

PPB

Crash course

Module- C

Lec- 4

Digital Payment Systems – NPCI

National Payment Corporation of India





Payindia

Your India.
Your Payments.

India's Payment Systems Revolution

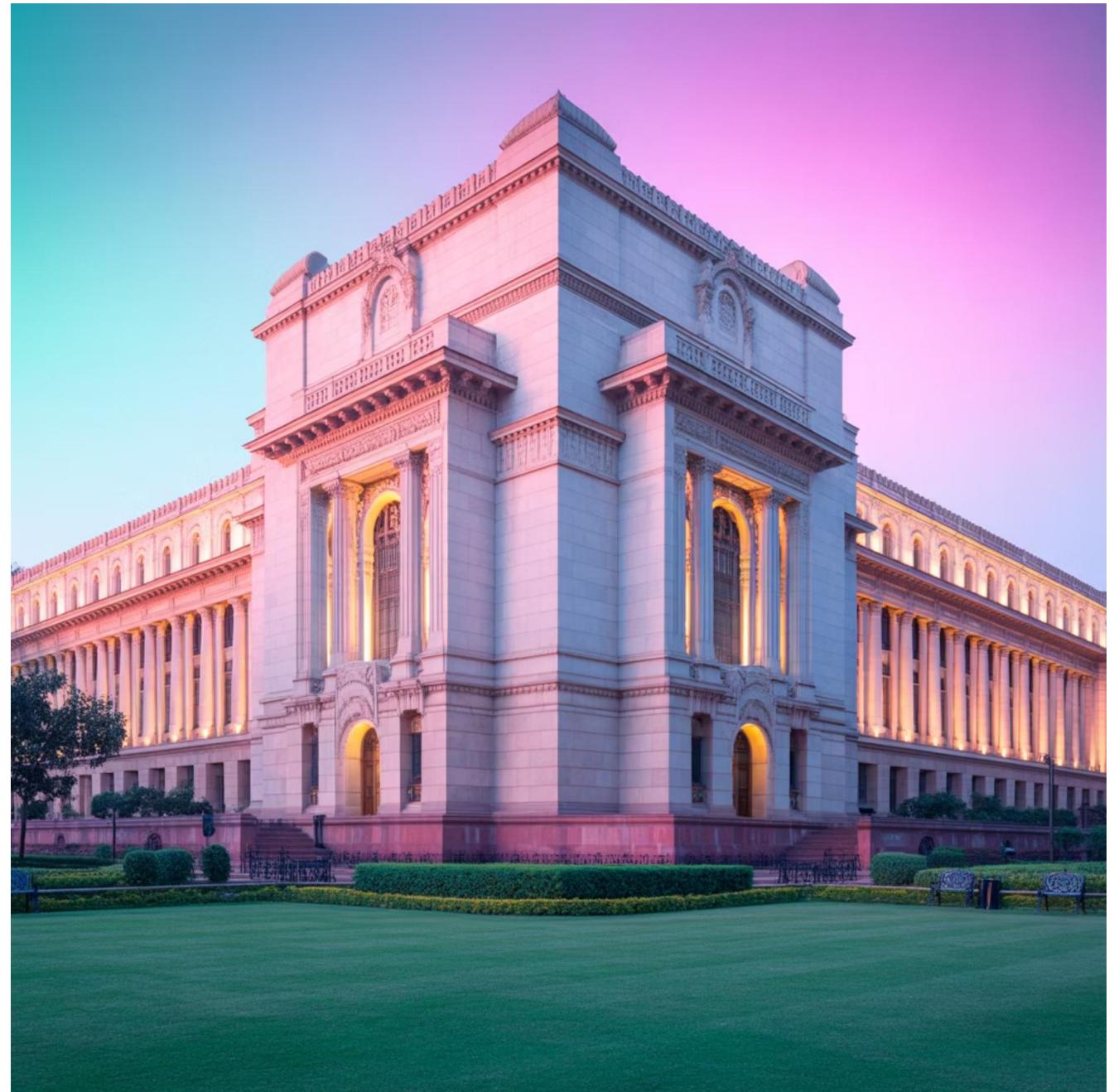
A comprehensive journey through India's transformation into a digital payment powerhouse, exploring the systems that enable seamless financial transactions for over 1.4 billion citizens.

The Foundation: RBI's Vision

Historical Leadership

The Reserve Bank of India pioneered India's payment infrastructure, establishing critical systems like ECS, NEFT, and RTGS that formed the backbone of modern digital payments.

In 2005, the Board for Payment and Settlement Systems was created to consolidate fragmented payment systems into a unified national framework.



~~NPCI~~

12 Core Electronic Clearing Systems

ECS

Electronic Clearing Service

RTGS

Real-Time Gross Settlement

IMPS

Immediate Payment Service

NEFT

National Electronic Fund Transfer

CTS

Cheque Truncation System

UPI

Unified Payments Interface

These systemically important financial market infrastructures (SIFMIs) include NACH, Credit/Debit Cards, PPIs, and specialized clearing systems for government securities and forex.



NPCI

The Game Changer

Founded in December 2008, the National Payments Corporation of India emerged as a not-for-profit organization with a revolutionary mission: provide "anytime, anywhere payment services that are simple, easy to use, safe, secure, fast and cost-effective."

NPCI's Founding Vision

01

Consolidation

Unite multiple systems with varying service levels into a nationwide uniform standard

02

Standardization

Create consistent business processes for all retail payment systems

03

Innovation

Transform India into a 'less-cash' society through cutting-edge payment solutions

Backed by ten core promoter banks including SBI, PNB, ICICI, and HDFC, NPCI operates for the benefit of all member banks and citizens.

NPCI's Product Portfolio



National Financial Switch

*National
Financial
Switch (NFS)*

India's largest shared ATM network connecting over
2.55 lakh ATMs nationwide



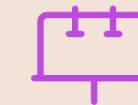
UPI & BHIM

Revolutionary real-time payment systems enabling
instant bank-to-bank transfers



RuPay Cards

India's domestic card scheme offering lower costs
and customized solutions



BBPS & Digital Services

Comprehensive bill payment ecosystem and
mobility solutions

National Financial Switch: ATM Revolution

Massive Scale

Launched in 2004 and managed by NPCI since 2009, NFS connects over 1,203 members to 2.55+ lakh ATMs across India, creating the world's most extensive shared ATM network.

Core Services

- Cash withdrawal and balance inquiry
- PIN changes and mini statements
- Interoperable cash deposits
- Card-to-card fund transfers



Advanced value-added services include mobile banking registration, Aadhaar seeding, and statement requests across all participating banks.



NACH: Automated Clearing Powerhouse

: ECS

National Automated Clearing House revolutionizes bulk transactions for banks, corporates, and government agencies. This web-based solution handles high-volume, repetitive transactions like salary distributions, subsidies, and utility payments.

- 1 Government Benefits
Direct benefit transfers and subsidy distributions
- 2 Corporate Payments
Salary, dividend, and pension disbursements
- 3 Utility Collections
Loan EMIs, insurance premiums, and bill payments

IMPS: Instant Payment Revolution

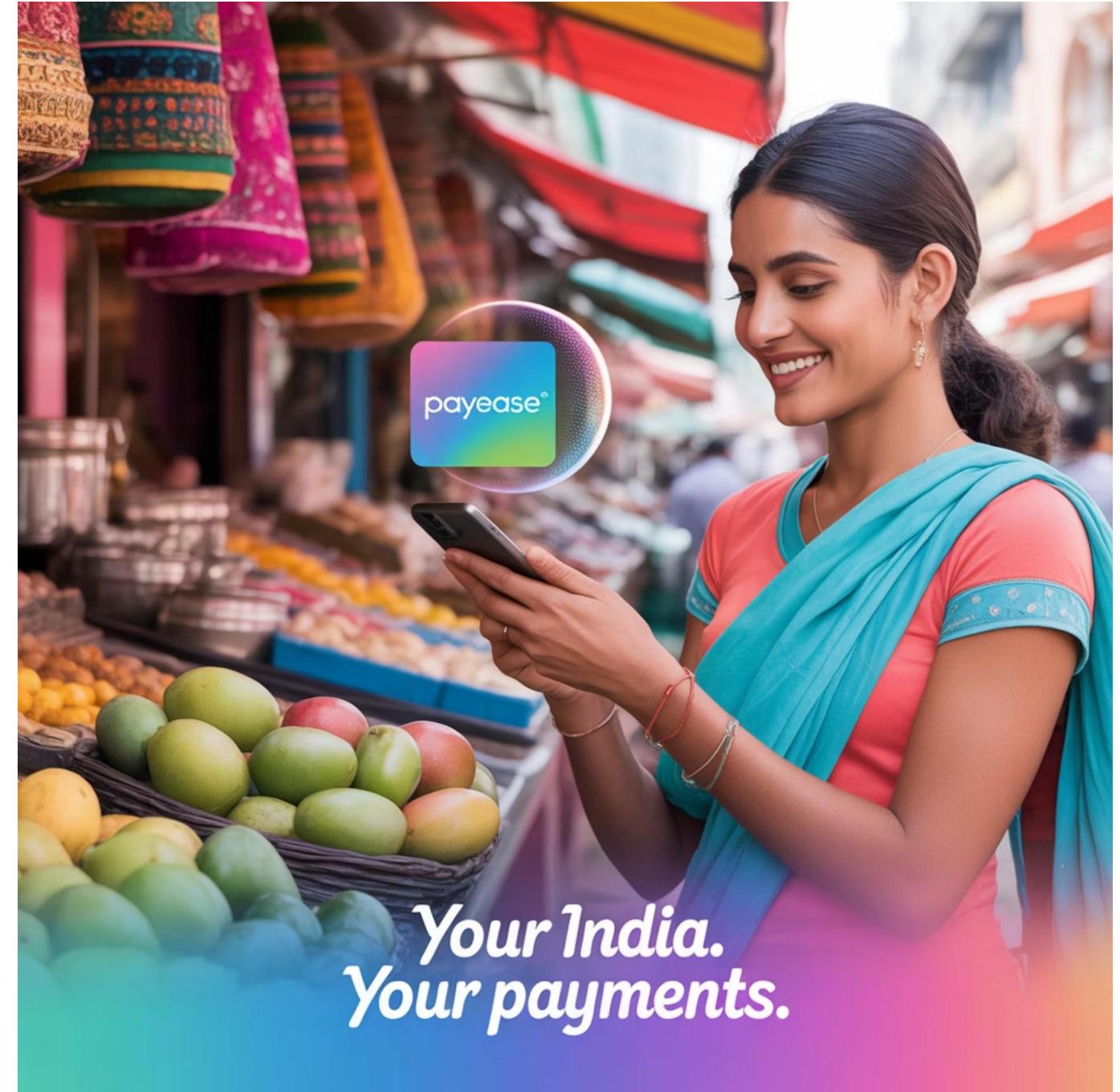
24x7 Availability

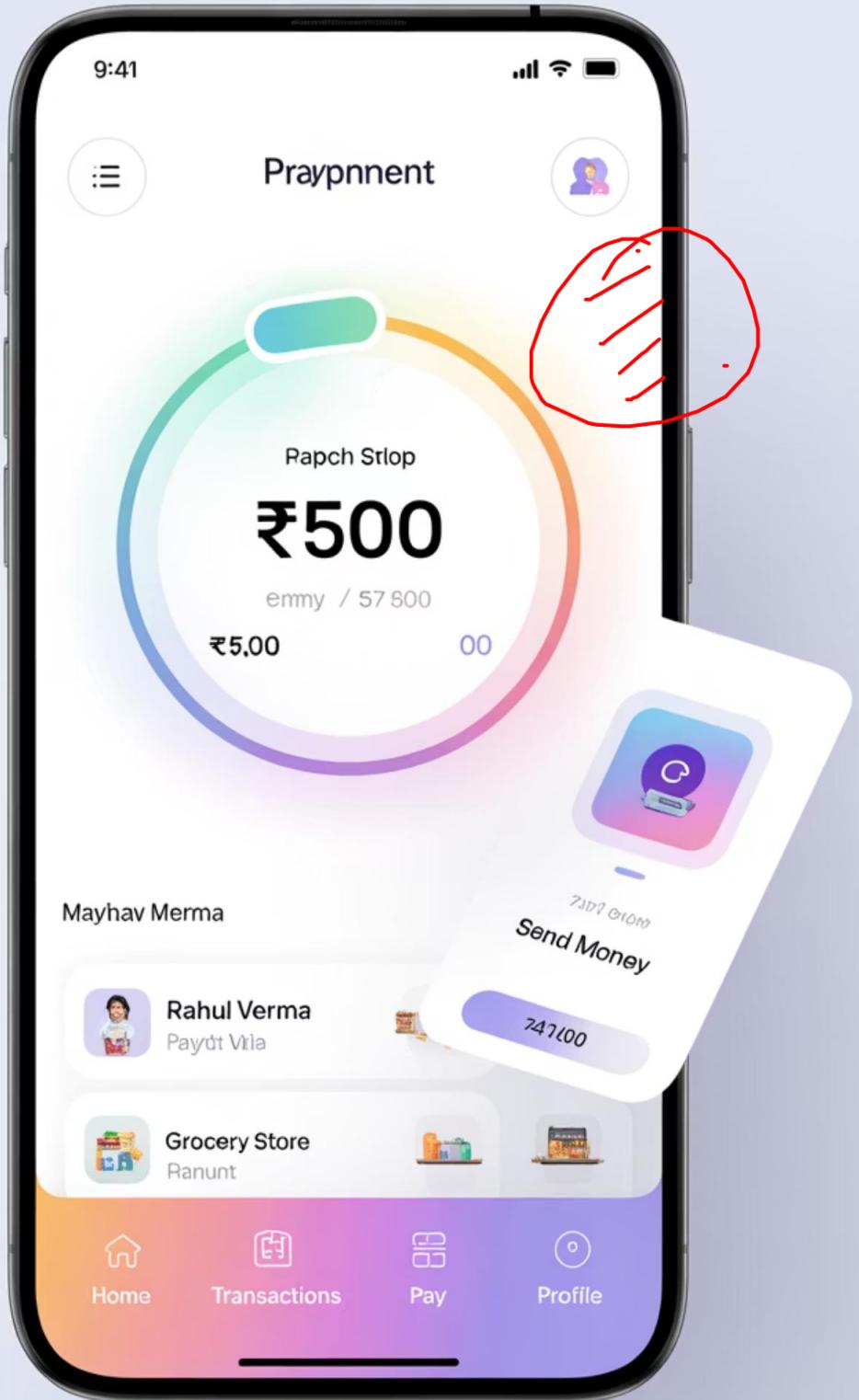
Immediate Payment Service delivers instant, inter-bank fund transfers available round-the-clock, including holidays. Built on NFS infrastructure, IMPS supports multiple channels: mobile, internet, ATM, SMS, and USSD.

Key Features

- Real-time fund transfers
- Multi-channel accessibility
- Mobile Money Identifier (MMID) system
- Two-factor authentication

Manual Workload





UPI

The Game-Changing Innovation

Unified Payments Interface transforms multiple bank accounts into a single mobile application, merging banking features, fund routing, and merchant payments seamlessly. Available 24x7x365 with single-click, two-factor authentication.

UPI: Technical Architecture



10/10

UPI 2.0: Advanced Features

One-Time Mandate

Pre-authorize transactions with fund blocking capability for delayed debits, enabling secure "pay later" scenarios with digital signature validation.

Qoool

Overdraft Integration

Link OD accounts showing both available and actual balances, expanding payment options for eligible customers.

Yay

Invoice Attachments

Review invoices securely before payment authorization through verified merchant attachment links.

Signed QR Security

Enhanced security with signed QR codes and intents, reducing tampering risks and unauthorized entities.

BHIM: Empowering Digital India



Universal Access

Bharat Interface for Money democratizes UPI payments through a government app supporting 20 regional languages and comprehensive payment features.



Key Capabilities

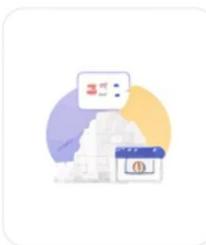
- Send/request money via VPA or QR codes
- Transaction limits: ₹1,00,000 per transaction/day
- Split bills and payment reminders
- IPO applications and UPI Autopay

Bill payment poyoudur in India.

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Search



Railbhavas Payment

20.20.000
D2. 33. 2019, 101, De
20.3.100

2025 1000 41 + 42.1000

Paveivine Payment

20.35.000
D2. 33. 2019, 101, De
20.3.100

5000 1000 41 + 42.1000



Electricity

20.200 465.000



Water

20.205 465.000



Plaferryue

20.200 465.225



Mobile

20.204 465.225



Internet

20.300 465.225



DTH

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BBPS: One-Stop Bill Payment

Bharat Bill Payment System creates an interoperable ecosystem for "Anytime Anywhere" bill payments with certainty, reliability, and safety. Multiple payment modes with instant SMS confirmations.

BBPCU

NPCI as central clearing unit setting standards and procedures

BBPOU

Banks and non-banks authorized as operating units

Agents

Customer touchpoints across retail outlets and branches

RuPay: India's Card Revolution

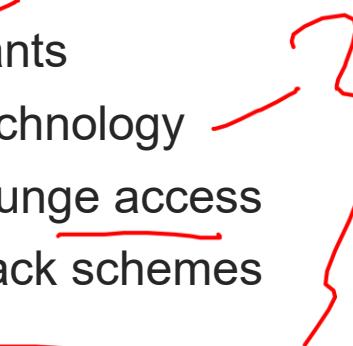
Domestic Advantage

"Rupee + Payment" = RuPay represents India's sovereign card scheme, reducing transaction costs through domestic processing while protecting Indian consumer data within national borders.

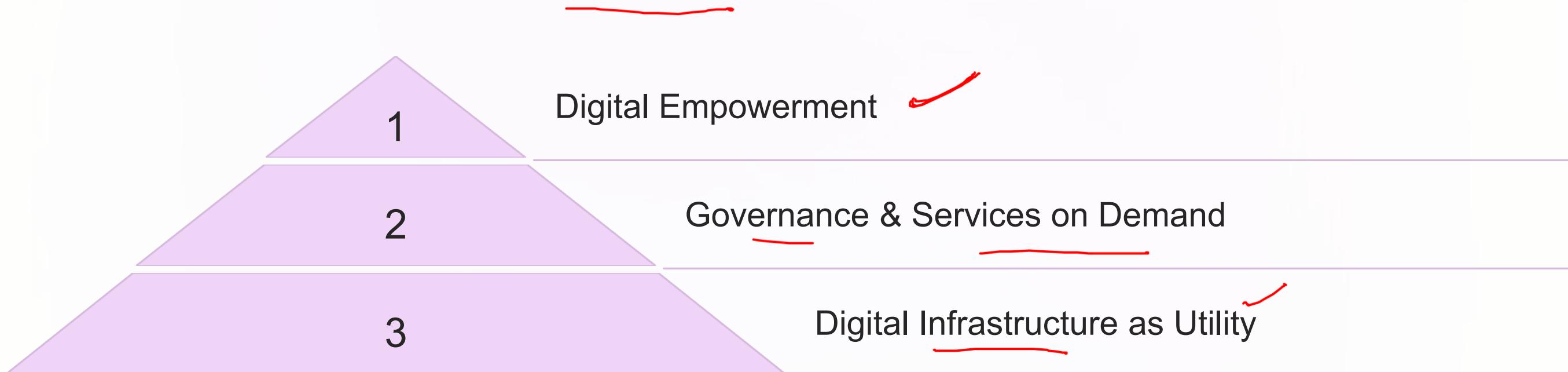
Product Range

- Classic, Platinum & Select variants
- Contactless and tokenization technology
- International acceptance and lounge access
- Insurance coverage and cashback schemes

0



Digital India: Government's Vision



Digital India programme transforms India into a digitally empowered society and knowledge economy by 2030, ensuring electronic access to government services for all citizens through robust internet infrastructure and digital literacy.



Key Digital Infrastructure

Bharat Broadband Network

National Optical Fiber Network connecting 2.5 lakh Gram Panchayats across 641 districts with high-speed internet infrastructure.

DigiLocker Platform

Secure cloud-based digital wallet for storing and sharing verified documents, eliminating physical paperwork through Aadhaar-linked storage.

*Government
market*

GeM Portal

One-stop government procurement platform ensuring transparency, with average buyer savings of 9.75% through cashless, contactless transactions.

Security & Cloud Infrastructure

CERT-IN Protection

Indian Computer Emergency Response Team serves as the nodal agency for cybersecurity, providing incident prevention, response services, and security quality management under IT Amendment Act 2008.

MeghRaj Cloud Initiative

Government's "GI Cloud" programme optimizes ICT spending while accelerating e-service delivery through distributed cloud environments with standardized protocols.



Multiple cloud services including PaaS, IaaS, SaaS, and specialized security services



40.

Payments Vision 2025: Future Roadmap

3x

Digital Transaction
Growth

Target increase in digital
payment volume

50%+

UPI Growth Rate
Average annualized
expansion target

8%

Payment-to-GDP Ratio
Transaction turnover target

0.25%

E⁴

Cheque Usage Limit

Maximum share of total
retail payments

RBI's vision: "E-Payments for Everyone, Everywhere, Everytime" through Integrity, Inclusion, Innovation, Institutionalisation, and Internationalisation.



India's Digital Payment Success Story

From fragmented systems to unified digital excellence, India has created the world's most comprehensive payment ecosystem. NPCI's innovations—UPI, BHIM, RuPay, and BBPS—serve 1.4+ billion citizens through secure, instant, and inclusive financial services.

"Today's India demonstrates how technology improves access to education, healthcare, and agriculture while promoting transparency and accountability through faceless, cashless, and paperless governance."

The foundation for a robust, secure Digital India is now reality, transforming how a nation conducts commerce and connects communities.

Impact of Technology Adoption and Trends in Banking Technology

Learning Objectives

1 Technology Trends

Understand current and emerging information technology trends transforming the banking landscape globally.

3 Electronic Data Systems

Grasp concepts of electronic data interchange and their applications in modern banking operations.

2 Digital Delivery Systems

Learn about innovative banking product and service delivery mechanisms enabled by technology.

4 Global Impact Analysis

Examine technology's transformative effects on banking systems worldwide and data privacy implications.

The Digital Banking Revolution

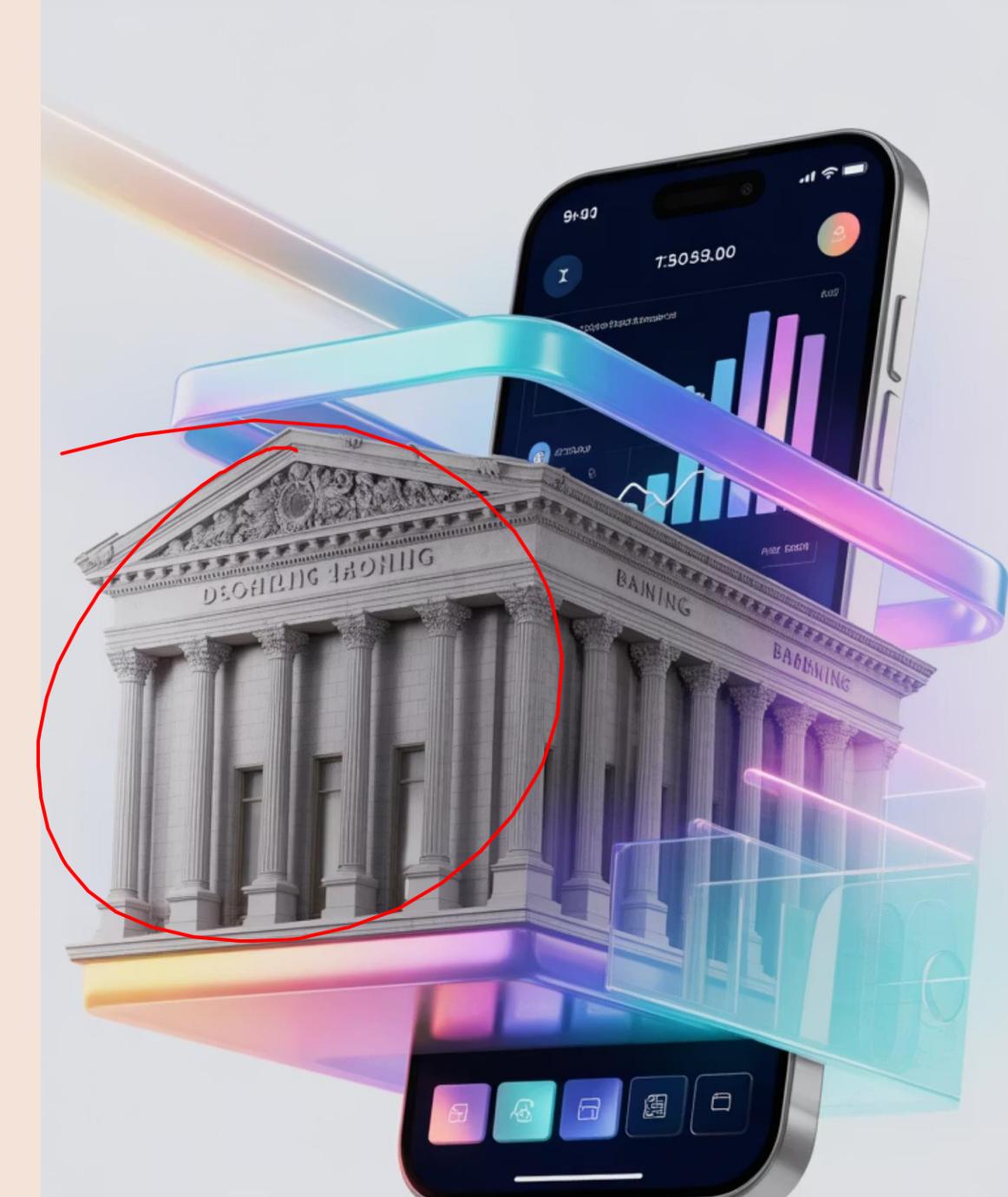
Traditional Banking

Conventional brick-and-mortar banks relied on physical branches for customer service delivery and face-to-face interactions.

Banks are enthusiastically absorbing latest technological innovations to devise new products and enhanced service delivery mechanisms.

Virtual Banking Era

Technology has transformed banking into virtual, accessible services from customers' perspective, enabling 24/7 connectivity.



Banking, Reimagined



Technology Driving Banking Innovation



Indian banks have aggressively invested in digital technologies, promoting innovative, robust, and secure solutions optimized for tech-savvy customers.

Digitalization Benefits

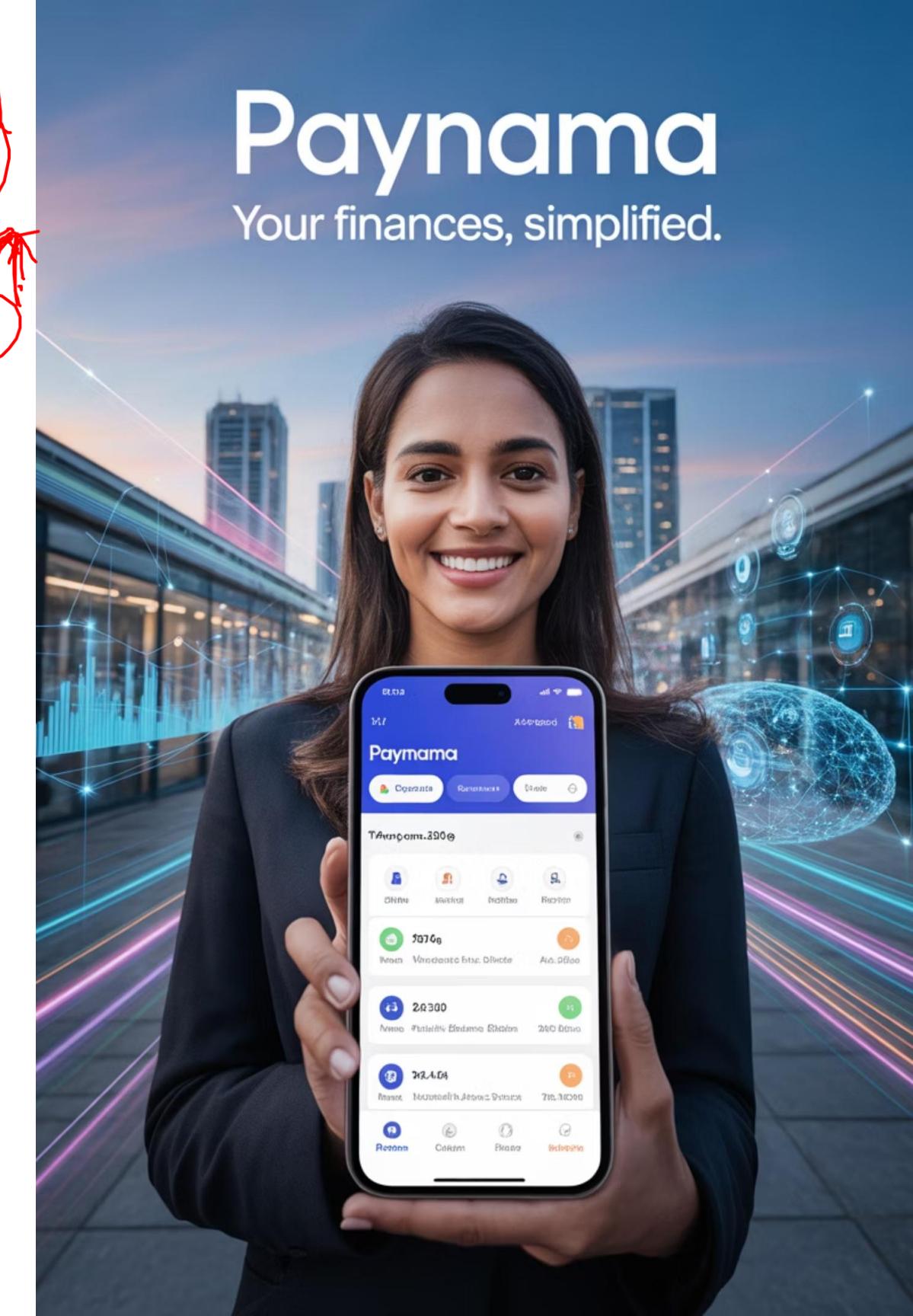
Branch-less banking through Internet banking, digital wallets, mobile banking, and chatbots has revolutionized customer access.

Cost Reduction

Cheaper broadband internet and reduced bandwidth costs enable banks to roll out extensive mobile and internet banking services.

Smart Analytics

CRM tools, data analytics, and AI target customers based on lifestyles and aspirations, enabling ultimate personalization.

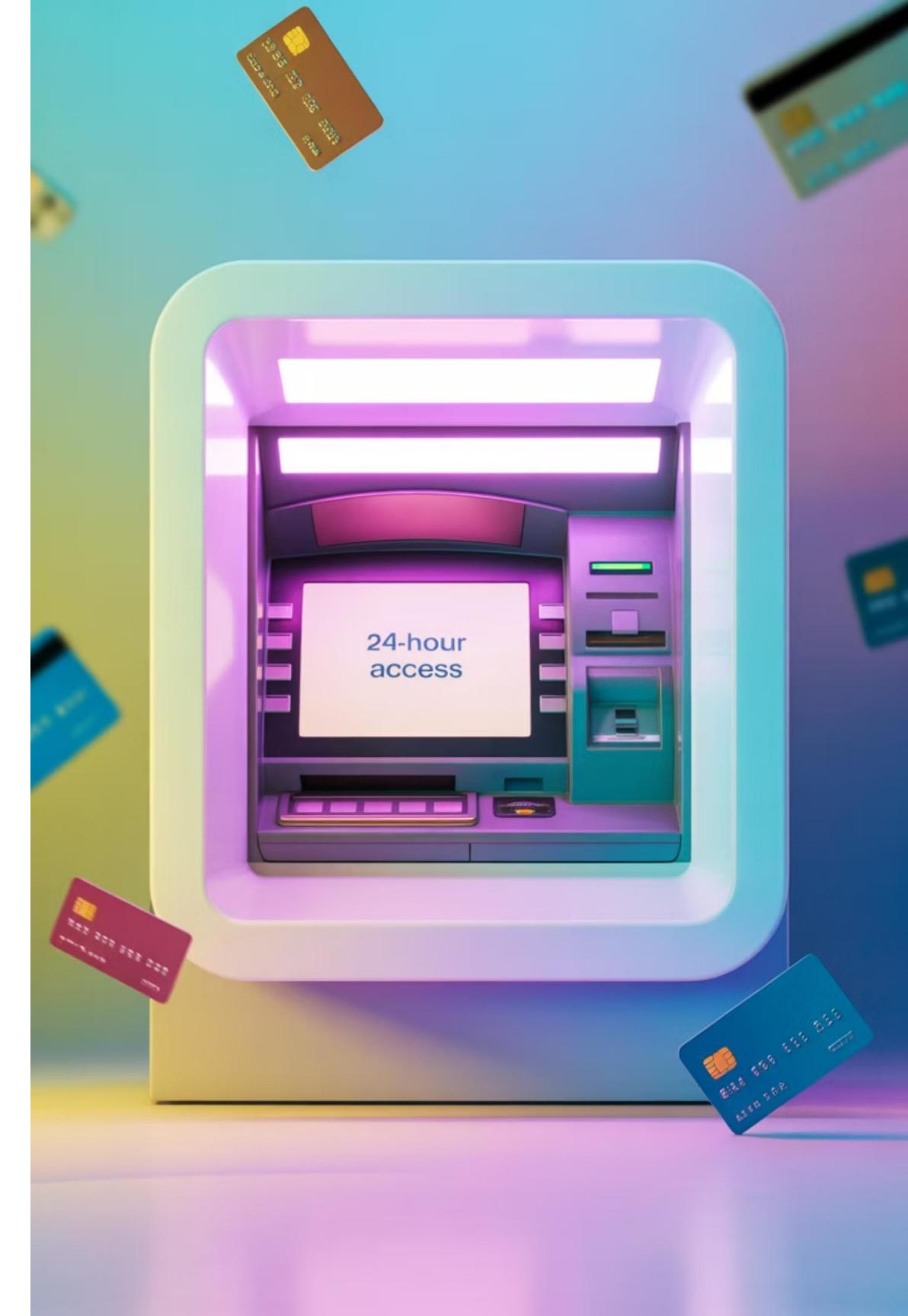


Anytime, Anywhere Banking

24/7 Access

✓ Technology has transformed banking from demographic-based clusters to lifestyle-driven, personalized services. Banks now offer card access, telephone banking, ATMs, credit cards, debit cards, and POS access worldwide.

✓ The current trend toward home banking fully exploits technological communications innovations, leading toward a cashless society through cyberbanking.



Core Banking Applications



Fund Transfers

Networks facilitate fund transfer messages, inter-bank settlements, and foreign exchange payment netting with unprecedented speed.



Communication Systems

Email services and inter-branch reconciliation systems enable instant communication and data synchronization across banking networks.



Information Management

Customer databases, MIS systems, and decision support systems provide comprehensive organizational and customer insights.

ELECTRONIC DATA INTERCHANGE



Electronic Data Interchange (EDI)

EDI represents inter-organizational exchange of business documentation processed by computers with minimal manual intervention. Banks extensively use EDI through SWIFT messages.

01

Electronic Funds Transfer

Credit and debit clearing systems facilitate electronic fund transfers using standardized EDI protocols.

02

EDIFACT Standards

Universal standards and guidelines for EDI communication covering document formats, information sequences, and transmission protocols.

03

Credit Card Networks

Comprehensive EFT systems utilizing EDI standards for seamless transaction processing and settlement.

Digital Communication Revolution

Email Systems

Nearly instantaneous communication between users regardless of system location. Banks use email for inter-office correspondence and important data file transmission, dramatically reducing physical delivery times.

Corporate Websites

Internet platforms for marketing products and services, offering information dissemination, financial advice, account services, and online application processing for banking products.



MIS

Management Information Systems

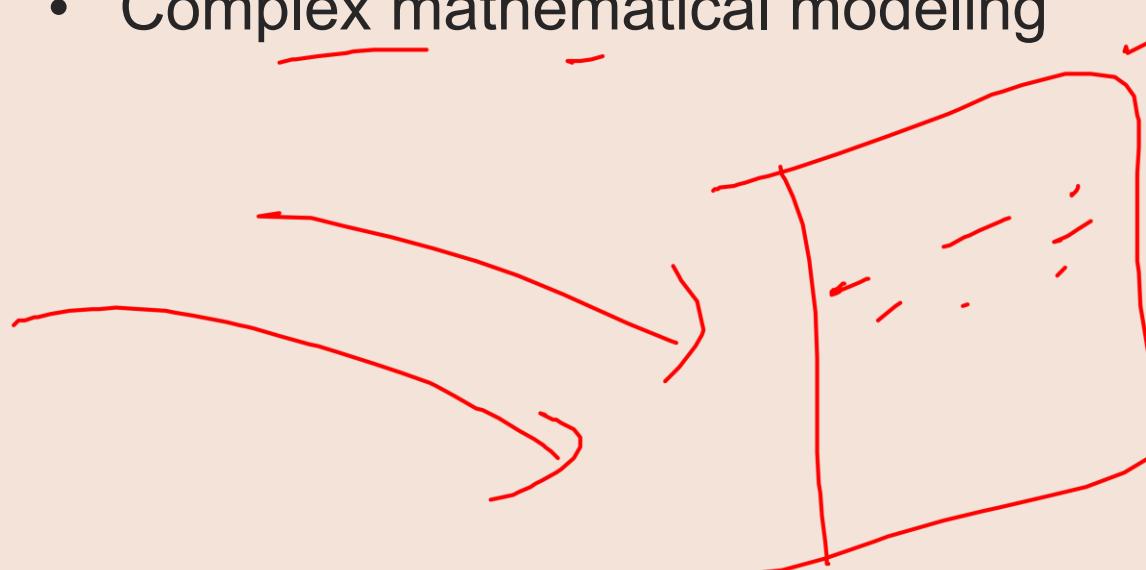
MIS emphasizes data availability and transformation into meaningful information for managerial decision-making. Computer-based systems offer consistent data, reduced redundancy, and enhanced flexibility.

- 1 Data Collection
Automated gathering of customer demographics, spending habits, and savings patterns.
- 2 Analysis & Processing
Fast, accurate processing for operational control and management insights.
- 3 Decision Support
Scientific decision-making in marketing, product development, and strategic planning.

Decision Support Systems (DSS)

Key Features

- Interactive computer-based systems
- Simulation capabilities under various conditions
- Query languages and statistical analyzers
- Complex mathematical modeling





Global Banking Technology Trends

- 1 Infrastructure Expansion
More ATM installations and non-branch collection points like supermarkets and video kiosks.
- 2 Digital Payment Systems
Mobile banking, debit/credit cards, smart cards, and comprehensive internet banking solutions.
- 3 Fee-Based Services
Insurance sales, financial planning, mutual funds, and trusteeship services generating new revenue streams.
- 4 Advanced Technologies
RTGS, cheque truncation, automated clearing systems, and customized corporate solutions.

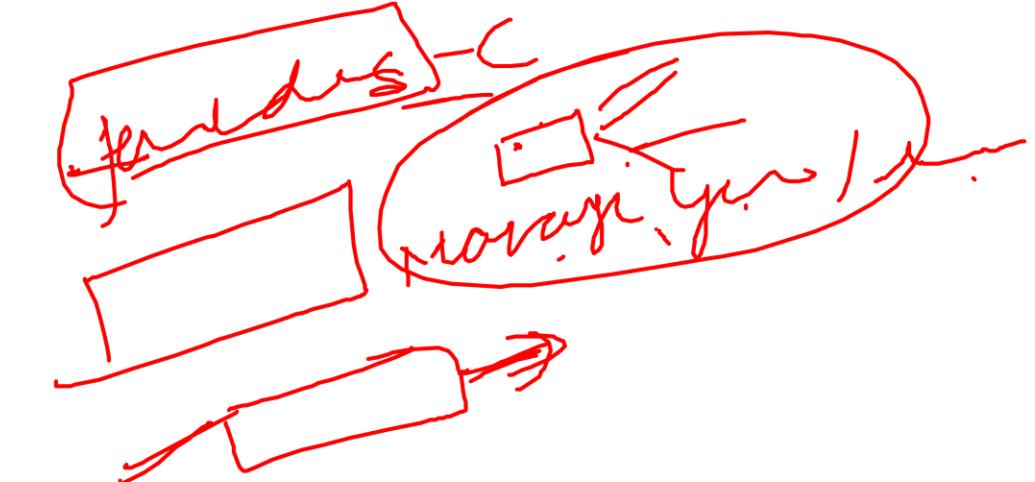
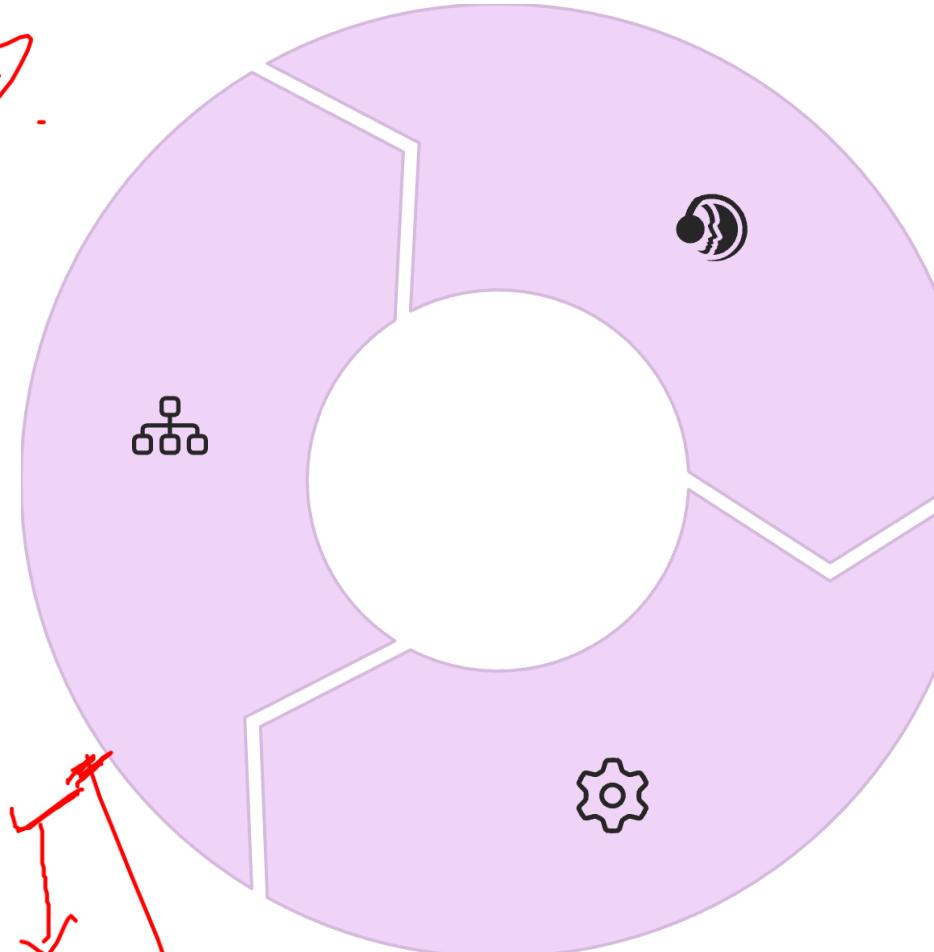
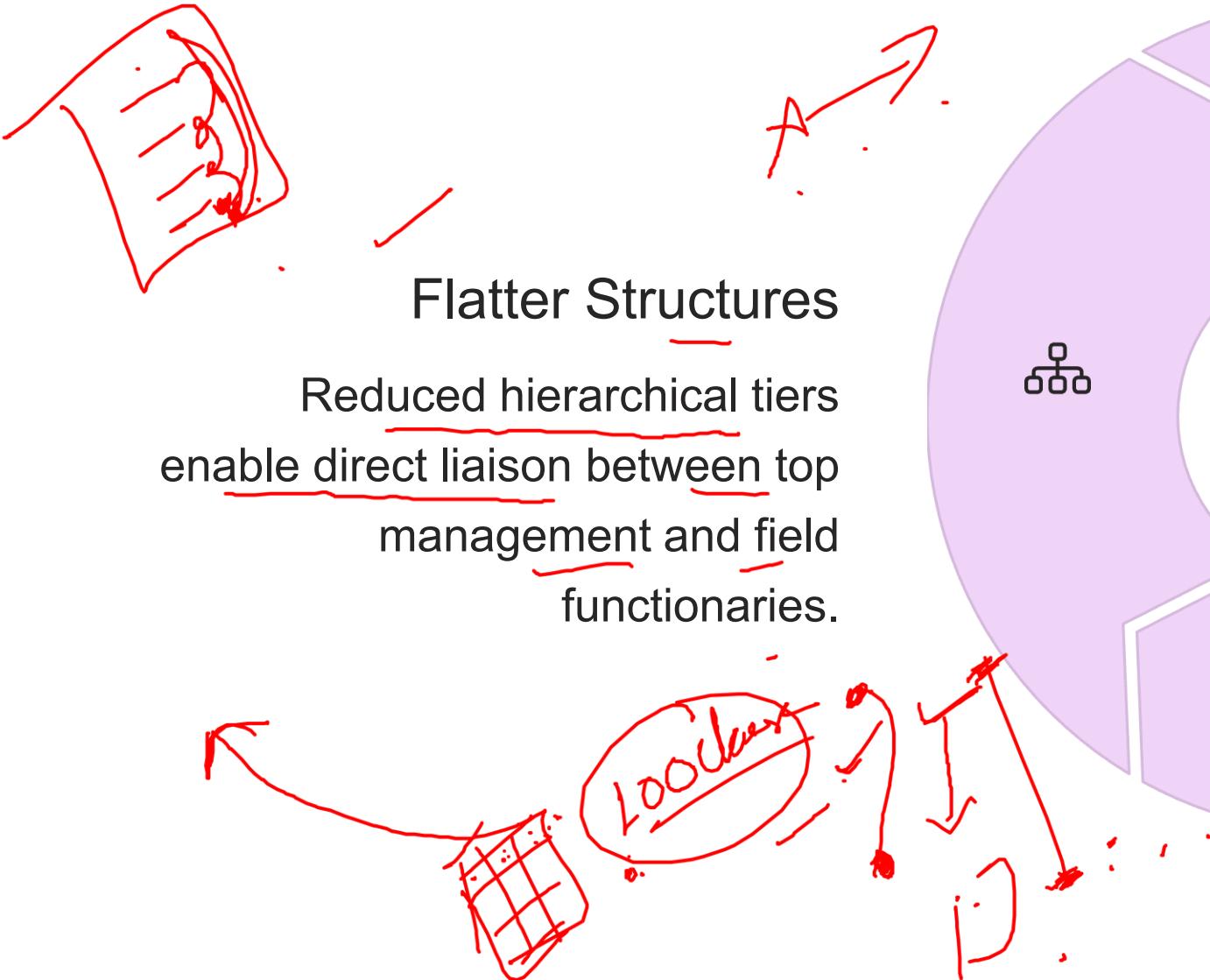


Emerging Payment Technologies

Next Generation

- ✓ Technologies range from sophisticated EMV and NFC cards to mobile services, wearables, and social media networks.
 - ✓ Cryptocurrencies and alternative e-cash forms are emerging, eliminating traditional paper-oriented payment systems.
 - ✓ These advances will intensely impact payment systems, giving new dimensions to banking products, services, and delivery mechanisms globally.
- near field communication*

Organizational Impact of IT



Process Changes

Operating procedures adapt to IT needs while maintaining privacy and security standards.

Technology's Impact on Service Quality



Level Playing Field

Small banks compete effectively with established institutions using state-of-the-art digital technologies and pricing strategies.



Service Commoditization

Technology forces banks to develop online delivery strategies for broader customer relationships and loyalty retention.



Depersonalization Risk

Reduced personal interaction may negatively impact relationship banking despite technological advances.



EASE 5.0 Initiative

Program Focus

Enhanced Access and Service Excellence program drives data analytics, automation, and digitization in Public Sector Banks to improve profitability and customer service.



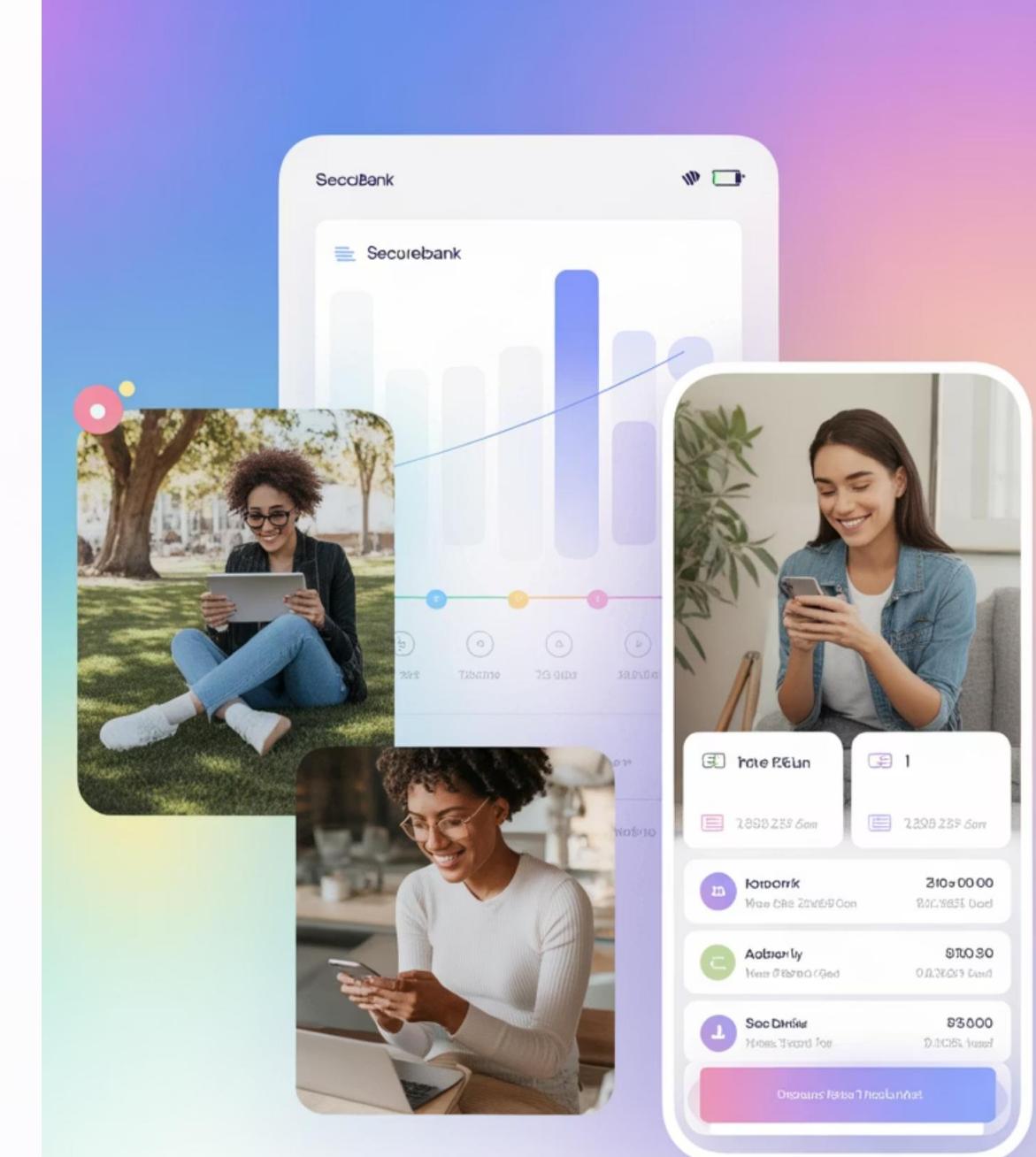
Changing Customer Expectations

24x7 Demands



Customers demand fast, accurate, reliable services with high standards. They no longer want physical location constraints, preferring banking facilities at home/business rather than branches.

Ever-evolving disruptive technologies with cheaper telecommunications enable innovative, real-time, 24x7 customer-centric banking services online.



Your Future. Deivinmt.
Simplified. ITT[®]

One future. Simplified.

securebank

Human Resources Transformation



Enhanced Productivity

Improved efficiency through better employee placement and specialized IT management personnel demand.



Skill-Based Recruitment

Banks recruit specialized IT personnel while managing high turnover rates of computer-skilled professionals.



Continuous Training

Extensive training programs for data scientists, analysts, network administrators, and cybersecurity professionals.

Secureflow

Q9

E

10
20

Data Privacy and Security

Customer concerns about financial transaction data misuse and inadequate privacy maintenance create suspicion toward computerized systems. Banks implement data encryption, leakage prevention, and database monitoring.

Access Authority

Individuals should discover automated personal data system existence and infer whether their information exists in systems.

Data Accuracy

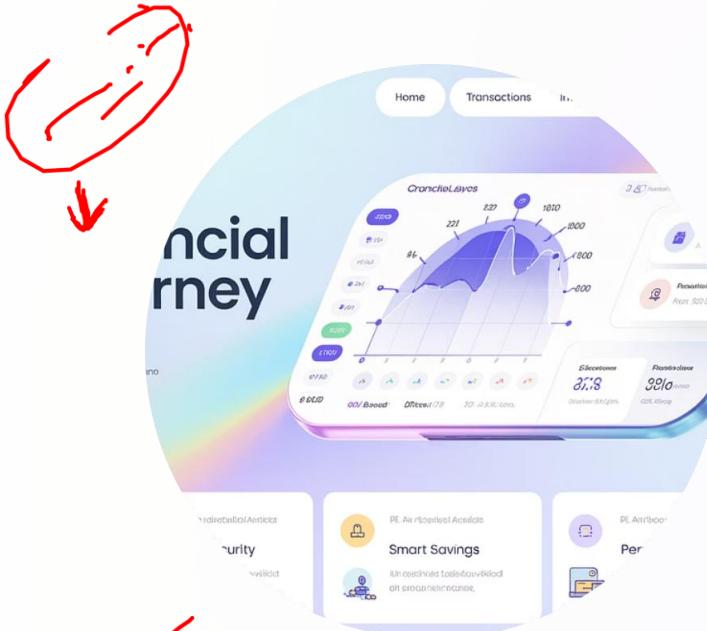
Information must be obtained fairly for specific lawful purposes, kept accurate, up-to-date, and no longer than necessary.

Purpose Limitation

Data must be used only for specific stated purposes with disclosure limited to those same purposes.

Emerging Technologies in Banking

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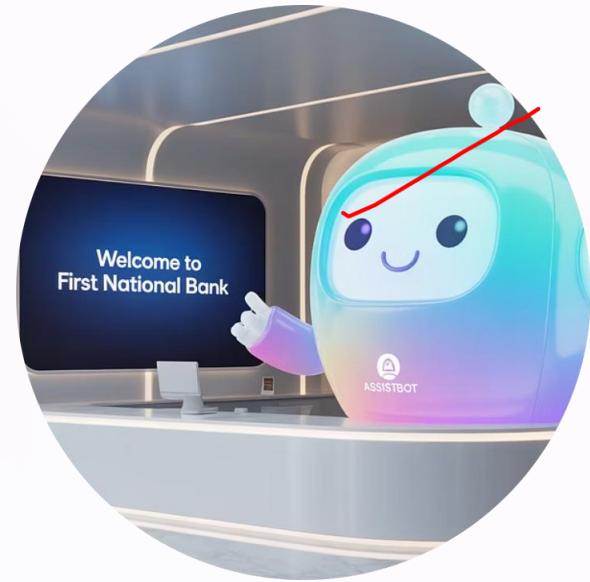
Artificial Intelligence

AI enables personalized customer services, predictive analysis, voice recognition, risk management, and fraud prevention through machine learning and natural language processing.



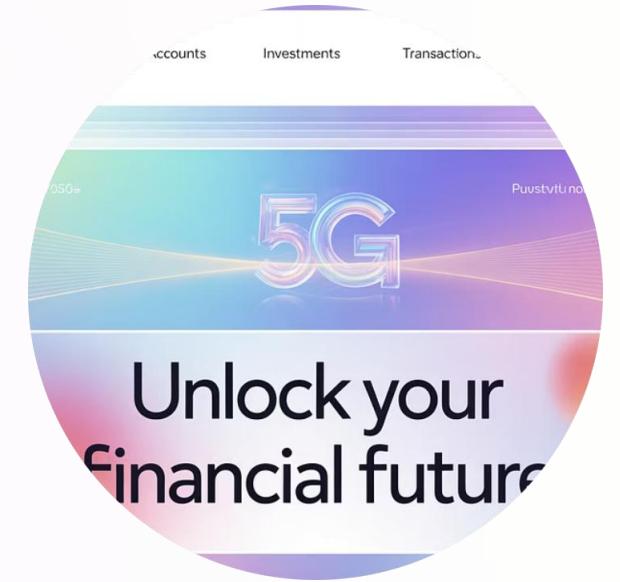
Robotic Process Automation

RPA automates routine business tasks like transaction processing and customer service, allowing employees to focus on complex operations requiring human interaction.



Chatbots

AI-driven conversational agents simulate human interaction for customer service, becoming increasingly sophisticated and responsive despite speech parsing limitations.



5G Networks

Fifth-generation cellular technology offers low latency, high data capacity, and reliability, enabling new mobile banking services and real-time fraud detection.



Digital Lending and Future Outlook

Digital lending platforms utilizing machine learning reach \$20 billion market by 2026. RBI guidelines ensure customer protection through standardized processes, transparent pricing, and grievance redressal mechanisms.

20B

Global Market Size

Digital lending platforms market value by 2026

19.6%

Annual Growth Rate

Compound annual growth over seven years

24x7

Service Availability

Continuous banking operations through technology

The banking industry continues evolving with blockchain, cryptocurrencies, virtual reality, and wearable technologies, creating unprecedented changes we can't yet fully imagine.



Security Considerations and Mitigation Measures in Banks

Thank You



Comment Your Feedback

