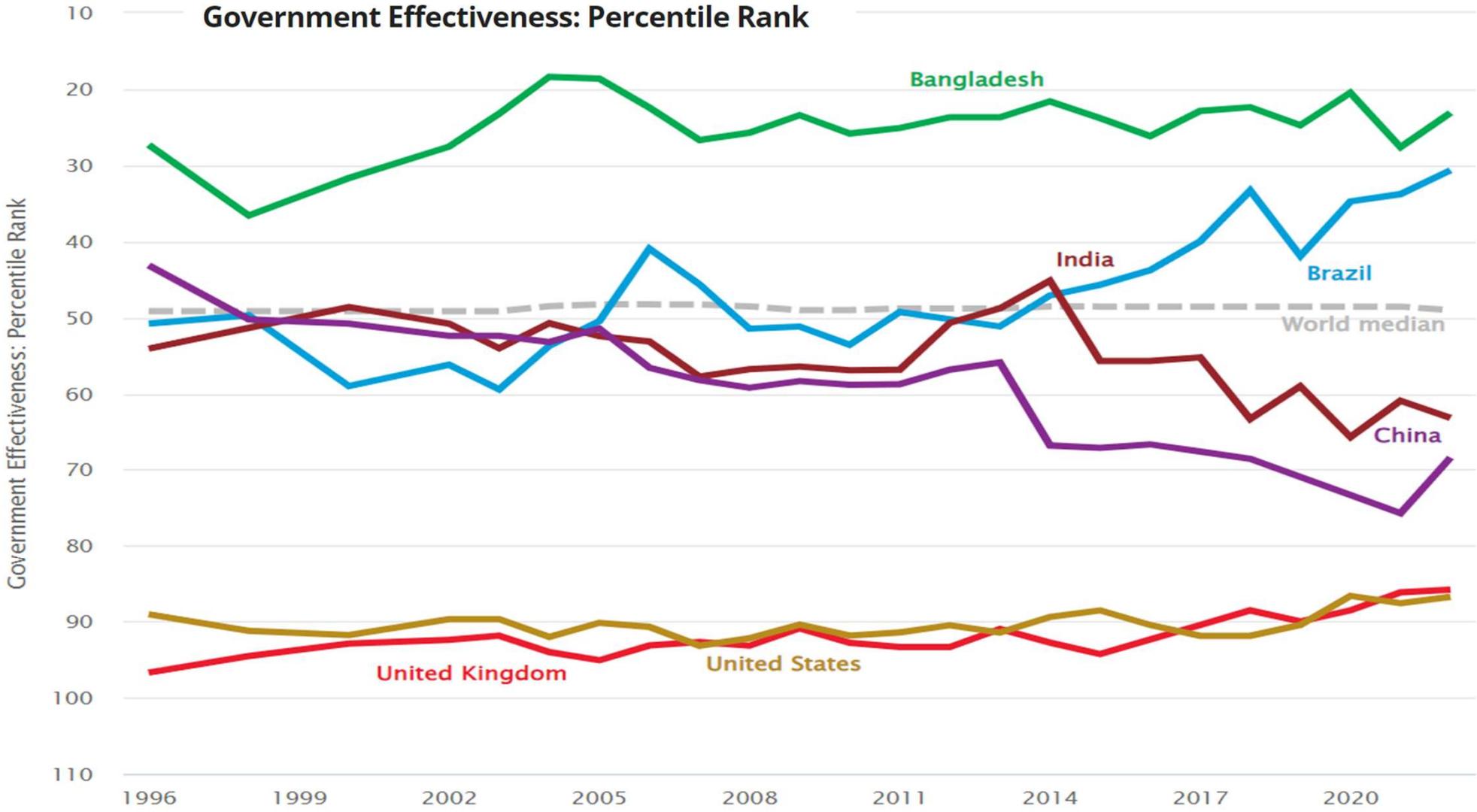Government need to be both Effective and efficient

psalwan@iimidr.ac.in

Government efficiency

- A measure of how well a government uses its resources to perform activities. This can include carrying out activities faster, with fewer resources, or to a higher standard. An efficient government produces the maximum possible outputs given its inputs.
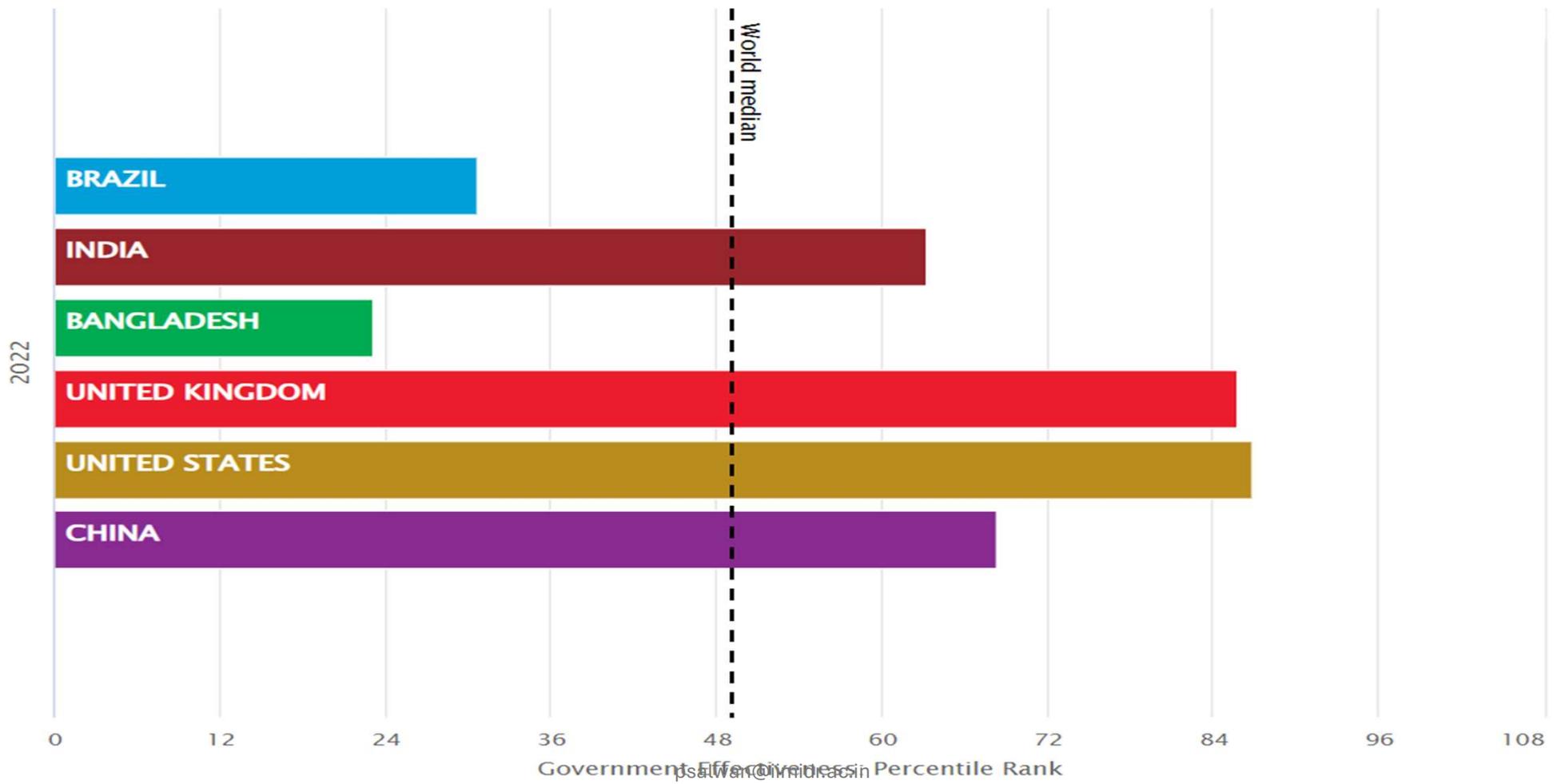
Government effectiveness

- A measure of how well a government performs in several areas, including the quality of public services, the civil service, and policy implementation. It also considers how credible the government is in its commitment to improving these areas. The World Bank Group's government effectiveness index ranks countries based on these factors

Government Effectiveness: Percentile Rank

Government Effectiveness: Percentile Rank
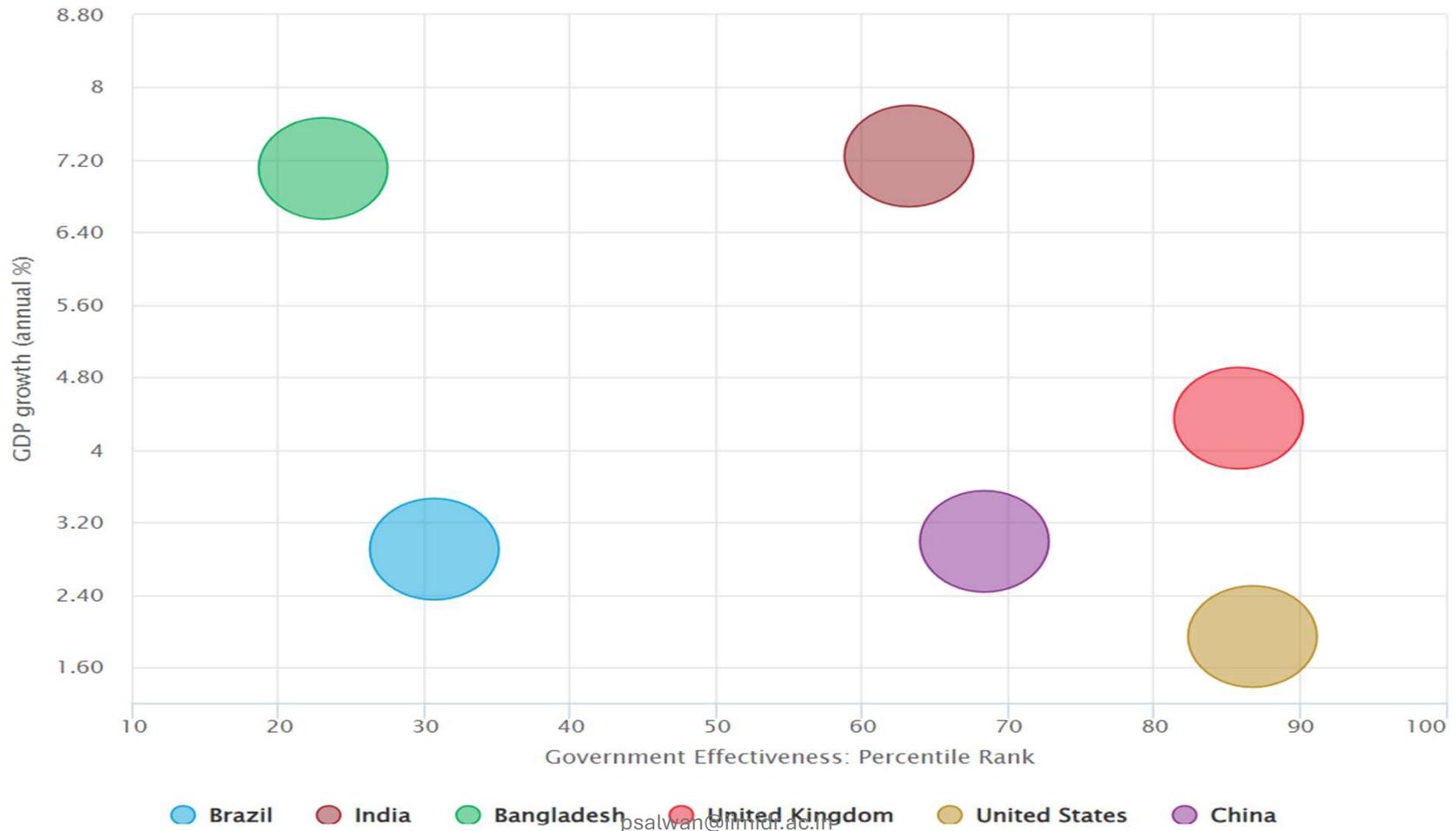
World median

BRAZIL

INDIA

BANGLADESH

UNITED KINGDOM

UNITED STATES

CHINA

2022

Government Effectiveness Percentile Rank

0 12 24 36 48 60 72 84 96 108

psalwan@iimidr.ac.in

Government Effectiveness: Percentile Rank 2022

- Governance can be defined as *the act or process of governing or overseeing the control and direction of something (such as a country or an organization)* . For federal agencies, digital governance refers to the internal systems and processes we use to manage our digital presence, including:

- Establishing clear operating rules

- Defining responsibilities and lines of authority

- Creating mechanisms to ensure those rules and authorities are followed

- A strong governance structure improves public trust through better organizational performance, and better customer outcomes.

- More than ever, digital government projects have to meet high levels of social expectations in   public value creation while facing increased levels of complexity and integration challenges. This has been especially reinforced by the use of front facing7 and interactive technologies like social media, data distribution tools and platform-based architectures. Their applications in open data and open government, data analytics, smart cities, services co-production and many other areas have been associated with public value creation .

Government services lag behind most private-sector services in the United States when it comes to customer satisfaction.

Residents satisfied[1] with US state service, by service benchmark,
% of respondents (n = 78,587)

■ Private sector   ■ Government

Service	%
Bank or credit union	49
State government, high	47
E-commerce site	46
Grocery store	44
Credit card	44
Mobile phone	42
Car insurance	39
Electric utility	35
Airline	34
Cable or satellite TV	30
State government, average	28
State government, low	17
Federal government	15
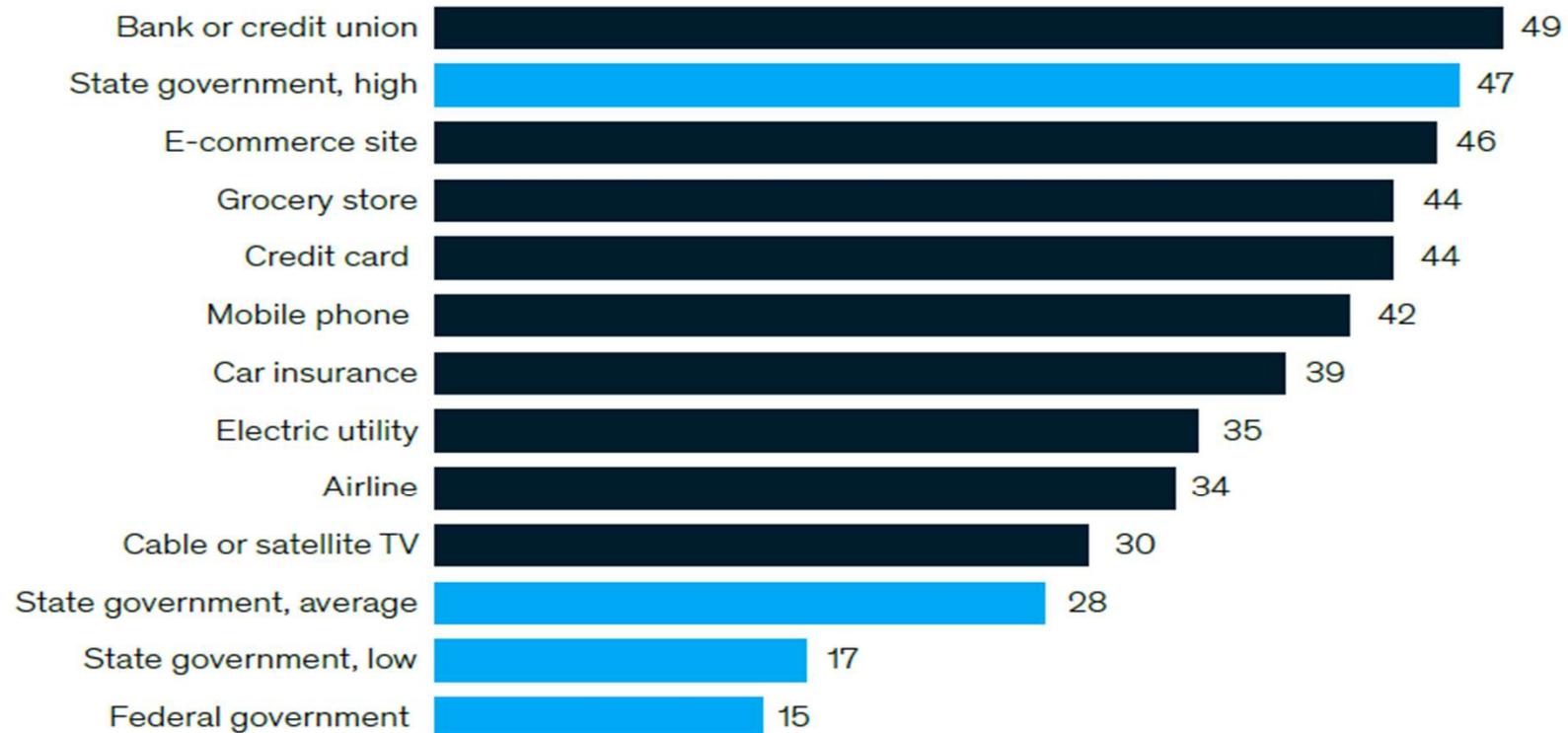
[1]Selected 9 or 10 on a scale of 1–10.
Source: McKinsey State of States Survey, 2022

psalwan@iimidr.ac.in

- ***Customer experience matters.*** States that have higher rates of customer satisfaction enjoy higher trust in government, lower cost-to-serve, lower risk of negative public coverage or commentary, and greater levels of voter participation. Residents are, on average, four times more likely to agree that their state provides an adequate standard of living (on aspects such as affordability, education, and health quality) when they are satisfied with customer experience.

- ***Not all services are created equal.*** The experience with some state services drives an outsize proportion of a resident's overall customer satisfaction with a state. Nationally, McKinsey research finds that five out of 21 services—vehicle services, taxes, public transit, affordable housing, and unemployment insurance—account for more than half of overall satisfaction. Understanding which services matter most to state residents, and where gaps in satisfaction exist, could help states prioritize where to get started.

Satisfaction with US state services varies at different stages of the customer journey, as does the importance of steps as drivers for overall satisfaction.

Share of residents satisfied[1] with interactions with US state services, by interaction,
% of respondents (n = 78,587)

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 |

Learn: obtain information about service

Apply: submit application for service

Wait: wait for application processing

Check: find application status

Obtain approval: receive approval to use service

Enroll: register to use service

Access: access service

Receive: receive service

Use: use service

Renew: renew enrollment or reapply for service

Update: make changes to enrollment information

Appeal: appeal decision

Cancel: cancel enrollment

Resolve: receive answer to question or issue

Importance of journey to customer experience, % of overall satisfaction

- <5
- 5–9
- 10–14
- 15–19
- 20–25

[1]Selected 9 or 10 on scale of 1–10.
Source: McKinsey State of States Survey, 2022

psalwan@iimidr.ac.in

Public value creation in digital government

- Digital government in fact transforms the ways in which public sector organizations produce and deliver services and interact with citizens. These transformations are mediated by digital technologies but also by organizational and institutional factors.

- Public value theory is a perspective that explores how public organizations operationalize public value and how public activities benefit citizens, stakeholders, and service users. It also examines how public administration attracts resources and legitimacy, and how public institutions and services perform.

- Public value theory shifts the focus of public sector management from within the organizational boundaries to society – from how to better produce public services to how to deliver public services that better satisfy those who will consume them.

- The diffusion of digital technologies has fostered this transition and created a powerful argument for public value creation as the ultimate aim of digital government initiatives.

- Public value theory has been particularly successful in providing an alternative to New Public Management's narrative that conceives digital technologies as tools of administrative efficiency.

- Instead, public value management provides a more encompassing view to account for the complex transformations required to shift the focus from service production to the fulfilment of public expectations and goals (Bannister & Connolly, 2014; Cordella & Bonina, 2012).

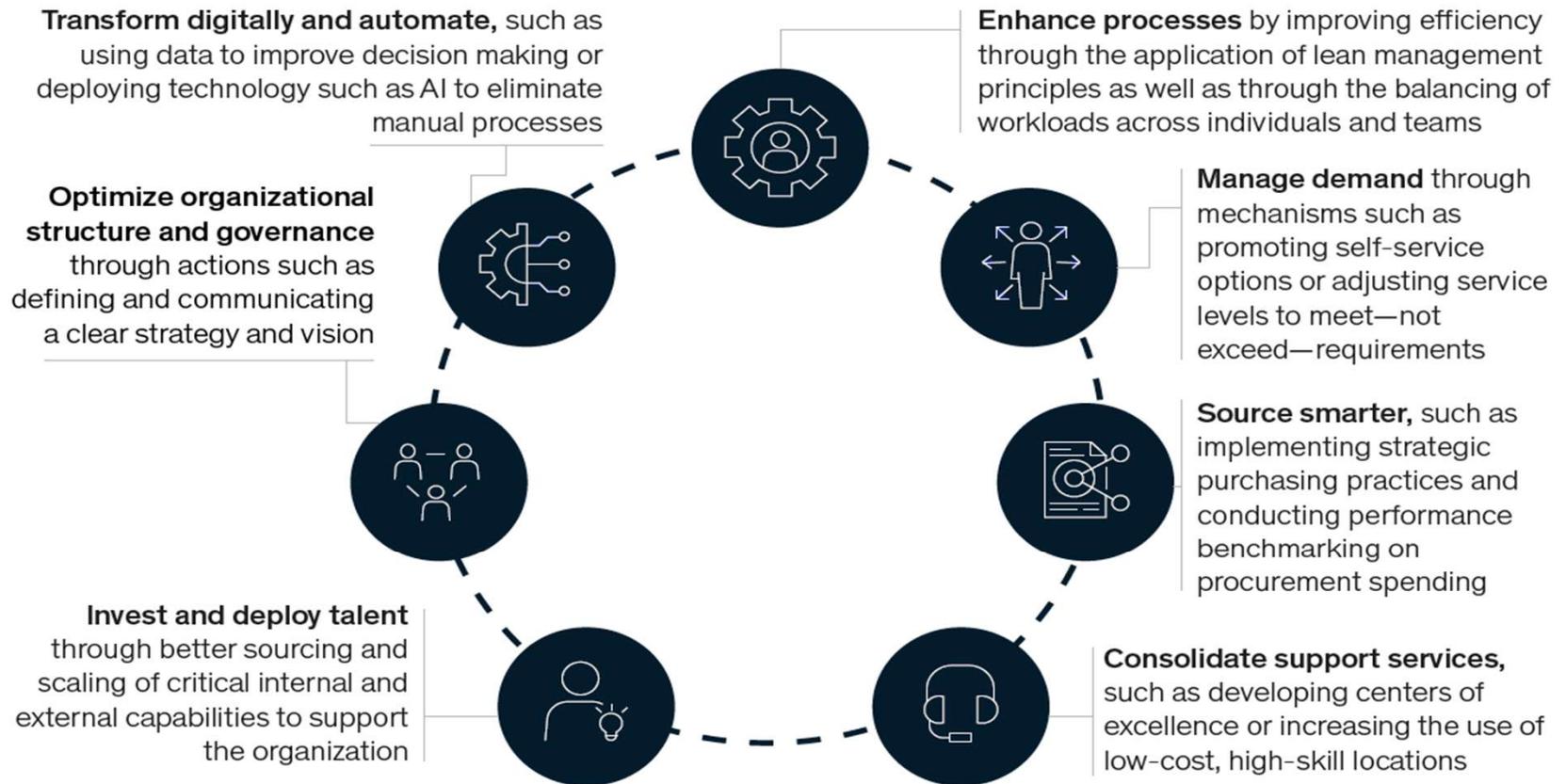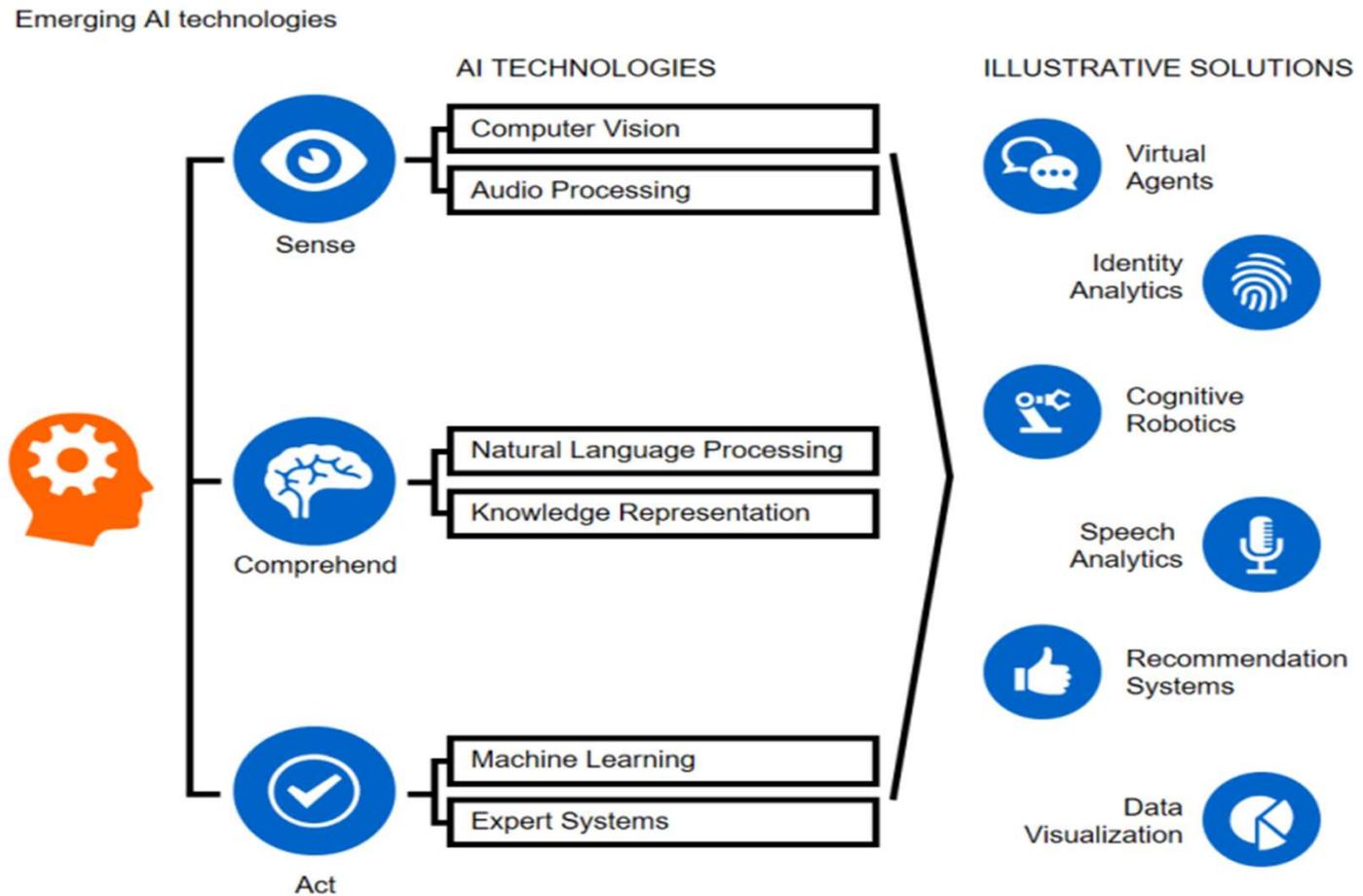# There are seven potential levels to improve government productivity.

Transform digitally and automate, such as using data to improve decision making or deploying technology such as AI to eliminate manual processes

Enhance processes by improving efficiency through the application of lean management principles as well as through the balancing of workloads across individuals and teams

Optimize organizational structure and governance through actions such as defining and communicating a clear strategy and vision

Manage demand through mechanisms such as promoting self-service options or adjusting service levels to meet—not exceed—requirements

Source smarter, such as implementing strategic purchasing practices and conducting performance benchmarking on procurement spending

Invest and deploy talent through better sourcing and scaling of critical internal and external capabilities to support the organization

Consolidate support services, such as developing centers of excellence or increasing the use of low-cost, high-skill locations

psalwan@iimidr.ac.in

Figure 1: *What is Artificial Intelligence*

Emerging AI technologies

AI TECHNOLOGIES

ILLUSTRATIVE SOLUTIONS

Sense
- Computer Vision
- Audio Processing

Comprehend
- Natural Language Processing
- Knowledge Representation

Act
- Machine Learning
- Expert Systems

Virtual Agents

Identity Analytics

Cognitive Robotics

Speech Analytics

Recommendation Systems

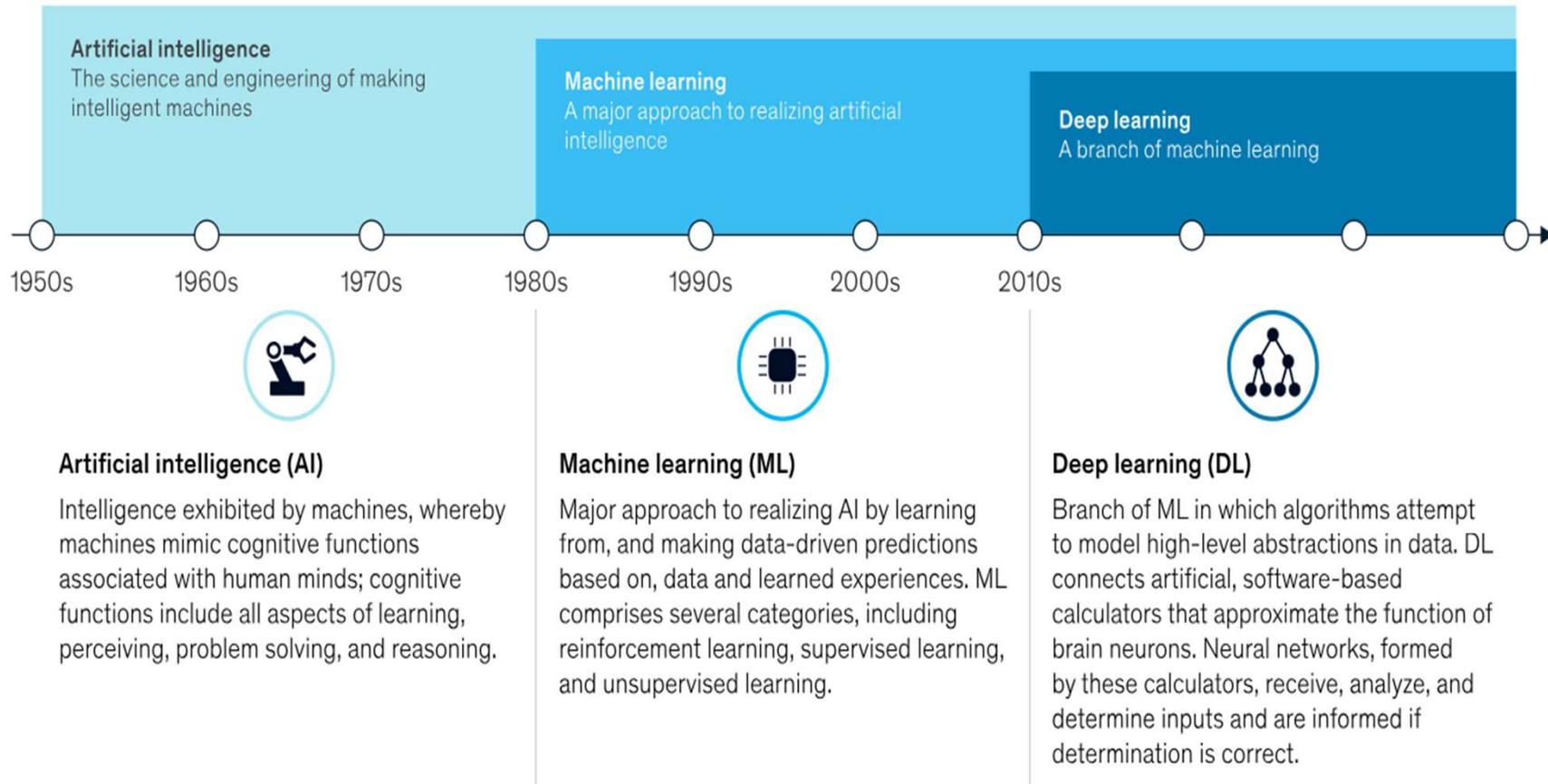Data Visualization

AI, ML and Deep Learning

- Machine Learning, a term coined by Artur Samuel in 1959, meant "the ability to learn without being explicitly programmed." Machine Learning involves the use of algorithms to parse data and learn from it, and making a determination or prediction as a result. Instead of hand coding software libraries with well defined specific instructions for a particular task, the machine gets "trained" using large amounts of data and algorithms, and in turn gains the capability to perform specific tasks.

- "Deep Learning is a technique for implementing Machine Learning. Deep Learning was inspired by the structure and function of the brain, specifically the interconnecting of many neurons. Artificial Neural Networks (ANNs) are algorithms that are based on the biological structure of the brain. In ANNs, there are 'neurons' which have discrete layers and connections to other "neurons". Each layer picks out a specific feature to learn. It's this layering that gives deep learning its name, depth is created by using multiple layers as opposed to a single layer

Artificial Intelligence Vs. Machine Learning

Generalized AI consists of devices or systems that can handle all sorts of tasks on their own. The extension of generalized AI eventually led to the development of Machine learning. As an extension to AI, Machine Learning (ML) analyzes a series of computer algorithms to create a program that automates actions. Without explicitly programming actions, systems can learn and improve the overall experience. It explores large sets of data to find common patterns and formulate analytical models through learning.

AI
Artificial Intelligence

AI consists of devices or systems that can handle all sorts of tasks on their own.

ML
Machine Learning

As an extension to AI, Machine Learning (ML) analyzes a series of computer algorithms to create a program that automates actions. Without explicitly programming actions, systems can learn and improve the overall experience.

DL
Deep Learning

Deep learning is part of the broader ML family and it leverages artificial neural networks.

psalwan@iimidr.ac.in

Artificial intelligence can deliver on industry expectations through machine learning and deep learning.

Artificial intelligence
The science and engineering of making intelligent machines

Machine learning
A major approach to realizing artificial intelligence

Deep learning
A branch of machine learning

1950s   1960s   1970s   1980s   1990s   2000s   2010s

Artificial intelligence (AI)

Intelligence exhibited by machines, whereby machines mimic cognitive functions associated with human minds; cognitive functions include all aspects of learning, perceiving, problem solving, and reasoning.

Machine learning (ML)

Major approach to realizing AI by learning from, and making data-driven predictions based on, data and learned experiences. ML comprises several categories, including reinforcement learning, supervised learning, and unsupervised learning.

Deep learning (DL)

Branch of ML in which algorithms attempt to model high-level abstractions in data. DL connects artificial, software-based calculators that approximate the function of brain neurons. Neural networks, formed by these calculators, receive, analyze, and determine inputs and are informed if determination is correct.

psalwan@iimidr.ac.in

AI use cases can be grouped into 15 domains.

	Domain	Use case examples
1	Personalization insights	Personalize promotions using historical customer purchases and publicly available data
		Use sentiment analysis and trend modeling to predict which products are likely to succeed
2	Pricing, promotions, and assortment	Optimize prices on customer demand, seasonality, real-time inventory level, price elasticity, and other factors
		Incorporate a next-product-to-buy algorithm to increase likelihood of cross-selling or upselling
3	Sales channel optimization	Employ geospatial analytics to identify most profitable locations for new stores and key drivers of store performance

4	Digital marketing	Segment website visitors and present customized pages and offers based on web browsing history and customer-specific data
5	Integrated supply chain optimization	Optimize routes and right-size delivery capacity
		Employ "always on" trade-off analysis between economic order quantity of manufacturing with inventory carrying and transportation costs
6	Robotics and workforce automation	Optimize plant fixed costs through robotization of key processes of production (eg, robots, exoskeletons)
		Use fully AI-based or rules-engine-driven chat app or phone line to resolve "easy" requests or perform initial triage
		Triage patient cases during hospital admission using patient data, audio, and video

7	Network optimization	Ensure efficient and safe operations by designing new facilities through virtual representations (5D models or digital twins) of plants
		Employ image-recognition technologies to understand customer behavior using the branch space
8	Yield, energy, and throughput	Predict failures and allow for planned interventions, reducing downtime and maximizing yield
9	R&D and product innovation	Perform real-time visualization and analytics to predict outcomes of experiments to reduce R&D costs
10	Procurement and spend analytics	Search through procurement contract text using AI to identify clauses of interest (eg, penalties) and recommendations for cost savings
		Optimize supplier portfolio by analyzing raw-material price volatility

11	Customer service optimization	Use bots to provide first-level support and answer most frequently asked questions via phone, email, and chat
12	Fraud and debt analytics	Employ data analytics to detect incorrect payment in social security—ie, optimize claims allocation and steering through legal intervention, best-match routing, and improved fraud detection
13	HR and people analytics	Use machine learning to identify factors influencing employee churn and to pilot intervention strategies Optimize staffing by predicting timing for patient discharges to enhance hospital throughput, and use a dynamic staffing model to optimize staffing levels
14	Strategic and financial analytics	Identify areas for economic development using advanced analytics Design economic revitalization strategies to spur growth and employment—ie, develop analytical and organizational capabilities using emerging digital and AI technologies to ensure governments make evidence-based, informed policy decisions to focus on inclusive economic growth at the national, regional, and city level (eg, COVID-19 response strategy, optimized subsidies)
15	Analytics-driven accounting and IT	Automate document sorting and extraction process through intelligent document recognition—ie, using AI technologies such as natural-language processing, computer vision, deep learning, and machine learning to classify, categorize, and extract relevant information and to validate the extracted data

A case of Insurance

psalwan@iimidr.ac.in

Digital claims customer journey

Julia

58 years old

A rock cracked her car's windshield.

Digital claims prevention

Julia receives a push message—"how to prevent glass damage during winter months."

Digital first notice of loss (FNOL)

She notifies her insurer about the glass damage via a simple, intuitive online notification on her phone.

Automated claims management

While in FNOL, Julia's claim is analyzed and fraud checked in real time and classified as a simple claim.

Digital loss assessment and repair

She selects a repair appointment with a nearby repair shop; Julia's car is picked up at her office for repair.

Automated settlement

Her insurer digitally receives the repair invoice, which is automatically checked and paid.

psalwan@iimidr.ac.in

Digital claims customer journey

< CLICK BLUE ARROWS TO SEE OTHER CUSTOMER EXAMPLES >

Betty
24 years old

A lightning strike in Betty's neighborhood caused her wireless local access network (WLAN) router to fail.

Digital claims prevention

Betty gets a push message warning her about an upcoming lightning storm.

Digital first notice of loss (FNOL)

She submits her claim via a simple, intuitive online notification on her tablet.

Automated claims management

Her claim is analyzed and fraud checked and identified as a direct replacement claim in real time.

Digital loss assessment and repair

She selects the brand and type of WLAN router she has by taking a photo of the name plate; a few days later, a new WLAN router arrives.

Automated settlement

The invoice of the service provider is automatically verified and processed; she does not need to worry about invoices or payments.

psalwan@iimidr.ac.in

Digital claims customer journey

Scott

39 years old

Parking his car, Scott hit his garage wall.

Digital claims prevention

Scott's smartphone reminds him to keep track of speed limits.

Digital first notice of loss (FNOL)

His car automatically notifies his insurer of all relevant details.

Automated claims management

His claim is analyzed and fraud checked and identified as only a minor damage claim.

Digital loss assessment and repair

He uploads photos of the damage for his insurance carrier, allowing automatic claim processing; he is offered a settlement via a push message.

Automated settlement

He accepts and within minutes receives the money in his PayPal account.

psalwan@iimidr.ac.in

Digital claims customer journey

< CLICK BLUE ARROWS TO SEE OTHER CUSTOMER EXAMPLES >

Rachel
29 years old

She discovers scratches on her left car door and immediately has her car repaired at her local OEM dealership.

Digital claims prevention

Rachel regularly receives information about the safety of the neighborhoods where she parks.

Digital first notice of loss (FNOL)

She contacts her insurance agent regarding the scratches; they digitally file the claim with damage photos, a police report, and repair invoice.

Automated claims management

Her claim is analyzed and checked for fraud, and automatically sent into the invoice verification process; a day later, she checks the claim status online and finds it has been approved.

Digital loss assessment and repair

As Rachel's car has been repaired already and the damage was minor, no further action is needed.

Automated settlement

After the repair invoice has been automatically verified it is paid to her bank; she receives the money from her insurer a few days later.

psalwan@iimidr.ac.in

Relevant digital assets

- Push notifications with safety warnings
- IoT–based driving behavior coaching

- Automated FNOL, eg, via telematics
- Intuitive digital FNOL for customer
- Simple, digital FNOL for intermediaries

- Automated intelligent case management
- Automated fraud detection
- Digital real-time progress tracking

- Digital self-service damage assessment
- Digital appraiser appointment selection
- Digital repair shop-appointment selection

- Digital offering of cash settlement
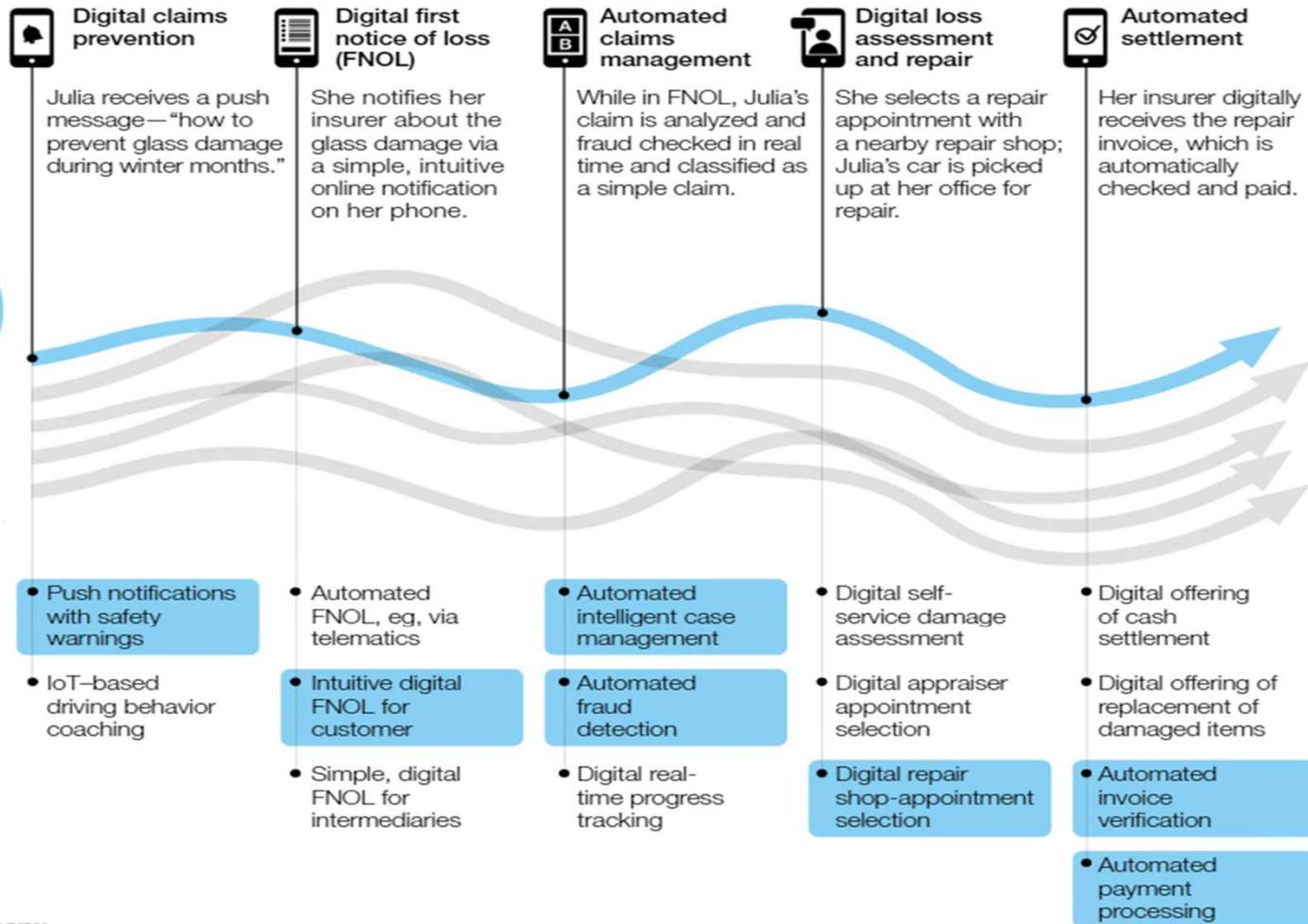- Digital offering of replacement of damaged items
- Automated invoice verification
- Automated payment processing

psalwan@iimidr.ac.in

Julia

58 years old

A rock cracked her car's windshield.

Digital claims prevention

Julia receives a push message—"how to prevent glass damage during winter months."

Digital first notice of loss (FNOL)

She notifies her insurer about the glass damage via a simple, intuitive online notification on her phone.

Automated claims management

While in FNOL, Julia's claim is analyzed and fraud checked in real time and classified as a simple claim.

Digital loss assessment and repair

She selects a repair appointment with a nearby repair shop; Julia's car is picked up at her office for repair.

Automated settlement

Her insurer digitally receives the repair invoice, which is automatically checked and paid.

Relevant digital assets

- Push notifications with safety warnings
- IoT–based driving behavior coaching

- Automated FNOL, eg, via telematics
- Intuitive digital FNOL for customer
- Simple, digital FNOL for intermediaries

- Automated intelligent case management
- Automated fraud detection
- Digital real-time progress tracking

- Digital self-service damage assessment
- Digital appraiser appointment selection
- Digital repair shop-appointment selection

- Digital offering of cash settlement
- Digital offering of replacement of damaged items
- Automated invoice verification
- Automated payment processing

psalwan@iimidr.ac.in

GST Madhya Pradesh

psalwan@iimidr.ac.in

NDTV
https://www.ndtv.com › India News ⋮

Gutkha King, Accused Of Tax Fraud Of ₹ 400 Crore, Sent ...

19 Jun 2020 — Gutkha Businessman Kishore Wadhwani, accused of tax evasion to the tune of ₹ 400 crore, was sent to a five-day custody on Thursday.

NDTV
https://www.ndtv.com › All India ⋮

GST Fraud Of Rs 400 Crore Involving Special Economic ...

25 Sept 2019 — The Directorate General of GST Intelligence has unearthed a scam in which exporters from the National Capital Region (NCR) allegedly availed Goods and Services ...

The Financial Express
https://www.financialexpress.com › policy › economy ⋮

GST evasion caught: Madhya Pradesh cement company ...

12 Aug 2020 — GST evasion caught: Madhya Pradesh cement company exec arrested for crores of rupees of fraud · Substantial quantities of cement and clinker have ...

- Apart the common national portal for GST and other related business intelligence related tools, Commercial Tax Department designed and implemented a series of innovative interventions for enhancing e-governance and service level delivery by further ensuring ease of doing business.

- These administrative and technology- based innovations have been implemented over a period of last 2 years for increasing service quality, data management, business intelligence and collective observance of law amongst stakeholders through new public service outlook.

- Stakeholders involved in the innovative initiatives of Commercial Tax Department are:- (1) Taxpayers of Madhya Pradesh registered under GST (Ease of Tax Compliance & Information Dissemination) (2) Officers of the Commercial Tax Department (Transparency & Good Governance) (3) State Government of Madhya Pradesh (Enhanced compliance resulting in higher GST revenue) (4) Other state government (busting network of bogus taxpayers evading tax leakage) (5) General public (awareness activities)

- Addressing stakeholder's requirement goes a big way in nudging administrative processes towards achieving higher efficiency. The department engaged in a broad- based consultative process with stakeholders such as micro & medium businesses, Chartered Accountants, Tax Practioners, Business & Trade Associations etc. this consultative process not only provided useful insights from taxpayer's perspective but also helped the department in ensuring higher tax compliance.

- The following requirements prompted the innovation:
-

(i) Better understanding of GST law
(ii) Understanding several tax compliances that too by due dates
(iii) Knowledge of latest amendments in law/ rules or new notifications
(iv) Credible source of knowledge dissemination/ awareness in hindi language
(v) Variance in implementation of same Act/Rules or other tax- related interventions by tax administration
(vi) 85% of taxpayers in the state have an annual turnover less than 1.5 cr; tax compliance for them is a challenge

(i) On the administrative side there were loosely defined protocols for handling proceedings under scrutiny, audit, physical verification of business premises, registration, cancellation of registration etc. Absence of well laid down SOPs was resulting in avoidable delays, non- speaking orders and in some cases even harassment of taxpayers.

(ii) Existing GST portal and other associated portals (NIC e- way bill, GST Prime, GAIN etc) although generates reasonable actionable intelligence but realtime monitoring of tax- related proceedings was a challenge as these portals doesn't provide such reports.

(1) Madhya Pradesh e- GST Hindi Assistant (MeGHA) – MeGHA is a AI & Whatsapp Based Chatbot using technology as a mediation in e- service quality. MeGHA addressing several queries related GST Act and other compliances in hindi language. It works through an official number "6262000256" on Whatsapp where any user can type "Hi" and get answers of his queries related to GST.

(2) Welcome Kit is an email based solution where the newly registered taxpayers under GST in the state are sent a booklet "Welcome Kit" to provide information on GST Act, procedures and compliance mechanism. It is helping taxpayers navigate the complexities of GST act.

(3) SMS/Whatsapp based messages is helping in ensuring high rate of compliance for taxpayers. MP has been amongst the top 5 states in return filing in the country.

(4) End to end automated solution for physical verification of suspected taxpayers through a mobile app and online portal has been a big success in plugging revenue leakages. GIS based app captures realtime progress through a powerful and interactive dashboard.

(5) AVTS (Automated Vehicle Tracking System) has been designed to track movement of suspicious vehicles on real-time basis.

(6) Customised online suites for performance appraisal.

(7) Standard Operating Procedures (SOPs) have been laid down to govern timelines and ensuring fairness & transparency in all cases where notices are issued to taxpayers under various sections of the act.

(8) High end data analytics by consuming data from multiple datasets for higher revenue realisation and plugging revenue leakage.

Results

- (1) Madhya Pradesh has consistently being ranked amongst Top 5 return filing state in the country under GST regime. This is the testament of the message of department's initiatives for increased & better compliance.

- (2) More than 3,000 business premises have been verified using physical verification app. Seamless integration of app's data with online portal facilitates the tax administration in generating case profile and other notices under the act in few seconds which earlier used to take 15-20 days for one single case. This exercise has resulted in cancellation of more than 1500 bogus/ non- existent taxpayers and tax recovery

- 3) SOP on granting registration under GST has resulted in faster and more accurate disposal of applications. Address of place of business is being verified online by integrating database of Power Distribution Companies. Average number of days in granting GST registration has been brought down considerably.

- (4) SOP on Scrutiny has resulted in expedited disposal of cases along with realisation of Rs.460 cr as additional revenue.

- (5) High end data analytics by consuming data from multiple sources resulted in increase in taxbase by adding 29,000 new taxpayers and additional revenue of more than 800 cr in last two financial years.

- (6) Data analytics helped in busting one of the largest non- existent taxpayers network across the country involving 4,202 taxpayers and revenue of 4,000 cr.

Application of Machine Learning Algorithm in Managing Deviant Consumer Behaviors and Enhancing Public Service

- Technology applications not only help to enhance public services but also reduce deviant consumer behavior (DCB). (Fullerton & Punj, 1997) defines deviant consumer behavior as any behavior which is "against the law, organizational policy or violates the generally accepted norms of conduct." DCB causes financial and physical losses to the organization and emotional harm to the owners and employees (Daunt & Harris, 2012).

- Organizations, especially public service organizations, use tactics like communicating with customers to comply with the legal and social norms centering their messaging around, "it's wrong, don't do it." The second tactic that industries such as the retail industry use are evoking fear of punishment. In these tactics, organizations have to proactively demonstrate that customers cannot get away with unethical practices and that they may be caught and punished for their deviant behavior.

psalwan@iimidr.ac.in

Application of Machine Learning Algorithm in Managing Deviant Consumer Behaviors and Enhancing Public Service

Consumer-deviant behavior costs global utility firms USD 96 billion yearly, attributable to nontechnical losses (NTLs). NTLs affect the operations of power systems by overloading lines and transformers, resulting in voltage imbalances and, thereby, impacting services. They also impact the electricity price paid by the honest customers. Traditional meters constitute 98% of the total electricity meters in India. This paper argues that while traditional meters have their limitation in checking consumer-deviant behavior, this issue can be resolved with ML-based algorithms. These algorithms can predict suspected cases of theft with reasonable certainty, thereby enabling distribution companies to save money and provide consistent and dependable services to honest customers at reasonable costs. The key learning from this paper is that even if data is noisy, it is possible to create a machine learning model to detect NTL with 80% or higher accuracy.

psalwan@iimidr.ac.in

We have used the trained ML model in the city areas to help identify the theft cases with encouraging results. Despite the limitation in the granularity of data from traditional meters, we could achieve about 20 percent success in identifying theft cases from the limited number of cases identified by the model. This is even better than the rule-based analysis deployed to identify theft in about 0.2 million smart meters in the city.

- Dubey, Shantanu; Salwan, Prashant; Agarwal, Nitin Kumar. *JOURNAL OF GLOBAL INFORMATION MANAGEMENT*; 2022;

psalwan@iimidr.ac.in

- Thanks ,for further details please contact me at

- Prof Prashant Salwan
- Email:psalwan@iimidr.ac.in
- Mobile : 9584988874
- Tel 0731 2439641