



Risks to Digitalising our Food System

Three areas for regulation

Global B2B IOT set to generate ~\$300bn in 2020, farming most radically changed by technology

Opportunities

- High level of investment (M&A, VC)
- Technology addresses real business issues
- Increasing # trials funded by large corporate

Challenges

- Slow-to-adopt population
- Internet connectivity issues
- Unclear regulation around data

Vast range of IOT devices and applications

Sources: Bain Insights: Choosing The Right Platform For The Internet Of Things, Cisco Visual Networking Index: Forecast and Methodology, 2016–2021; ZDNet, The five industries leading the IOT revolution; Agfunder News: Report: Smart Farming Can Make Food Supply Uncertainty and Volatility a Thing of the Past



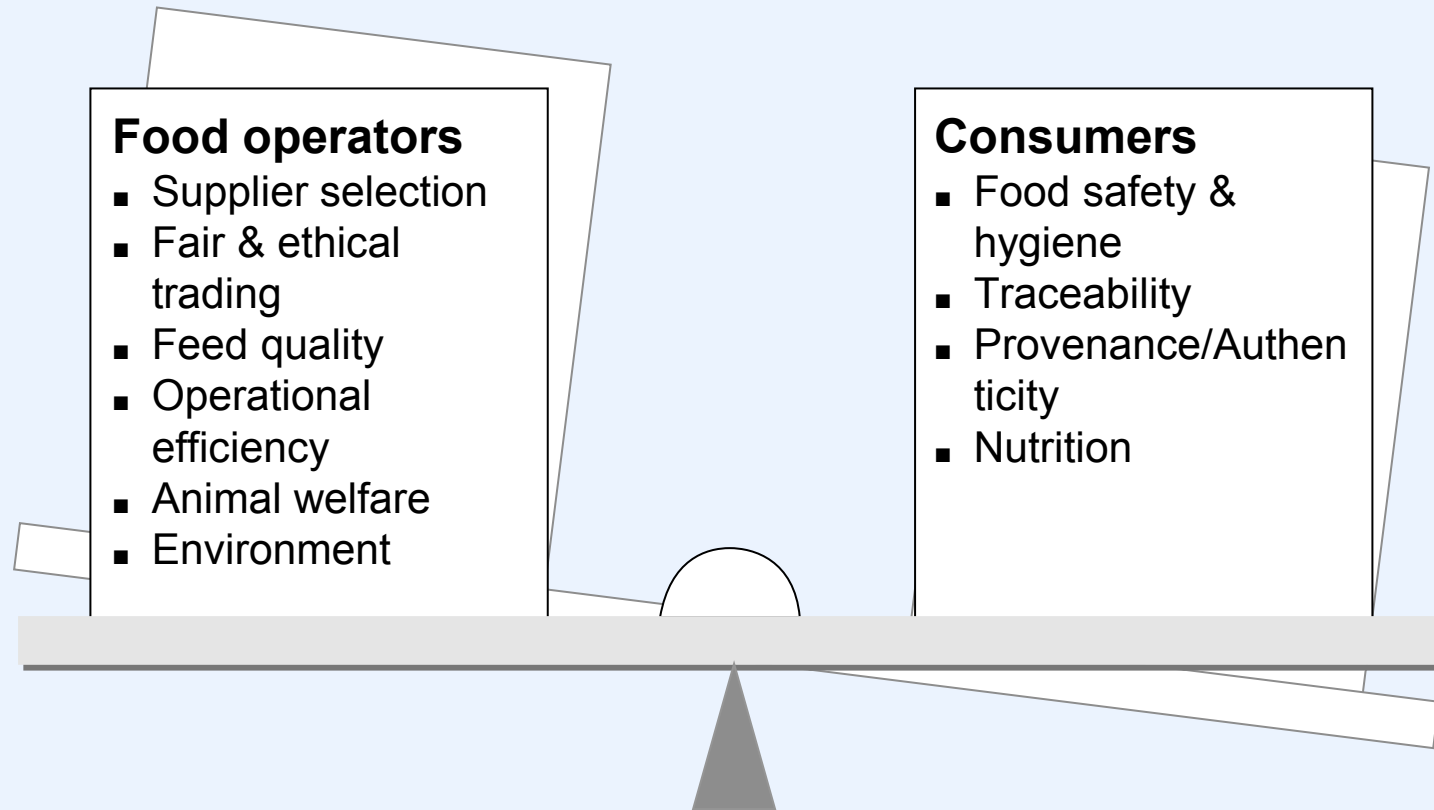
Introduction & Blockchain

Supply Chain Applications

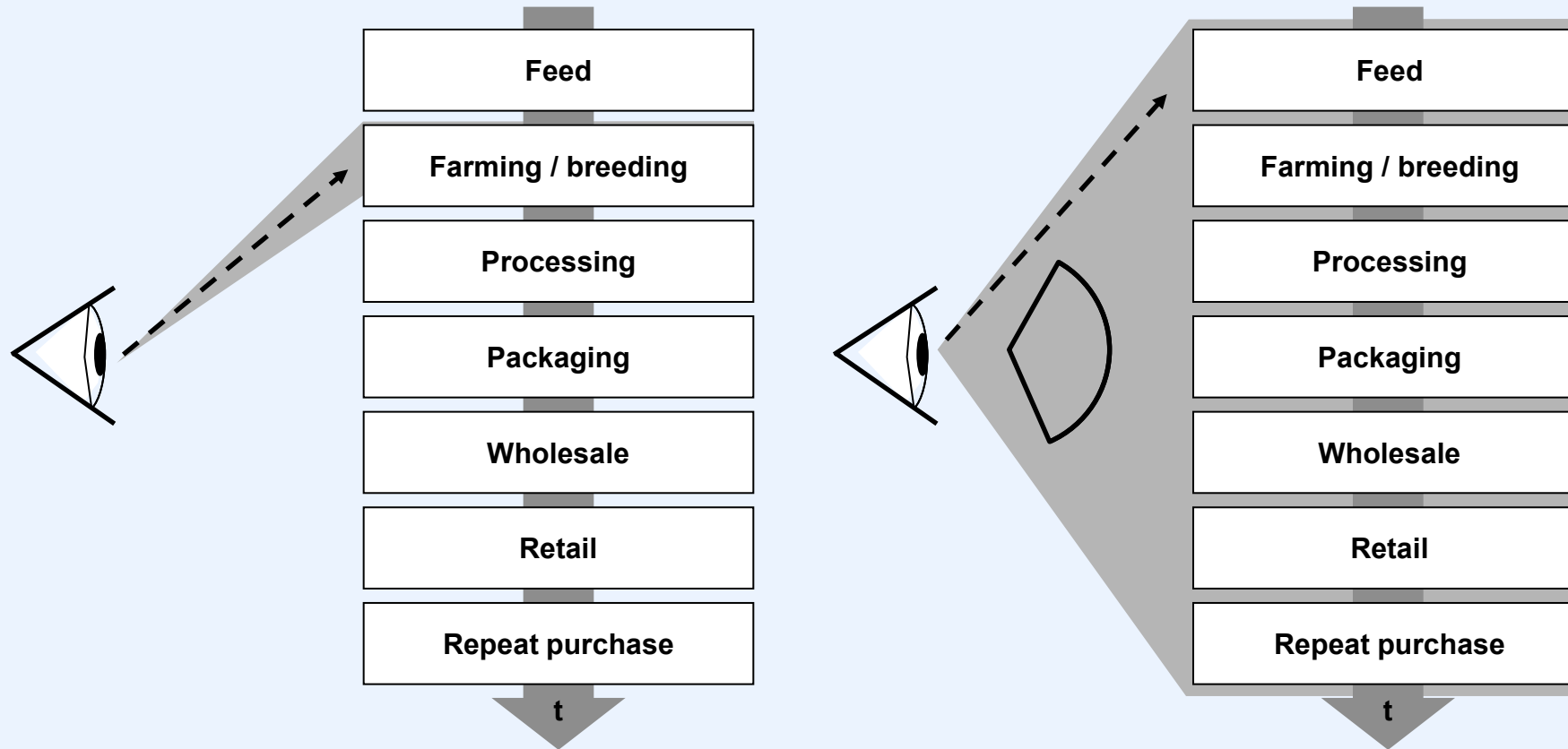
Protocols & Cyberthreats

Closing Thoughts

IOT & Blockchain applications stand to resolve a range of food system inefficiencies

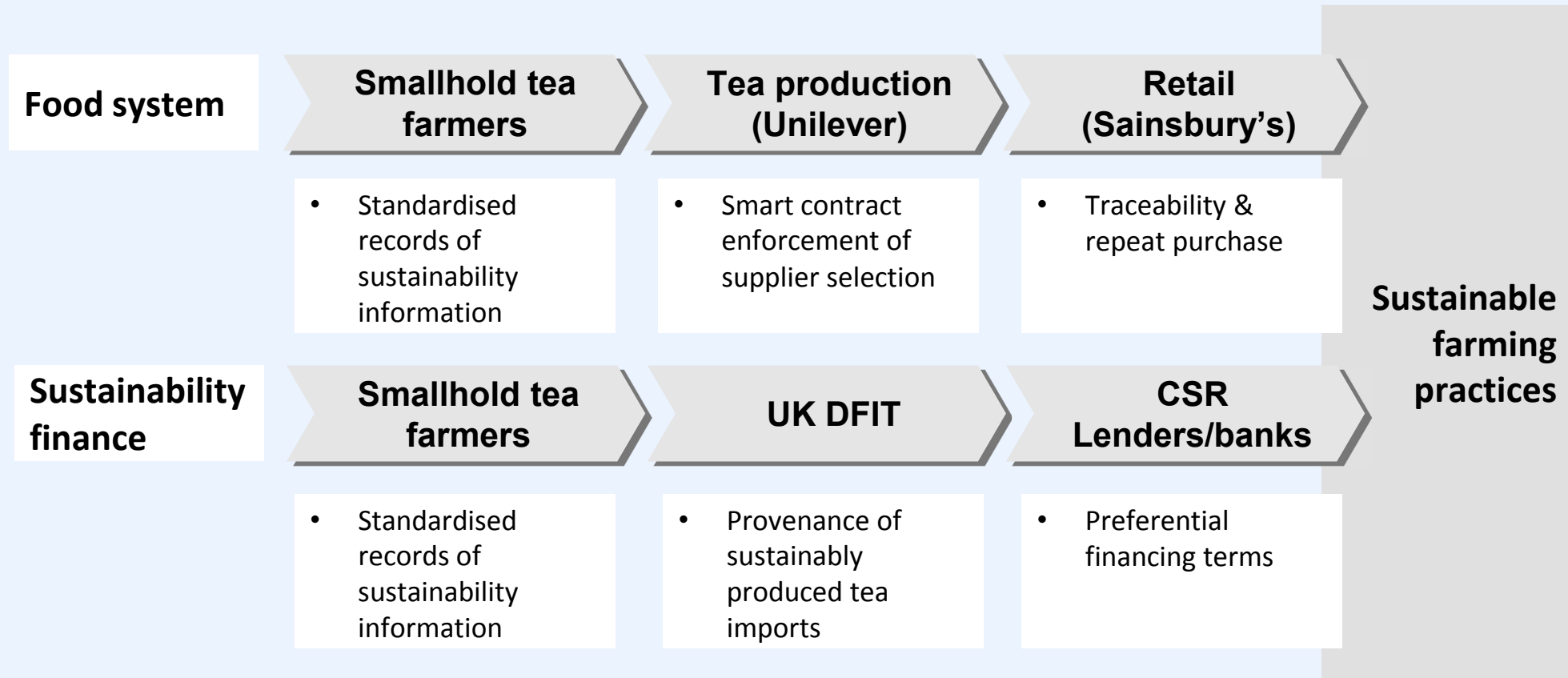


Smart Agriculture has matured into encompassing the entire supply chain



ROI models extend beyond food system – new technologies empower collaborations

Project: Unilever, Sainsbury's and the UK Department for International Trade (DFIT)

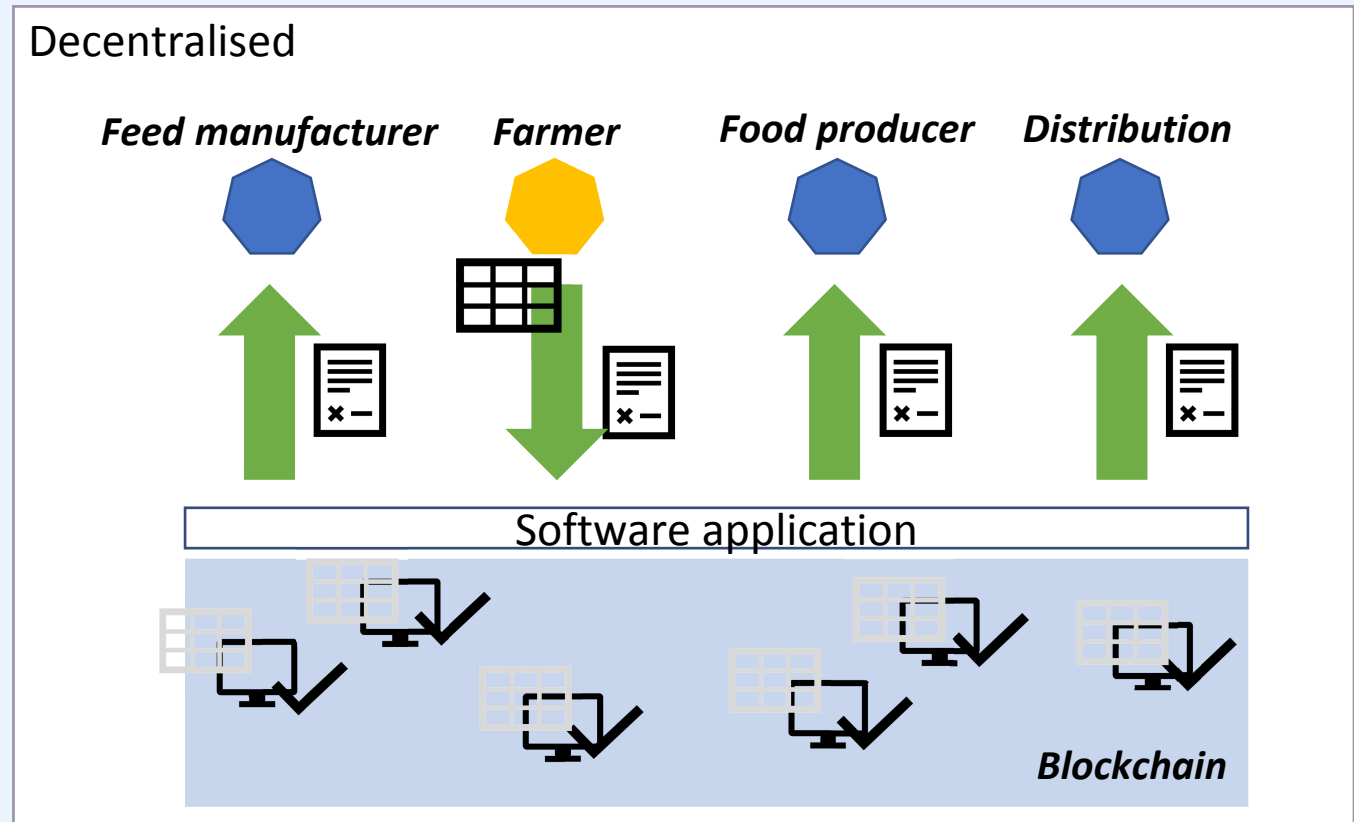
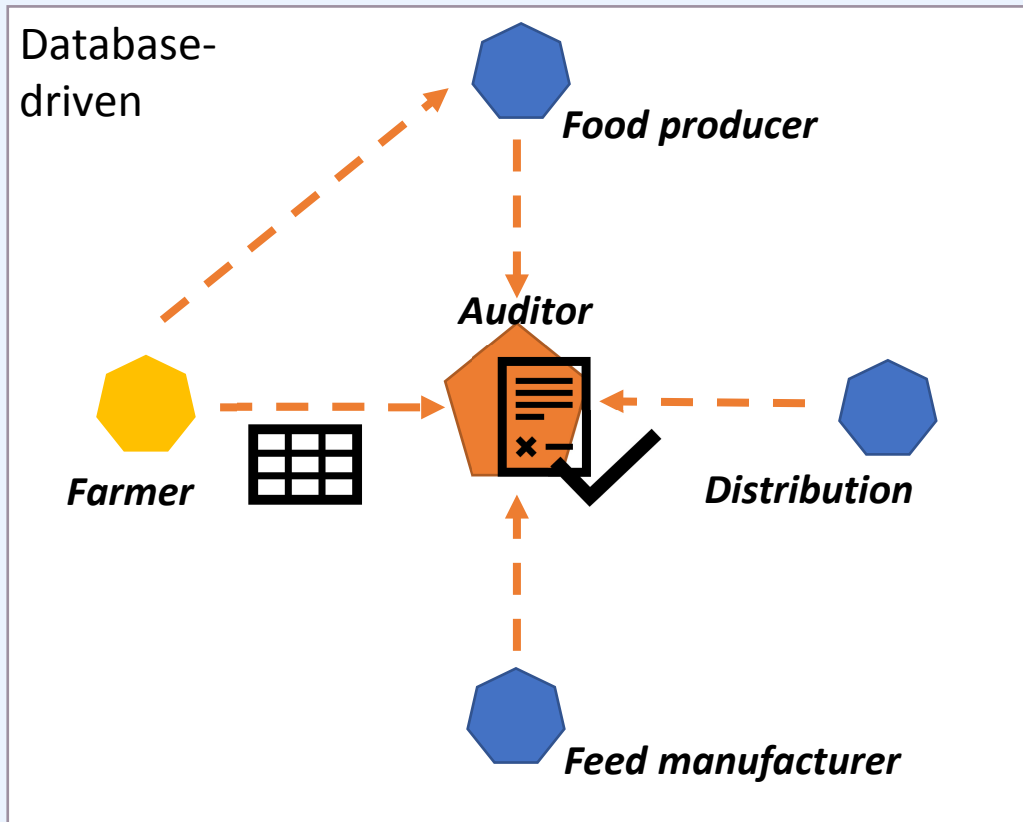


Not all business problems require a Blockchain solution

Assurance	Sector	Agency	Technology	Country	Blockchain
Food safety & hygiene	Gastronomy	Food Standards Agency	ClickIT	UK	No
Food safety & hygiene	Production (eggs)	World Health Organisation	IBM	US	Yes
Food fraud	Production (beef)	Queensland University	Food Agility CRC	Australia	Yes



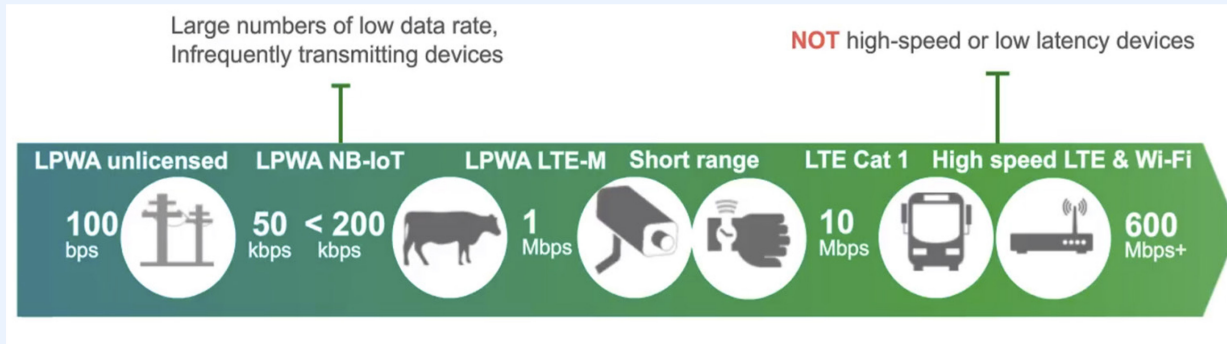
Blockchain makes data collected on IOT devices available to all (authorised) parties, in real-time & continually – no middleman



LEGEND  Datastring/Block  Ledger  Nodes  Validation

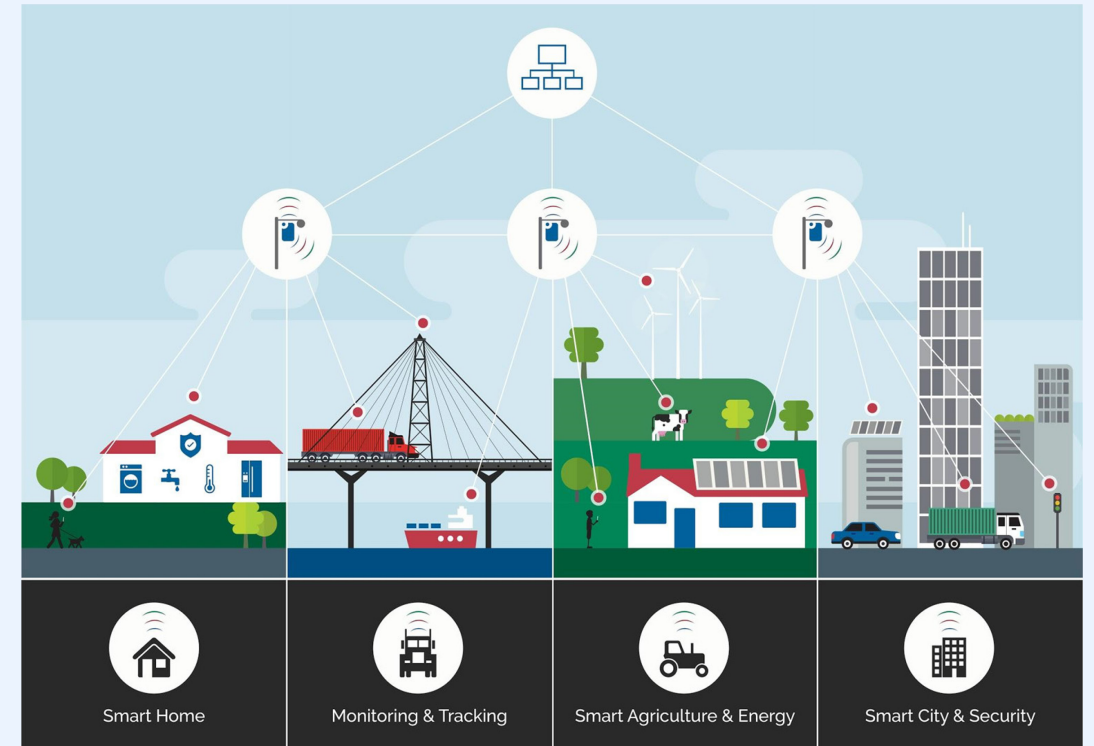


Mobile operators chose not to invest in IOT, leading to various long-range low-bandwidth protocols – two dominant



Source: IHS Markit Technology “Can Low-Power Wide-Area (LPWA) IoT Networks Capitalize on 5G Confusion?”

Smart Agriculture IOT protocols focus on delivering occasional bursts of small data packages over long distances; Low-Power Wide-Area (LPWA)



Source: <http://airgain.com/portfolio/lpwan-low-power-wide-area-networks/>

Two-thirds of IoT networks globally run LoRa & Sigfox; unlicensed technologies



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Varying risks at every level of interconnectivity

1

IOT hardware/software

- Low-power wide-area networks (LPWAN) not regulated
- Emergence of different (licensed) protocols
- “Winner takes all” principle

**Relative
high costs**

2

IOT integrated solutions

- Engineering/machinery partnerships
- Strategic data connectivity deals
- Own protocols for data exchange

**Lack of systems
interoperability**

3

IOT infrastructures

- Attacks on Domain Name Servers (DNS) common
- Public key infrastructure (PKI) in Smart Agriculture not regulated
- Human attack vector

**Hacks compromise
data integrity**

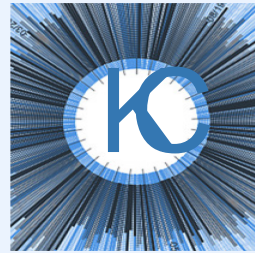
Interconnectivity



Summary

1. Smart Agriculture has evolved, Blockchain tested on entire value chain issues
2. Blockchain generates security protocols that are impenetrable
3. Regulators have been late to legislating LOWAN data exchange protocols
4. Increasing amounts of sensitive data are digitally shared
5. Data management regulation to ensure User benefits and systems security





Thank you!

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