

AI in Telecommunications Customer Service and Operations Management



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Agenda

1. Background to today's AI technology
2. Current areas of AI use & development by Telcos
3. Challenges facing the Telcos in deploying AI
4. Conclusions



1. Background to today's AI

Development of AI

1956: Dartmouth College (USA) conference established the founding principles for AI with vision statement: *“Every aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it”*

1970s & 1980s: specific applications – natural language parsers, expert systems. Using heuristic or rule-based algorithms.

1990s: AI technology matured. Large scale AI applications enabled by fuzzy logic.

➔ control systems in lifts, washing machines, autofocus cameras, etc.

➔ first telecoms applications using constraint logic-programming for resource management (workforce deployment, network optimized planning & design), fault management, & semi-auto fault diagnosis.

Early 2000s: Algorithmic & statistical techniques evolved – capable of detecting patterns in large data sets.

➔ Cyber security, strategic planning, product or movie recommendations, vehicle routings & satnav, customer-churn modelling.

Recent Developments of AI

Until recently, AI systems have been 'closed' or 'narrow' restricted to specific tasks offering intelligence equal to humans but operating at a faster rate. Known as '**Weak AI**'.

Neural networks (based on nodes & connections reflecting human brain mechanism) have become powerful analytical systems. When combined with the massive fast computing power of GPUs (graphical processing units) leads to '**Generative AI**' or '**Strong AI**'

Generative AI has broad cognitive and self-learning capabilities, capable of a broad range of applications.

Deep Learning = use of big data sets + neural networks + GPUs

Rapid developments in speech analytics: e.g., Google speech recognition software using neural networks trained on labelled speech datasets achieved 23% error rate in 2013; 8% in 2015; and 4.9% in 2017.

➔ Alexa, Eco, Siri, smart search engines,

Similarly in **image & video recognition** systems

➔ Smart-phone apps; passport control barriers, surveillance systems

Customer & user profiling enables predictive modelling, leading to personalization of content, adverts., etc.

Recent Developments of AI-2

The recent public awareness of **Generative AI** is the use of a chatbot called **ChatGPT**.

- **ChatGPT** can give convincing generation of written text – loved by students for writing their essays and thesis!
- **Chat GPT** is powered by a type of neural network called a ‘Transformer’, invented by Google in 2017.

AI chips are now being used in smart mobile phones

- User identification
- Photo enhancements

2. Current areas of use and development of AI by Telcos

Artificial Intelligence (AI) in Field Operations

- Telcom network operators ('Telcos') have been developing AI-based tools and applications for managing their customer service and network planning and operations over the last 10 years or so. The aim is to:
 - Improve network and customer service performance;
 - Improve customer service;
 - reduce annual operating costs.
- AI now increasingly used to automate and optimise telecoms. field operations.
- Applied in both Front and Back Office applications
- Typical applications:
 - 'Concept-to-Market' – introducing new products and services;
 - 'Lead-to-Cash' – fulfilment of customer orders
 - 'Trouble-to-Resolve' – ensuring that service specs and SLAs are met

Strategic

Set the long-term
overall direction

Tactical

Tackle a specific
task

Operational

Day-to-day
management

Telcos' AI Use-Cases

1. Network operations:

- ➔ Detection of bottlenecks and congestion and optimizes routing.
- ➔ Prediction of equipment failure, based on historical data
- ➔ Equipment/plant fault diagnosis (expert system + historical data pattern recognition)
- ➔ Maintenance & provision patch deployment planning (optimising field staff travel to customer & operation sites against, stores' location, travel times, and time to repair/provide)

2. Network planning:

- ➔ Forecast demand in different areas for optimal resource allocation
- ➔ Traffic routing optimisation
- ➔ Mobile cell planning, radio signal strength prediction.

Telcos' AI Use-Cases

3. Customer service automation

- ➔ AI –enhanced customer voice enquiry (chatbot),
- ➔ AI-enhanced CRM (customer relation management)

4. Cyber security:

- ➔ Fraud detection using pattern recognition, AI-driven authentication
- ➔ Real-time surveillance using pattern recognition.

The Future of AI in Telcos' Field Operations

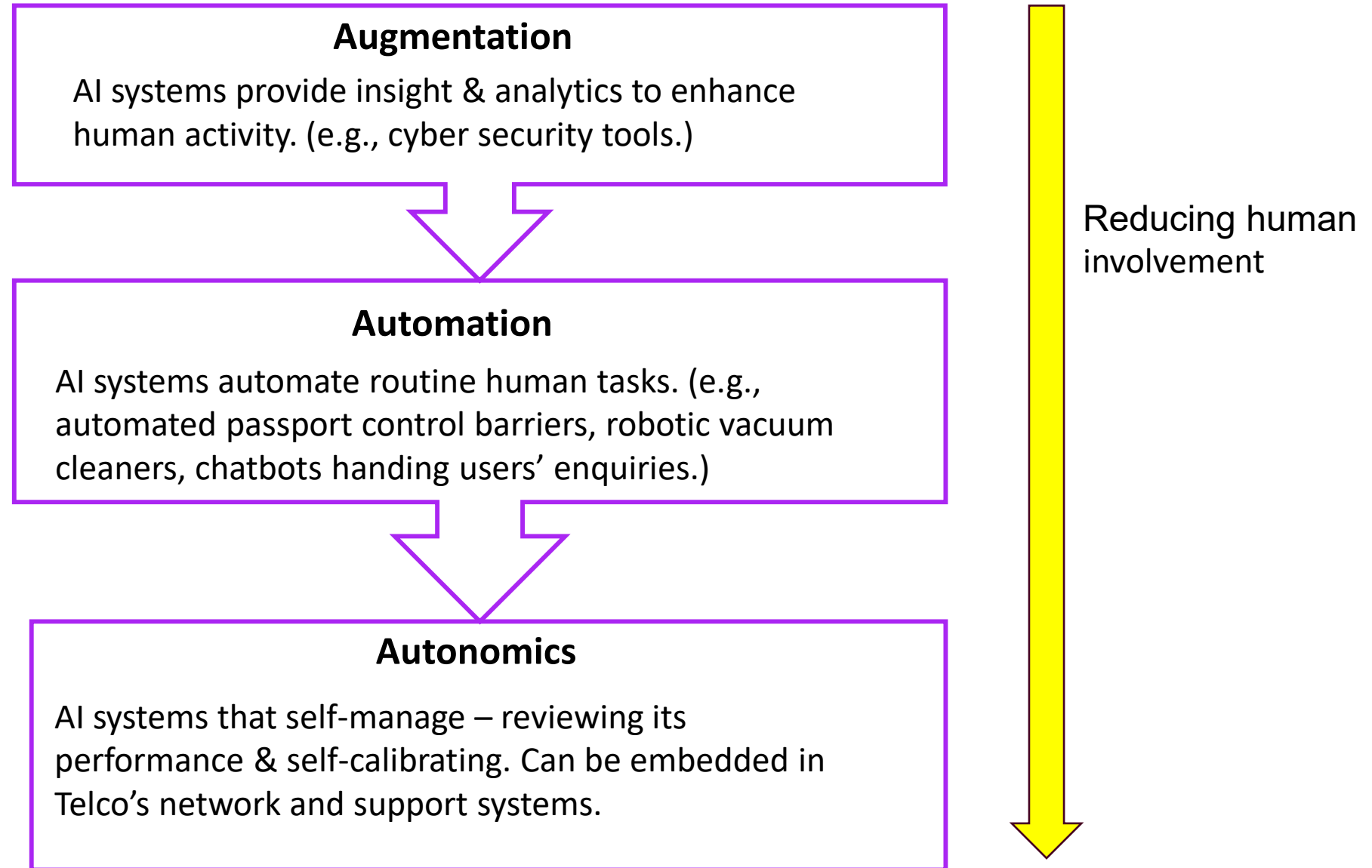
Global Telco AI Alliance announced in July 2023 with the aim of developing a Telco-specific AI platform. Alliance Co-Founders are Deutsche Telekom, e& (Etisalat), Singtel, and SK Telecom.

Looking ahead:

- the increasing digitalisation and automation in customer's applications and businesses, and
- the virtualisation of the new generations of telecommunications networks (software-defined networks and NFV),

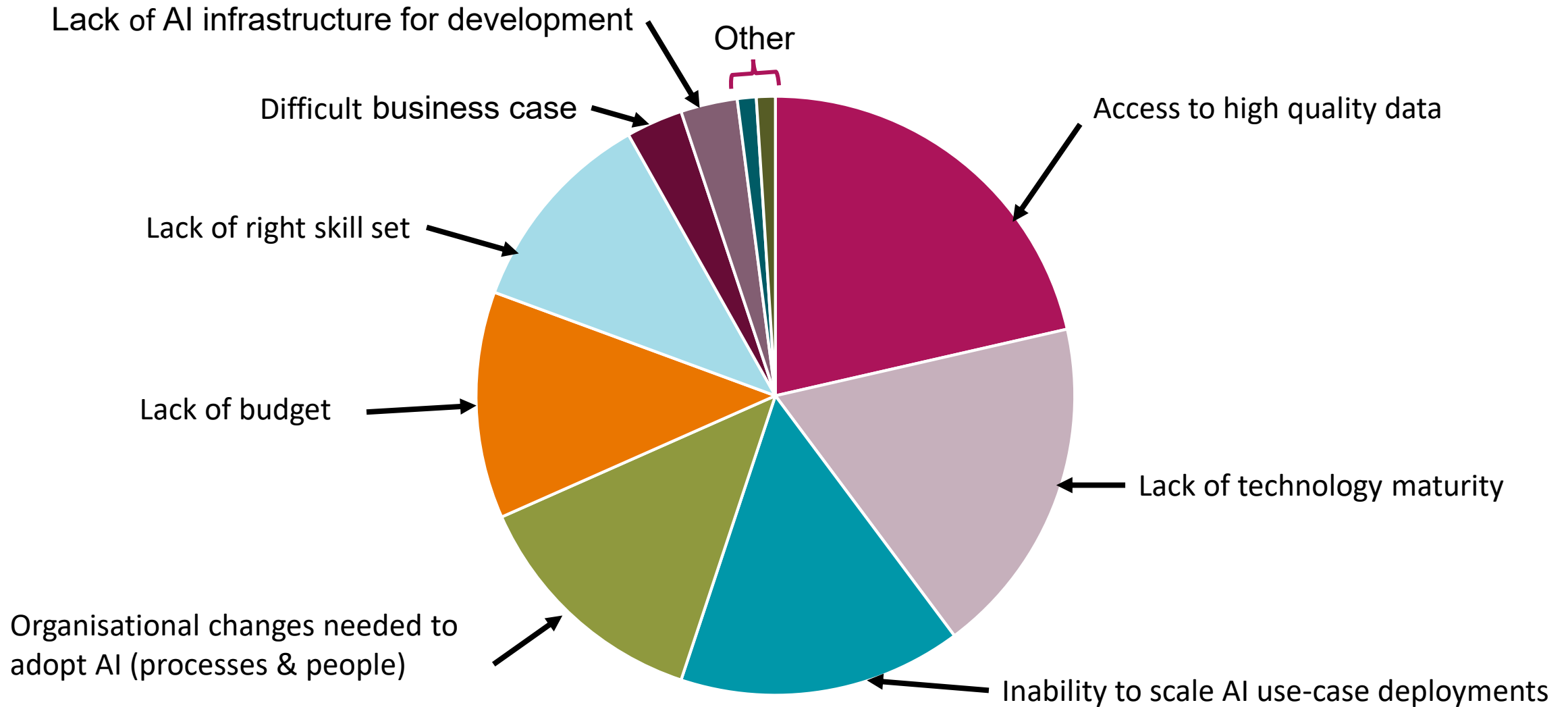
make telecoms networks amenable to the use of AI technology.

AI Automating Telco Products, Applications & Services



3. Challenges facing Telcos in deploying AI

Challenges for Telcos in deploying AI



Other Challenges for the Telcos

1. Culture of caution in introducing radical changes to managing operations. Continuing need to maintain ultimate human control:
 - Limiting the extent of autonomous network management systems (will “hands-free network” happen?)
2. Non-homogeneity of the Telco’s network, often several generations of ‘legacy networks’ co-exist.
3. Difficulty in achieving the target cost savings and business advantages.
4. Telco’s sensitivity to the ethics of using AI technology and public and customer perceptions

4. Conclusions

Conclusions

- i. Clearly, the use of AI technology can help the Telcos to improve their customer service, network performance, and operational effectiveness.
- ii. But, there are still problems in widespread deployment of AI
- iii. Also, still difficult to derive the cost and other business benefits
- iv. However, as the AI technology matures and the understanding of how best implement it safely on a large-scale increases the adoption of AI by Telcos to manage their customer service and operations will greatly increase.



thank you

Components of Generative AI

