

“Future proofing the digitalised Municipal
Dx Electricity Utility of the future”

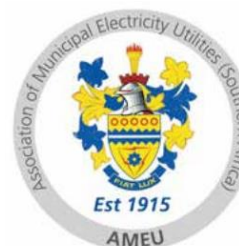


ENERGY 4.0

How digital transformation is shaping the future electricity sector for SA.

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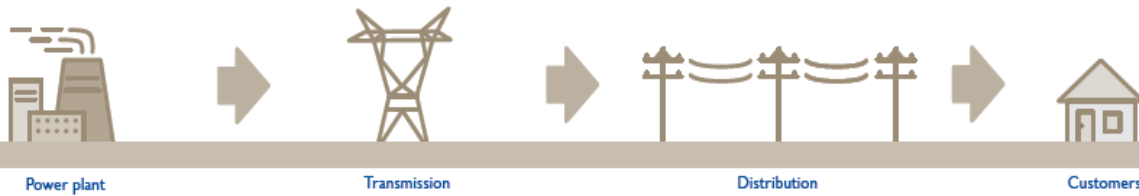


Eskom Distribution

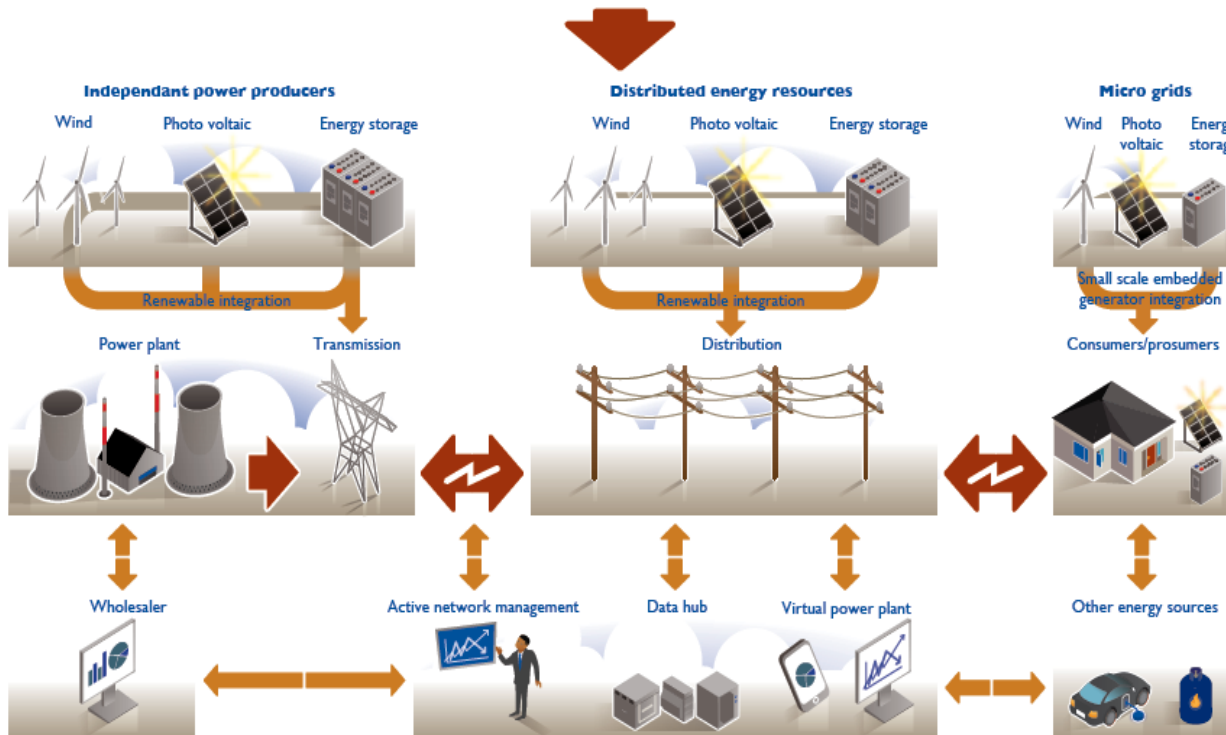
SA Utility problem statement: Distribution modernisation and SMART grid realisation through integrated systems and networks will increase data generation, availability and access, however only 20% of data is collected and utilised with limited data analytics and data driven decision making.

Digital revolution in data and processing LEADING to increased threat landscape.

Traditional power systems



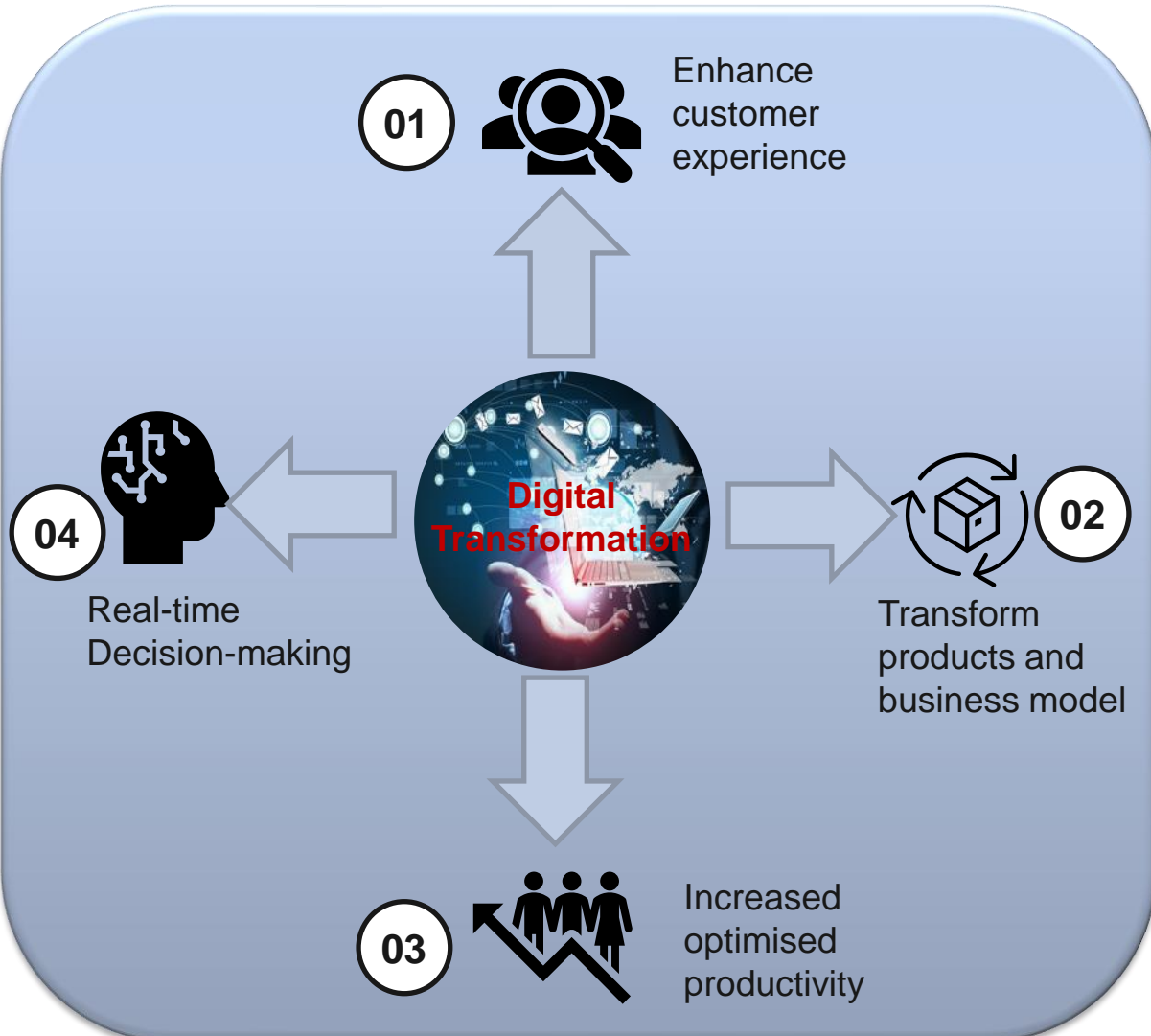
Future power systems



Benefits of the electricity digital revolution **ENERGY 4.0**:

1. Utilities to **address grid instability and imbalance issues** caused by intermittent renewable energy generation.
2. **Interoperability of multiple types of assets**, such as renewable generation, sensors, telecom. and flexible loads.
3. Use of **data and monitoring** at industrial sites has also enabled the identification of process inefficiencies and improved asset management practices.
4. **Demand reduce** of the energy consumption by industries +/- 13-29%.

Emergence of new technologies such as cloud, artificial intelligence (AI)/machine learning, internet of things (IoT), big data, social media, and other operational technologies, technology risk is continually increasing, and cyber vulnerabilities are being uncovered.

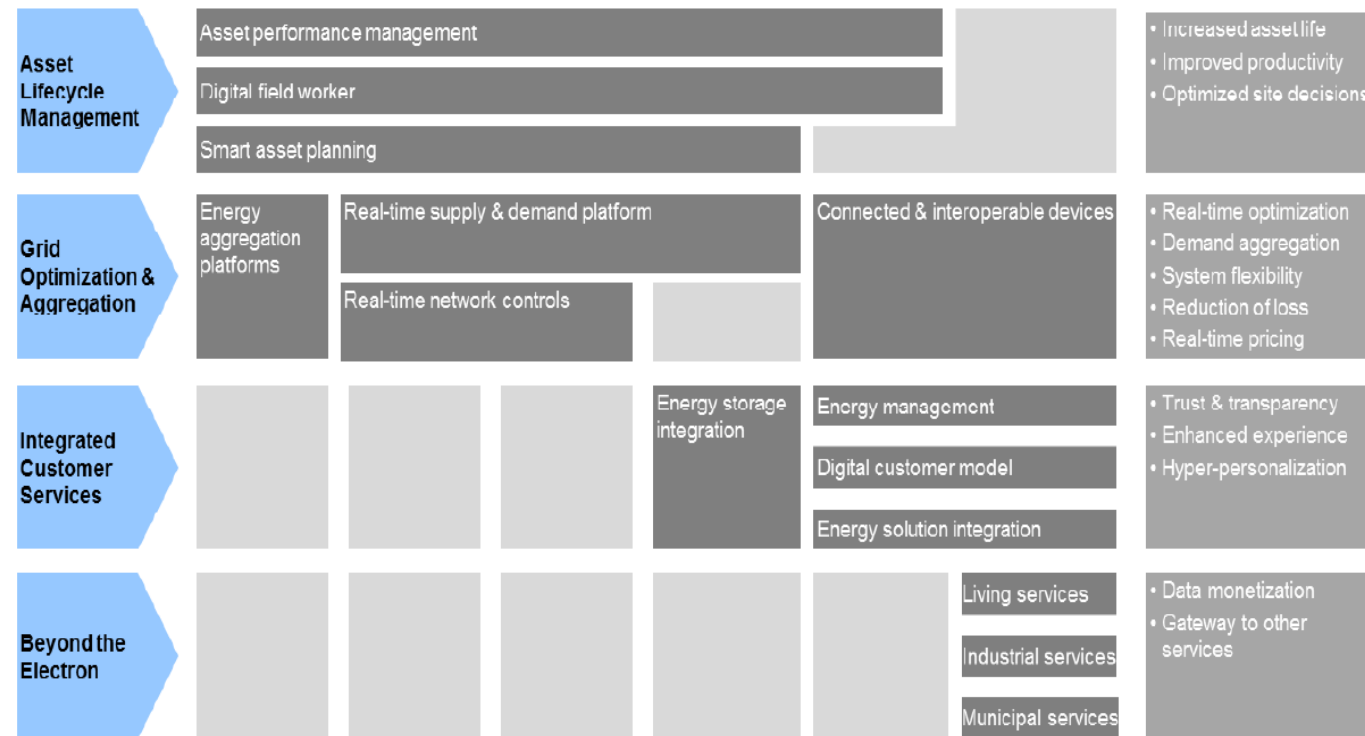


- Empowering and enhancing **customers needs and experience**.
- The digital transformation of energy is a critical component in the establishment of **new business models and products**.
- Sustainable energy production and delivery strategies that **promote positive change**.
- Embracing innovative technologies and creating an **efficient operating model**
- Modernization of the grid and systems leads to **improved real-time decision making** to improve operations.

Future Horizon – Unlocking Value considering the Digital themes and initiatives (+ 5th Theme)



Digital Themes Digital Initiatives



Source: Accenture research for the Digital Transformation of Industries project

- **Four emerging themes.**
Asset Lifecycle Management, Grid Optimization and Aggregation, Integrated Customer Services, Beyond the Electron
- **Significant value for industry and society.**
- **Analytics and robotics**
Condition monitoring, predictive forecasting, and reliability-center maintenance are all part of the digital initiative,
- **5th Digital Theme - increase connectivity can lead to increase of Cybersecurity threats.**

Theme 5 - Beyond IoT → Increase the threat landscape and complexity of data analysis and engineering of data to improve decision making

Reference: Worldbank, “Digital Transformation of Industries: In collaboration with Accenture”

Digitally interconnected systems could fundamentally transform electricity operations and markets



EDSO



IPP Connections



BESS



SSEG and Micro-grids



Smart Charging EVs



SMART Demand response

- Ability to operate active Distribution system (ADMS)
- Neutral facilitator to local, regional and national energy markets
- Management of complex Power System: Smart Grid and DERs
- Facilitate peer-to-peer trading

- Integrate variable renewables
- Incentives & making it easier for producers to store and sell surplus to grid.
- Dx grid strengthening required to facilitate IPP connections

- Complements renewable energy sources
- BESS is advantageous as it has a small footprint
- Rapidly dispatchable for power systems management

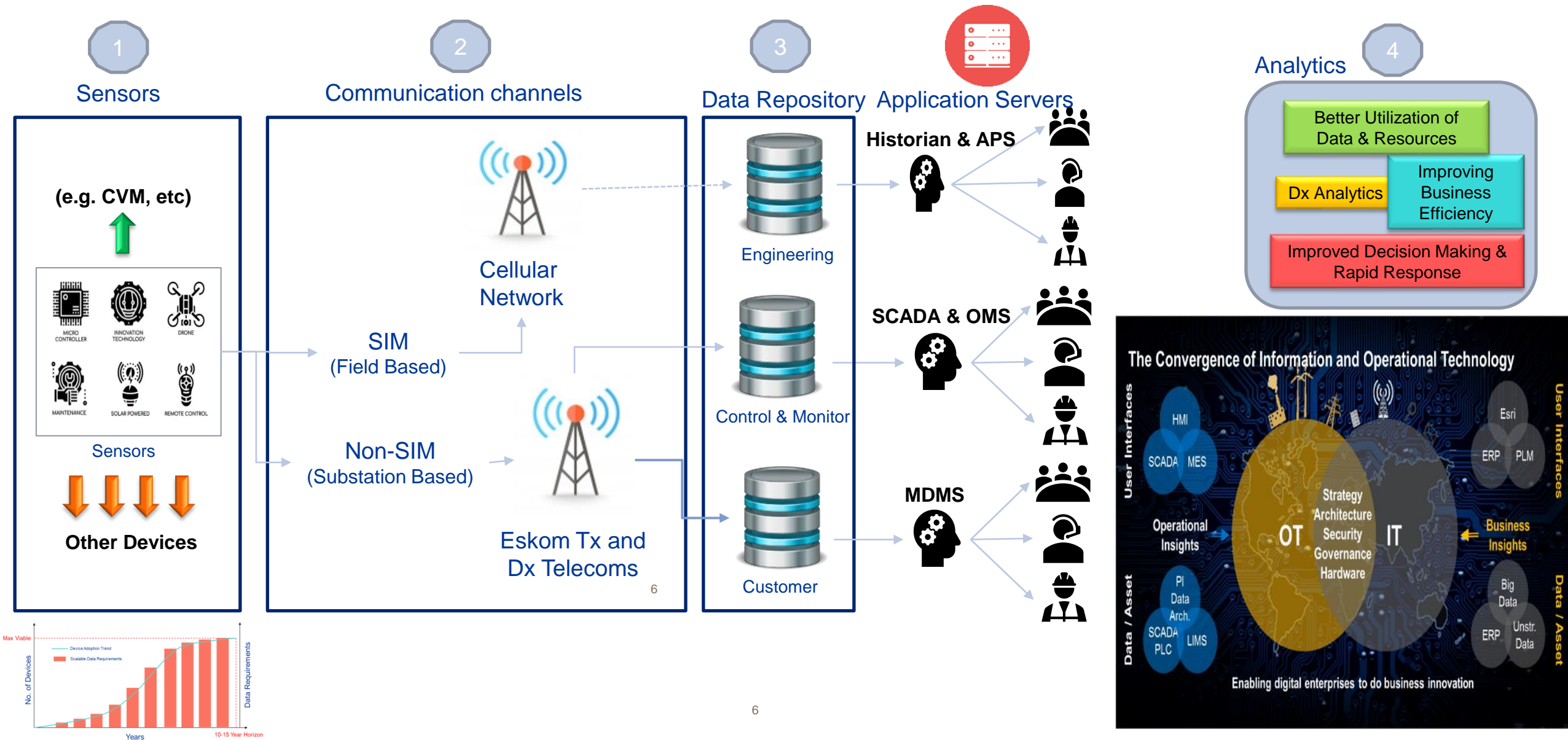
- DERs supports the just transition - empowering prosumers
- Important power balancing feature
- Micro-grids reduces the need for long Tx and sub-Tx networks

- Electric Vehicles can significantly reduce Distribution's carbon footprint while creating economic value.
- Shift charging to low demand period
- Supply the grid

- Incentives customers to participate in DR, DSM and EE
- Allow customers to alter consumption and enable self generation

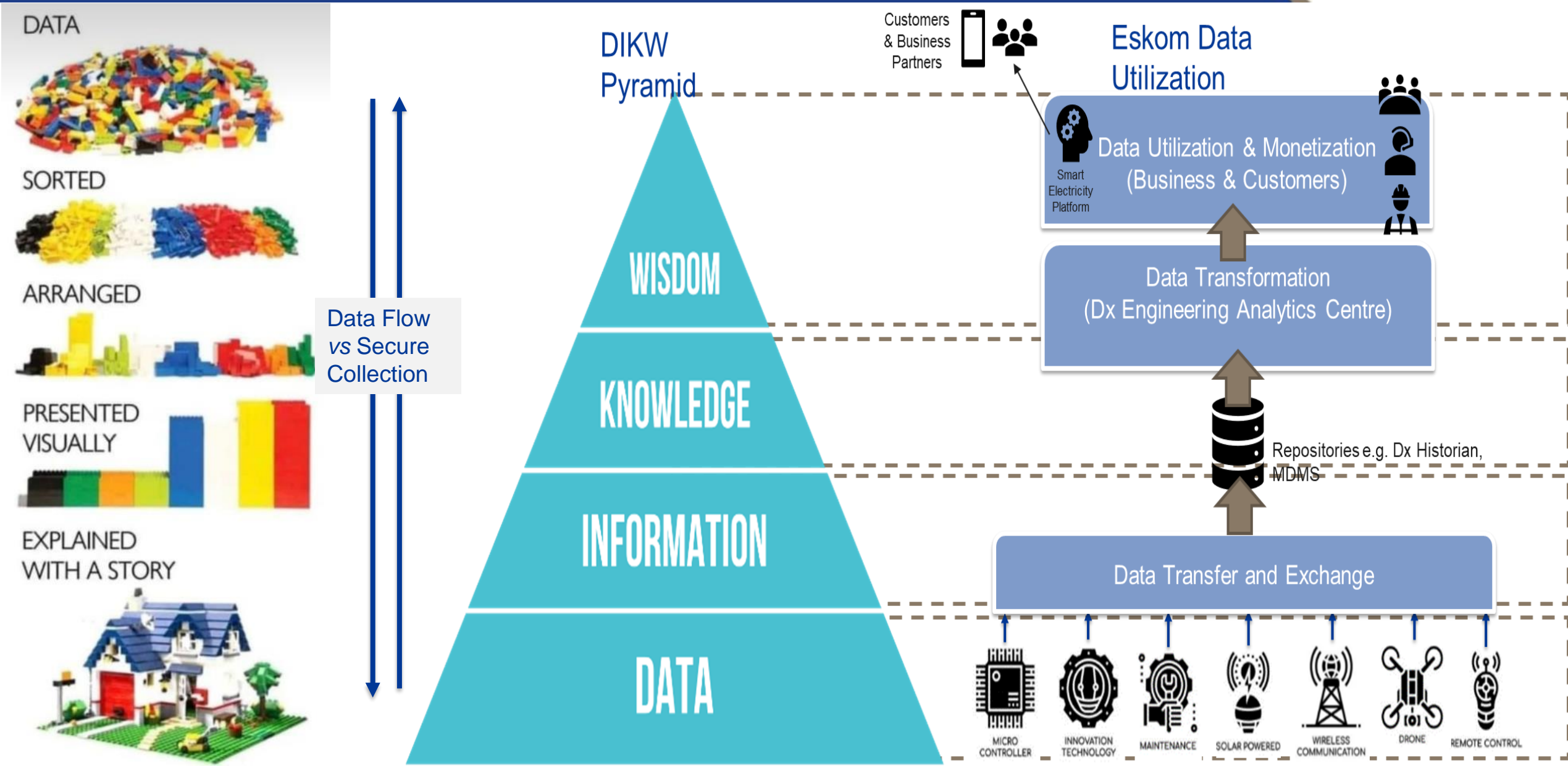
- The ability of digitalization to dismantle boundaries between the energy sectors, increase flexibility, and enable integration across entire systems, represents its greatest transformational potential.
- This transformation is centered on the electricity industry, where **the line between production and consumption is becoming increasingly blurry** as a result of digitalization.

Current Activities and their Relationship









Operating Model: Engineering Analytics Centre

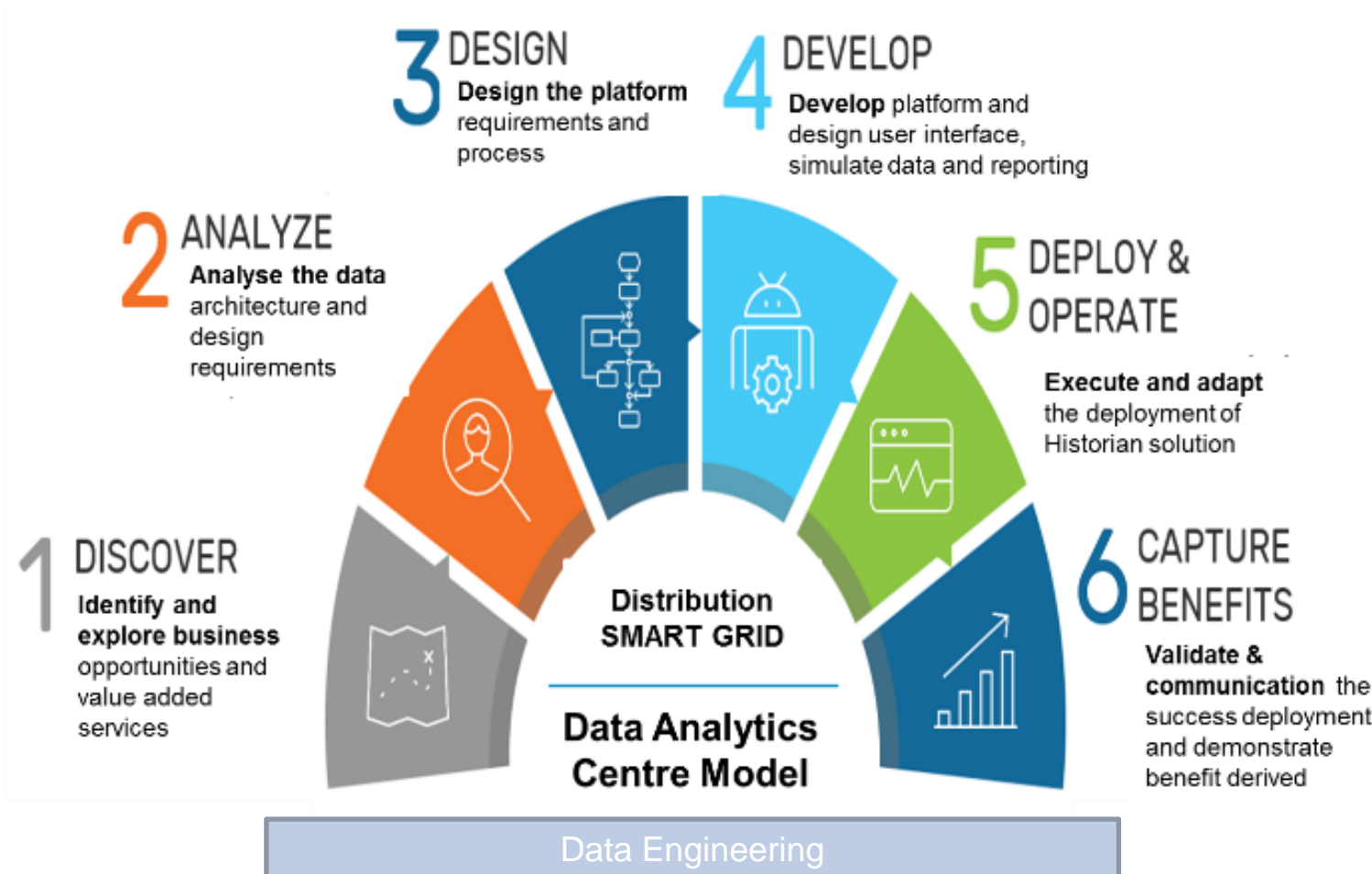
(How the CENTRE will deliver value to the business and customers)



Emerging risks that we need to overcome with the evolving OT/IT convergences

Challenge	Description	Implications
Evolving IT/OT landscape to enable future operating model	 Evolving Distribution operating model	<ul style="list-style-type: none"> The evolving technology and industry changes will influence the business operations and architecture It would influence the data exchange and information flow to improve efficiency
	 Significant skills shortages and lack of operational depth	<ul style="list-style-type: none"> Significant training to upskill Specialised resources and collaboration required (insource/outsource) Retention of specialised resources
	 Significant inoperability of technology and common platforms	<ul style="list-style-type: none"> OT/IT convergence require adoption of the governance to facilitate the collaboration and efficiency Effectiveness adoption of common hardware / software, communication and creating opportunities for increase interfacing/ data exchange and security standards
	 Grid and platform modernisation requires significant investment	<ul style="list-style-type: none"> Aging hardware & insecure infrastructure threatens security of the system and supply of electricity Limited resources to implement Dx Smart Grid strategy
	 Cyber Security threat landscape increase	<ul style="list-style-type: none"> Insufficient specialised resources and capabilities to manage cyber security threats for OT / IT Lack of monitor, detect and contain capability & specialized resources Speed of threat vectors leading to exposure to malware & ineffectiveness of controls
	 Global shift towards cloud first solutions	<ul style="list-style-type: none"> Exposed to viruses, malware and ransomware if the organization is unable to correctly provision, manage and administer the correct endpoint Remote end users are particularly at risk due to their physical location, and can result in extensive business data loss The deployment of Endpoint software and signature files to the IT and OT environment requires monitoring of network availability and reliability

Objectives: facilitate & coordinate the consumption of engineering data (*data repository – Dx Historian*) by adapted data collection, utilization, management, deployment, test analytics models, dashboard, reporting and data-driven business decision → against Distribution data life cycle.



Concluding remarks - SA Distributor will be at the epicenter of the Digital Transformation

Electricity

Four digital themes for value creation



Asset life cycle management

Technology solutions can enable real-time, remote-control or predictive maintenance to extend the life cycle or operating efficiency of the generation, transmission or distribution of assets and infrastructure.



Grid optimization and aggregation

Grid optimization is possible through real-time load balancing, network controls and end-to-end connected markets, enabled by connected assets, machines, devices and advanced monitoring capability.



Integrated customer services

Innovative, digitally enabled products and services relating to energy generation and energy management are bundled into an integrated customer service.



Beyond the electron

Hyper-personalized connected services beyond the electricity value chain that adapt to the consumer. Electricity moves from being a commodity to becoming an experience.

- SA distributors and resellers will **lose energy sales volume**, but there are **opportunities to integrate and coordinate** all prosumers, customers, Distributed Energy Resources, and energy producers.
- Eskom Distribution is in the process of establishing its System Operator, which will include Energy Aggregation and Trading capabilities, with the **goal of enabling prosumers and providing a win-win situation for both the utility and the customer.**
- Many new technologies have emerged as a result of the **digital revolution in the electricity sector**, as well as an exponential increase in data, cybersecurity threats, privacy risks and value stacking of data engineering/processing to support Digital themes.
- To maintain a competitive advantage, improve operational efficiency, and save money, **Eskom Distribution is increasingly relying on analytics.**
- The application of big data and artificial intelligence in energy management enables the **optimization of these complex systems** as well as the **reduction of unnecessary electricity consumption.**

Thank you.
Questions

