

UNIVERSITY OF WALES TRINITY SAINT DAVID

**Module Title: Visions for the Future - Theoretical Perspectives on
Management (LCDB7008_LON)**

**Topic 2: Technology advances - specifically in the areas of e-Commerce
and e-Business have rendered traditional models of organisational
structure and theories of management roles obsolete in the light of the
changing nature of 21st century corporations**

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Table of Contents

Glossary of Abbreviations	3
Executive Summary	4
1. Introduction	6
2. Literature Review	9
2.1 Evolution of Technology in Business	10
2.2 The Rise of e-Commerce	11
2.3 The emergence of e-Business	13
2.4 Organisational Structure in the Digital Context	15
2.5 Theories of Management Roles	16
3. Changing Nature of 21st Century Corporations	18
3.1 Increased Connectivity and Globalisation	18
3.2 Shift towards Digital Transformation (DX)	19
4. Obsolescence of Traditional Organisational Structures	23
4.1 Hierarchical Structures vs. Flat Organisations	23
4.2 Matrix Organisations and Cross-Functional Teams	26
4.3 Decentralisation and Empowerment	29
5. Redefining Management Roles	30
5.1 Transformational Leadership	30
5.2 Embracing Technological Literacy	32
5.3. Ethical and Social Responsibility	32
6. Challenges and Opportunities	34
6.1 Overcoming Resistance to Change	34
6.2 Navigating the Surveillance Paradox and Achieving Requisite Variety	35
7. Conclusion	36
7.1. Summary	36
7.2 Implications for Future Research	37
8. Recommendations	37
References	39

Glossary of Abbreviations

This table summarises the key technical and theoretical terms used throughout the report.

Abbreviation	Full Term	Context in The Essay
4IR	Fourth Industrial Revolution	The broader context of digital disruption (AI, IoT, Big Data).
AWS	Amazon Web Services	A prime example of the "Frenemy" relationship in e-business ecosystems.
CRM	Customer Relationship Management	Tools that integrate customer data into "Brain-like" decision-making.
DX	Digital Transformation	The core process of moving from "Machine" to "Brain" metaphors.
ERP	Enterprise Resource Planning	Systems that automate "Machine-like" operational efficiency.
HRM	Human Resource Management	The field managing the tension between global standards and local values.
POLC	Planning, Organising, Leading, Controlling	Fayol's traditional management functions challenged by the 21st century.
RFID	Radio Frequency Identification	The technology enabling Zara's real-time supply chain agility.
SME	Small and Medium-sized Enterprises	Agile entities using e-business to compete with global giants.
STL	Single-Threaded Leader	Amazon's leadership model used to bypass matrix bureaucracy.
VUCA	Volatility, Uncertainty, Complexity, Ambiguity	The environmental conditions that make "Machine" models obsolete.

Executive Summary

The recent surge in online shopping has made traditional ways of running a business less and less useful. This report aims to investigate the veracity of this assertion, especially in relation to the contemporary retail sector. The theoretical framework contrasts the 20th-century "Machine"¹ paradigm with the 4IR-driven "Brain"² and "Organism"³ paradigms, drawing on Morgan's (1986) organisational metaphors and Bertalanffy's (1968) systems thinking.

The report looks at the most well-known retail companies. First, Sears is a good example of a mechanical failure and used to be a big player in U.S. retailing, which ultimately declared bankruptcy due to its inertia and resistance to change while e-commerce rose to prominence. Second, Amazon exemplifies digital disruption through its radical reconfiguration of how consumers shop via technology. Third, Walmart represents structural evolution in which a long-established traditional retailer successfully transformed itself by integrating physical stores with online channels. Fourth, Zara illustrates extreme "Holographic"⁴ agility, demonstrating its capacity to design and deliver new apparel collections to stores within approximately two weeks, thanks to an exceptionally responsive management system. Additionally, Spotify's Squad model and Alibaba's Zhongtai restructuring illustrate structural innovations that make "Aligned Autonomy"⁵ possible on a large scale.

The study highlights the obsolescence of Weberian bureaucracy and Taylorist standardisation in high-velocity markets yet does not reject the vital role of management. There is also an ontological shift from "transactional headship", where managers primarily issue commands

¹ Rigid, hierarchical organisation; employees as cogs in a wheel

² Learning organisation, distributed intelligence, self-regulation

³ Organisation as a living entity, adapting to the environment

⁴ Each unit contains whole-system information

⁵ Autonomous by aligned with organisational strategic goals

and monitor task completion, to “transformational facilitation”, where leaders empower their employees to engage in autonomous and creative problem-solving.

The report advances three central arguments. First, structural obsolescence is that rigid hierarchies fail to provide "Requisite Variety"⁶ and cannot cope with the non-linear complexity of global e-business ecosystems. Second, it is an inevitable fact that 21st-century leadership can no longer rely solely on intuitive or heuristic thinking (System 1⁷) but must increasingly depend on data-driven analytical processing (System 2⁸), namely cognitive shift. Third, it addresses the “Surveillance Paradox”⁹, whereby digital transformation undeniably enhances managerial oversight yet simultaneously risks degenerating into “Digital Taylorism”¹⁰, similarly when direct supervisory scrutiny is replaced by algorithmic control and poses significant ethical challenges.

The report concludes that legacy management models are not replaced entirely but must be integrated within “Ambidextrous” frameworks that balance operational reliability with digital agility. The proposed recommendations include democratising data across all levels, enabling "wikified" self-managing teams, and adopting dynamic capabilities.

⁶ Internal complexity must match external complexity

⁷ Intuitive thinking

⁸ Analytical thinking

⁹ Technology both empowers and monitors

¹⁰ Taylorism in algorithmic form

1. Introduction

The global economy is currently undergoing a profound and structurally irreversible transformation driven by the emergence of the Fourth Industrial Revolution (4IR). That is the reason why making a comprehensive and systematic re-evaluation of organisational design and managerial practice is necessary. The accelerated expansion of e-commerce and e-business is the centre of this transformation in which they no longer function simply as transactional tools; instead, they operate as strategic reference points that shape organisational direction.

For more than a century, dominant management practices were grounded in Morgan's (1986, 2006) "Machine Metaphor", where organisations functioned as rigid hierarchical systems aligned with Taylor's Scientific Management (1911) and Fayol's (1916) administrative principles, prioritising predictability over autonomy.

However, the emergence of structural evolution marks a decisive departure from this logic. It represents a shift away from linear stability, where simplicity, slowness, and control were prioritised, towards a model defined by networked complexity. This paradigmatic transition (Figure 1), illustrated conceptually as a movement from the mechanistic "Machine" to the organic "Brain", reflects a deep reconfiguration of organisational ontology. Modern organisations run less like "Machines" and more like cognitive systems, exhibiting "Holographic" self-organisation (Morgan, 2006) whereby each subunit understands overarching goals. Traditional bureaucratic structures lack the flexibility to replicate such an operation.

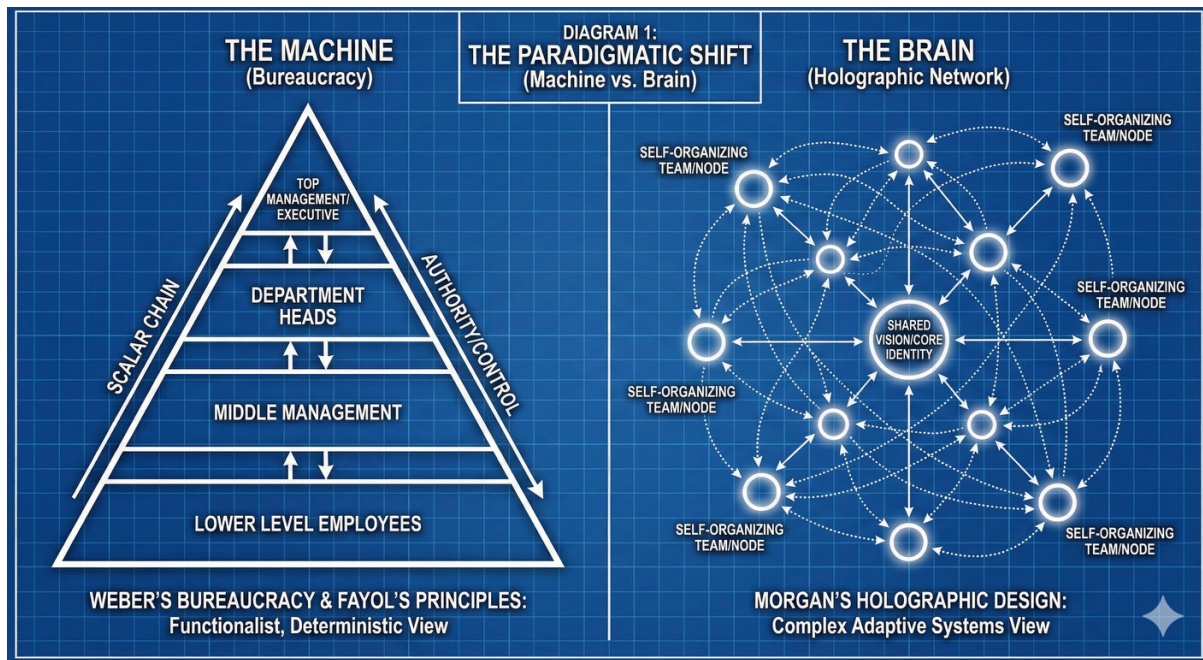


Figure 1: The Paradigmatic Shift (Machine vs. Brain). *Source: Adapted from Morgan (2006) and Cole & Kelly (2020).*

Indeed, within the 21st century, the historically dominant “Visible Hand¹¹” (Chandler, 1977) of professional management that was once deemed indispensable for coordinating large-scale physical operations is now being systematically supplemented and, in certain domains, partially displaced by the “Digital Hand¹²” (Cortada, 2004) of automated systems and decentralised networks.

Against this backdrop, the present research conducts a rigorously critical examination of the obsolescence thesis, with a deliberate analytical focus on the retail sector. Retail is selected precisely because it has undergone especially profound disruption resulting from the convergence of physical and digital value chains. It is a key place for analysis where the differences between old mechanistic frameworks and new organic systems are most clear.

¹¹ Traditional management, manual coordination

¹² Automated systems, algorithmic coordination

Established retail incumbents using top-down command-and-control architectures increasingly struggle to compete with digital-native ecosystems such as Amazon and Alibaba.

The primary aim of this study is to ascertain whether classical management theories are truly obsolete or if they necessitate a process of evolutionary adaptation to sustain relevance in a VUCA environment defined by volatility, uncertainty, complexity, and ambiguity (Bennett & Lemoine, 2014). This study looks at how transactional¹³ and transformational¹⁴ leadership styles (Bass, 1985) are used in companies that are moving from hierarchical structures to agile networks. It also talks about what e-business means for the future of management.

The study argues that while managerial forms are obviously evolving, the fundamental need for systemic coordination stays unchanged. What has fundamentally changed is the way of coordination that is carried out. Effective management in the digital era must, therefore, rely on the use of digital technologies alongside an understanding of human cognition and behaviour.

¹³ Reward/punishment

¹⁴ Inspiration

2. Literature Review

Before looking at the specific literature, it is important to set up the theoretical framework that this analysis is based on. Figure 2 shows the substantial change from mechanistic management in the 20th century to organic management in the 21st century, as well as the main problems that come up during this change.

Category	20th CENTURY	21st CENTURY
Metaphor	“MACHINE” Metaphor	“BRAIN”/“ORGANISM” Metaphor
Theorists	• Taylor (1911) • Fayol (1916) • Weber (1947)	• Morgan (1986) • Bertalanffy (1968) • Johannessen (2019)
Systems Type	Hard Systems	Soft Systems
Management Approach	Visible Hand	Digital Hand
Leadership Style	Transactional	Transformational
System Level	System 1	System 2
Authority	Headship	Leadership

TENSIONS/PARADOXES

- Surveillance Paradox
- Stability-Agility Paradox
- Digital Taylorism

Figure 2: Theoretical Framework – From Machine to Brain/Organism Paradigms

The next parts look at each part of this framework in depth, starting with the technological changes that made this change happen.

2.1 Evolution of Technology in Business

The role of technology in business has undergone an ontological transformation from the mechanical augmentation of labour toward a total, systemic digital integration. This evolution can be understood through two distinct phases:

From Mechanistic Augmentation to Digital Discontinuity

Across the first three industrial revolutions, technology was predominantly outlined as a “Hard System¹⁵” which is an exogenous instrument deployed to optimise production and standardise labour (Checkland, 1981). This era was governed by the organisational “Machine” metaphor established in the introduction, within which employees were reduced to functional components executing predefined tasks, with creativity and autonomy being structurally constrained.

However, the 4IR constitutes a decisive discontinuity – not just accelerated computation, but a fusion of technologies dissolving boundaries between physical, digital, and biological domains (Schwab, 2016). Technology has shifted from operational periphery to principal architect of value creation.

The Transition to E-Business Ecosystems

A critical conceptual distinction emerges between e-commerce and e-business. While e-commerce primarily concerns front-end online transactions, e-business encompasses the comprehensive digital integration of all internal and external organisational processes (Chaffey, 2015; Kalakota & Whinston, 1997). Zara exemplifies e-business logic using RFID-enabled products that continuously transmit data to central coordination systems, allowing production instructions to be issued to factories in real time without manual intervention (Inditex, 2016;

¹⁵ Linear control, command-and-control

Caro & Sadr, 2019). Such deep system integration makes traditional linear planning models less useful, forcing organisations to work as "Complex Adaptive Systems¹⁶" (Holland, 1995; Stacey, 1996) that respond dynamically through data-driven feedback loops instead of relying on hierarchical command structures.

2.2 The Rise of e-Commerce

E-commerce was the first big break, replacing local physical stores with global digital interfaces. E-commerce started out as a way to sell things online, but now it has become a catalyst forcing comprehensive restructuring.

The Erosion of the Mechanistic Fixed-Asset Model

In the retail industry, this disruption is most clearly manifested in the erosion of the fixed-asset model. The assets—high-street stores and centralised warehouses of traditional retailers belonging to “mechanistic systems” which are no longer able to meet the flexible, 24/7 shopping demands of digital consumers. When customers wish to make a purchase at 2 a.m. and receive goods immediately, traditional stores have already closed, and their high rental costs as fixed assets mean they are inevitably unable to compete.

The collapse of Sears is evidence of this. It used to be the most important store in the US, but it got stuck in Taylorist rigidity, where employees followed instructions without adaptation. When consumers shifted online, Sears' apparatus failed to respond (Appelbaum, 2016), leading to bankruptcy in 2018 (Loeb, 2018; Bomey, 2018). This demonstrates that structures lack "Requisite Variety" (Ashby, 1956), which cannot match digital market complexity.

¹⁶ Self-regulating systems via feedback loops

The Emergence of the “Brain” Metaphor: Amazon

This is where the rise of Amazon and the “Brain” metaphor become clearly visible. Moving beyond the manual “Visible Hand” style of management, Amazon does not require managers to inspect each individual item. Instead, it advances towards a computer system capable of autonomously identifying best-selling products for replenishment and dynamically repricing products millions of times per day based on customer demand, while traditional bureaucratic supermarkets must manually relabel prices.

In addition, with regard to dismantling information asymmetry, e-commerce has achieved this and shifted power from firms to consumers (Akerlof, 1970). In the past, sellers clearly knew cost prices and quality, while buyers were often disadvantaged, but today consumers can compare prices and read reviews online within minutes, demonstrating their proactive position.

From Hard to Soft Systems Thinking

This shift from “Hard Systems” thinking to “Soft Systems¹⁷” thinking reinforces that rigid, command-and-control approaches are ineffective in sustaining competitive advantage (Checkland, 1981).

However, one pressing issue arising from this is the dominance of “Platform Ecosystems” (Parker, 2016). E-commerce democratises market access by enabling even small grocery sellers to sell nationwide, yet they become entirely dependent on these platforms. This drives the concentration of power in the hands of a few dominant actors who can determine survival, for example, by shutting down shops or increasing fees, creating a new form of digital hierarchy that challenges the ideal of a “flat” organisational world.

¹⁷ Adaptive, interpretive, complex

2.3 The emergence of e-Business

E-commerce can be understood as a visible online store that customers can see. E-business, by contrast, is the entire operating system behind that store, connected from warehousing, accounting, and human resources through to logistics partners. More broadly, e-business represents a deeper form of integration, playing a role in systematising all internal and external processes of the organisation through the “three-in-one” integration of supply chain management, enterprise resource planning (ERP), and customer relationship management (CRM) into a unified whole (Chaffey, 2015; Turban, 2018; Laudon & Laudon, 2020).

Dismantling Silos and Holographic Structures¹⁸

In the past, logistics, finance, and customer service each relied on separate software systems; e-business emerges here to integrate them into a single system. This is also the point at which traditional departmental silos which are characterised by isolation and a lack of information sharing that are replaced by integrated digital networks that enable real-time information flow. Put simply, under traditional systems, the marketing department might run promotions without knowing whether inventory was available, whereas this does not occur under e-business, as barriers between departments are removed and operations become transparent.

Consequently, corporations adopt "Holographic" structures where each unit is digitally connected to the whole, and a warehouse employee can access system-wide information comparable to headquarters as well.

¹⁸ Each unit contains whole-system information

Zara: A Case Study of Holographic Agility

Zara represents a clear example of this rise through its “fast fashion” ecosystem. At Zara (Inditex), e-business integration is used to link design teams, manufacturing facilities, and retail stores within a continuous feedback loop. This digital integration allows the organisation to operate like a “Brain”, where market signals or sales data at once trigger adjustments in production.

For instance, if a garment sells unusually well in Tokyo, sales data are transmitted to Spain in real time, enabling production adjustments within two to three weeks, which is ten times faster than traditional brands without prolonged approval meetings, yet with human judgement in key decisions. As described by Ferdows et al. (2004), commercial teams, designers, and production planners operate at the same organisational level, with decisions made within the same day based on direct feedback from store managers worldwide. The outcome was that Inditex increased revenue from EUR 3.25 billion in 2001 to EUR 13.79 billion in 2011 (Inditex Annual Reports, 2001, 2011).

The Surveillance Paradox¹⁹

However, these developments create a “Surveillance Paradox” as digital efficiency dehumanises workplaces (Gutelius & Theodore, 2019; Delfanti, 2021; Kantor, 2021). At Amazon, warehouse employees are monitored second-by-second; such things as standing idle including toilet time which can trigger "time off task" warnings or dismissal, illustrating dignity loss from excessive optimisation.

¹⁹ Technology empowers and controls simultaneously

2.4 Organisational Structure in the Digital Context

The Friction Between Technology and Structure

In the previous sections, the manner in which e-business integrates with processes and data has been established; in this section, the author seeks to emphasise that these technological advances become useless if they are embedded within an incompatible organisational structure. Cole and Kelly (2020) define this concept as an organisational structure that is not just a hierarchy of positions but also a model for how relationships are set up to decide how power is shared and how information moves.

The fundamental friction observed in the contemporary retail industry arises from the lag between digital strategy and structural reality. Despite adopting e-commerce tools, many long-established retailers continue to retain mechanistic structures, relying on high formalisation and functional specialisation, giving rise to operational silos, where departments operate in isolation.

Mechanistic Failure: The Amazon Fire Phone

The Amazon Fire Phone (2014) illustrates this. Lab126 developed it secretly for four years without consulting retail on the price of USD 199, which was too high; it also did not work with App Store apps (240,000 versus Google's 1.3 million) and did not challenge the CEO's ineffective "Dynamic Perspective" feature (Stone, 2021). The outcome was fewer than 35,000 units sold, a USD 170 million loss, and discontinuation after thirteen months. This demonstrates that even companies that started out as digital can get stuck in mechanistic traps.

The Cohesion Paradox²⁰

²⁰ Excessive decentralisation —> loss of direction

But organic "flatness" creates a "Cohesion Paradox" because too much decentralisation can make it hard to make decisions when there is not a clear vision. The holacracy experiment at Zappos (Bernstein, 2016) shows that full decentralisation does not work very often. This means that companies need to find a balance between giving employees freedom and making sure everyone is working towards the same goals.

2.5 Theories of Management Roles

According to Fayol (1916), classical theory describes management through five functions: Planning, Organising, Commanding, Coordinating, and Controlling (POLC). In "Machine" organisations, the managerial role is transactional, maintaining order through reward and punishment mechanisms without requiring creativity.

However, 21st-century enterprises require managers to abandon passive thinking toward managerial objectives. In modern management theory, a clear distinction is made between headship²¹ and leadership²² (Bennis & Nanus, 1985; Kotter, 1990): headship carries the spirit of traditional management in which power derives from position; by contrast, leadership represents the authentic role of the manager, where influence comes from vision and trust. In volatile e-business environments, the "planning" function is often disrupted by rapid market changes, forcing managers to shift from rigid forecasting to "Learning to Learn" (Argyris & Schön, 1978). Instead of "commanding", contemporary roles emphasise transformational leadership, in which managers act as facilitators and agents of change (Bass, 1985), shaping employees' values, motivation, and behaviour through inspiration and vision rather than control.

²¹ Position power

²² Influence based on vision/trust

Walmart: From Transactional to Transformational

Historically, Walmart is a typical example of Fayol-style management focused on control and cost efficiency, with its core philosophy of cutting operating costs at every possible stage to maintain low prices for customers. Concretely, it built a competitive advantage based on a cross-docking system that transfers goods directly from suppliers' trucks to delivery trucks, minimising storage time and inventory costs (Stalk et al., 1992). However, Doug McMillon—CEO of Walmart since 2014 represents this leadership transition. Unlike previous CEOs who focused on cost control, McMillon led Walmart's transformation toward an omnichannel model: the acquisition of Jet.com (2016), the launch of Walmart+ (2020), and the integration of physical stores with digital platforms (Walmart Inc., 2016, 2020).

The Exploitation-Exploration²³ Conflict (March, 1991)

Nevertheless, an increasing role conflict is emerging, in which managers are caught in between: on one side, organisational demands for traditional administrative control (efficiency/cost saving); on the other side, market demands for strategic breakthrough (goal effectiveness/creativity). Best Buy illustrates this conflict clearly; especially when facing "showrooming" in the early 2010s, CEO Hubert Joly chose exploration over exploitation by investing in training staff as "trusted advisors" while price-matching Amazon (Joly, 2021). The result transformed Best Buy from near-bankruptcy to one of retail's most successful turnarounds.

In summary, failure to transition from the "Machine" to "Brain" or "Organism" metaphor creates a severe cognitive gap, where leaders continue applying intuitive System 1 solutions to

²³ Exploiting the present vs. Exploring the new

problems requiring System 2 analytical processing (Kahneman, 2011). Nevertheless, organisations face the “Stability–Agility Paradox”²⁴, as sufficient traditional structure is required for operational reliability, while simultaneously fostering creativity is the decisive survival factor in the digital age.

3. Changing Nature of 21st Century Corporations

3.1 Increased Connectivity and Globalisation

The 21st century witnesses unprecedented connectivity. Ricart (2004) argues that the world has moved to semi-globalisation, in which the internet blurs distances but cannot erase cultural or legal differences, forcing firms to retain strategic flexibility.

Walmart's failure in Germany and South Korea illustrates this tension in more detail; cultural practices like enthusiastic greetings were perceived as invasive, and the "Everyday Low Price" strategy violated Germany's Unfair Competition Law (Knorr & Arndt, 2003). Walmart hence withdrew from both markets in 2006 with losses of nearly USD 2 billion due to imposing the American model without local adaptation.

In addition, the primary driver of the 4IR is the creation of a weightless economy, in other words, one in which information travels at near-zero cost (Coyle, 1997; Quah, 1999). In retail, this has given rise to micro-multinationals: these SME enterprises have been able to access global markets from the outset (Varian, 2011; OECD, 2019). Statistics show that by 2020, more than 10 million SMEs had used Alibaba's platforms to export directly to 190 countries (Alibaba Group Annual Report, 2020).

It can be said that connectivity itself has dismantled the information asymmetry that once protected local monopolistic firms, forcing corporations to adopt a "network" or "flux"

²⁴ Need for stability and agility simultaneously

metaphor, where the organisation is seen as a fluid system of interconnected nodes rather than a rigid hierarchy (Morgan, 2006); from this, business ecosystems have been established. These are broad networks comprising suppliers, customers, and even competitors (Moore, 1993; Iansiti & Levien, 2004), in which firms no longer compete in isolation. Third-party sellers compete with Amazon on the same platform, yet this competition creates customer choices, attracts traffic, and draws more sellers, which is also known as Bezos's "Flywheel Effect"²⁵ (Stone, 2013). Netflix relies on AWS despite competing with Prime Video; Apple sells on Amazon Marketplace despite smart device rivalry, strengthening the "Frenemy"²⁶ relationships characteristic of the 4IR ecosystems (Galloway, 2017). This level of integration requires a shift from "Hard Systems" thinking to "Soft Systems" thinking (Checkland, 1981), because managers must now orchestrate a complex network of global stakeholders—actors who are no longer under their direct, hierarchical command.

However, existing in parallel is a cultural paradox, in which digital standardisation clashes with the persistent, deep-seated values of national and regional cultures, often leading to systemic friction in global HRM.

3.2 Shift towards Digital Transformation (DX)

Under the 4IR, DX shifts from using technology to optimise a "Machine" toward building an "Organism" or "Brain" that adapts within volatile digital ecosystems (Rogers, 2016; Schwab, 2017; Teece, 2018). This transformation reflects five domains (the 5 Spheres) in Figure 3: business models, customer experience, culture/process, data management, and innovation. The traditional linear value chain has given way to platform models empowering multi-directional value creation. For example, Walmart implemented DX by overhauling its entire data management system: fragmented reports that merely reflected past information, such as what

²⁵ Self-reinforcing loop (Amazon)

²⁶ Both rival and partner

was sold last month, were replaced by real-time analytical reports. This again reflects Walmart's shift from a management logic based on human-led intuitive guessing (System 1) toward data-driven analytical precision (System 2) (Kahneman, 2011). One classic real-world story from Walmart in 2004 before Hurricane Frances illustrates this: instead of only stocking flashlights, Walmart's predictive analytics identified that American consumers tended to buy beer and Pop-Tarts before hurricanes (Hays, 2004; Sharda, 2020). Walmart stocked these two items heavily at store entrances and sold out completely that is an insight that no executive relying purely on intuition would have conceived.

In culture and process, agile methodologies are mandatory, as employees cannot innovate within unflattened hierarchies (Schwaber & Sutherland, 2020). Traditional "Machine" organisations apply technology-push linear models, whereas the 21st century adopts feedback-loop models in which algorithms direct innovations from customer data, diminishing "commanding" as innovation emerges from self-organised networks.

It can therefore be concluded that DX is a continuous process of "Learning to Learn"²⁷ rather than an endpoint in the effort to align the organisation with the "Brain" metaphor's capacity for "Double-Loop Learning"²⁸ (Argyris & Schön, 1978; Argyris, 1991). However, an unresolved practical tension is left in the form of the legacy debt crisis, originating from past "Machine" structures that physically and psychologically constrain innovation aspirations across the five domains, resulting in surface-level digitalisation rather than true transformation.

²⁷ Continuous learning capability

²⁸ Questioning underlying assumptions

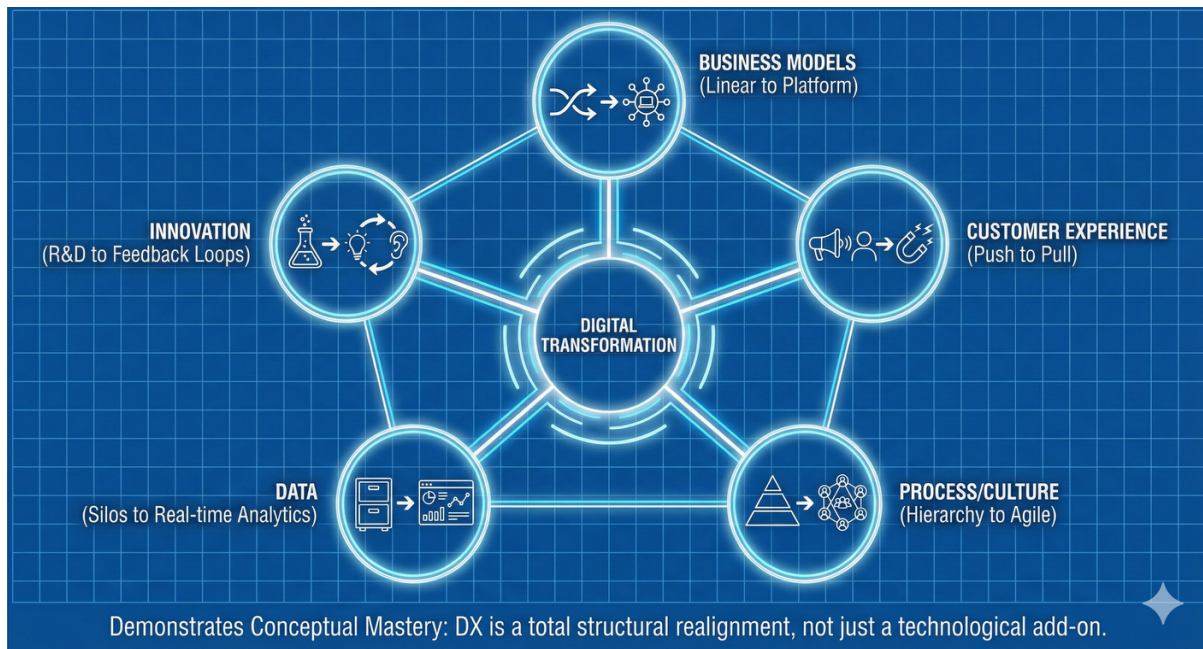


Figure 3: The 5 Spheres of Digital Transformation. Source: adapted from the 4IR Strategic Frameworks.

Importance of Adaptability and Agility

DX discussed in Section 3.2 requires a fundamental shift in organisational capability from static efficiency to dynamic agility. While legacy organisations strive to minimise variance and maximise predictability, in order to survive in the 4.0 environment, firms must operate like “Organisms” capable of sensing environmental change and reconfiguring resources in real time.

Agility in Practice: Zara versus Sears

Zara’s supply chain is a canonical example of so-called real-time retail, in which flexibility is embedded into the organisational structure itself rather than remaining a rhetorical claim (Ferdows et al., 2004). For instance, when a particular clothing item sells slowly at stores, Zara’s integrated feedback system allows production to be halted and redirected within days rather than months. This contrasts with Sears, where seasonal inventory was planned six to

nine months ahead; subsequently, by the time signals passed through bureaucratic layers, preferences had shifted. This explains why Sears' 2018 bankruptcy was a failure of agility, as internal complexity could not match market complexity.

Double-Loop Learning: Zara's Rejection of Industry Logic

Adaptation necessitates the examination of foundational assumptions, rather than mere error rectification. Zara is an example of "Double-Loop Learning" because it does not believe that having more inventory means more sales. Instead, it keeps its inventory low to create artificial scarcity (Argyris, 1977), which makes people buy right away.

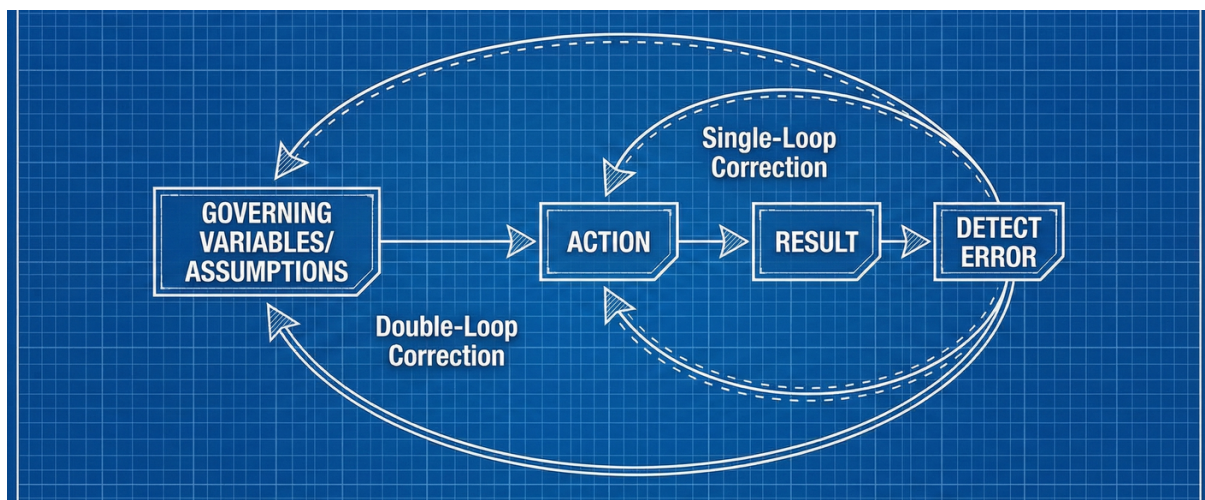


Figure 4: Double-Loop Learning (Argyris & Schön). Adapted from Morgan (2006) and Argyris & Schön (1974).

This counterintuitive logic yields measurable outcomes: markdown rates of only 3–4% compared to the industry average of 15–20%, and inventory turnover of 10–12 times per year versus 3–4 times for traditional retailers (Ferdows, 2004; Ghemawat & Nueno, 2006; Christopher, 2016). What Zara does particularly well is that instead of improving within

accepted industry norms—“Single-Loop Learning²⁹”, it questions whether those norms are still valid. This proves the power of the “Brain” metaphor in evolving core operational logic.

The Structural Paradox: Amazon’s Balancing Act

However, the downside of pursuing flexibility persists, because organisations must maintain slack and redundancy to enable rapid pivots, which directly conflicts with traditional financial imperatives of lean efficiency. To address this paradox; Amazon adopted the two-pizza team structure; meaning teams of roughly six to eight people, small enough to be fed by two pizzas; being designed to be autonomous, fast-moving, and free from bureaucratic approval (Rossman, 2019; Bryar, 2021), while still connected to centralised data infrastructure and strategic direction. This structure is important for taking advantage of the company's strengths and finding new ones. It is what keeps the “Ambidextrous Organisation³⁰” running (O’Reilly &Tushman, 2013). Still, finding this balance is not easy at all. The failure of the Fire Phone (discussed in Section 2.4) demonstrates that even with an agile structure, insufficient cross-functional coordination can still result in costly misalignments (Stone, 2021). This tension defines one of the central management challenges of the 4IR.

4. Obsolescence of Traditional Organisational Structures

4.1 Hierarchical Structures vs. Flat Organisations

The friction between digital strategy and structure (Section 2.4) requires deeper examination. Cole and Kelly (2020) define traditional hierarchy through the “Scalar Principle³¹” in which vertical command chains function only when information flows slowly and markets stay predictable.

²⁹ Error correction within existing frameworks

³⁰ Dual-handed organisation (exploit + explore)

³¹ Traditional vertical chain of command

The Information Bottleneck³² Problem

However, the 4IR's environment exposes a critical structural flaw in this model: that hierarchical layers create "Information Bottlenecks" (Johannessen, 2019). In real-time digital markets, when a market signal must pass through multiple approval layers before triggering a response, the time delay renders the response obsolete at the moment it is activated (Knight & Liesch, 2021). The core survival issue is that vertically structured organisations cannot achieve the "Requisite Variety" necessary to match environmental complexity, as established in Section 3.3.

Spotify: The Squad Model as Structural Innovation

Spotify arrived at an alternative to this legacy architecture. Specifically, it eliminated traditional departmental divisions and replaced them with the Squad–Tribe–Chapter–Guild model (Kniberg & Ivarsson, 2012; Smile, 2019). Spotify's Squads operate like miniature startups of 6–12 people, with end-to-end responsibility for specific features and a high degree of autonomy (Kniberg & Ivarsson, 2012), requiring no managerial approval. Rather than separating work into "engineering" and "design" departments, Spotify organises around work objects, for example, a "play button team" in which engineers and designers make decisions jointly. Discover Weekly emerged from one such autonomous squad (Pasick, 2015).

Tribes group related Squads (up to 100 people) for alignment without commands; Chapters connect specialists for technical standards, while Guilds are voluntary interest communities. Together, these structures produce "Aligned Autonomy" (Mankins & Garton, 2017); for instance, an engineer belongs to a "search Squad" responsible for day-to-day decisions and a "Java Chapter" focused on skill development and technical excellence.

³² Information congestion through approval layers

The measurable outcome is that Spotify grew from around 30 to over 3,000 employees between 2012 and 2020 while supporting the ability to deploy software updates thousands of times per day. This is an unimaginable pace under traditional structures (Spotify Engineering Blog, 2020).

Alibaba: Dismantling Hierarchy Through “Zhongtai”

Alibaba's 'Zhongtai' (middle-platform) restructuring under CEO Daniel Zhang extracted shared capabilities by integrating data analytics, payments, and logistics into a centralised intelligence layer accessible to all business units (Zeng, 2018; Chen & Shaheer, 2021; Greeven, 2023). This eliminated thousands of middle-management roles and reduced product launches from 6–12 months to weeks.

The Algorithmic Displacement of Middle Management

In summary, both cases illustrate the reason why middle managers are increasingly replaced by digital systems (Shrestha, 2019; Duggan, 2020; Schrage, 2020). Traditional span-of-control assumptions such as one manager supervising five subordinates presume that humans must process information cognitively (Graicunas, 1937; Urwick, 1956); . The introduction of ERP systems, real-time dashboards, and algorithmic workflows has removed this limitation; accordingly, individuals at Spotify or Alibaba can coordinate with dozens of stakeholders through digital tools without the need for intermediary managers.

The Power Paradox: Informal Hierarchy in Flat Structures

The shift toward flatness also introduces new tensions. Turco (2016) points out that removing formal hierarchy often leads to the emergence of shadow hierarchies based on informal influence, technical reputation, or proximity to founders. In practice, Spotify's squads are independent, but long-time engineers or those who are close to senior leadership still have too

much say over strategic decisions, which is a problem that the company itself admits.

4.2 Matrix Organisations and Cross-Functional Teams

Limitations of pure hierarchy prompted hybrid structures balancing expertise and responsiveness. The matrix organisation is dual-authority where employees report to functional and project managers, capturing both “Machine” stability and “Organism” adaptability (Galbraith, 2014; Davis & Lawrence, 1978).

The Theoretical Promise of Matrix Structures

In many complex contemporary organisations, expertise resides in functional silos, while value creation depends on cross-functional integration; matrix designs therefore address this genuine coordination problem. The matrix institutionalises this dual requirement through formal reporting relationships, enabling organisations to respond to the multidimensionality of global markets discussed in Section 3.1.

Sears: The Matrix That Accelerated Decline

Sears under CEO Eddie Lampert (2013–2018) exemplifies matrix dysfunction. Lampert divided the company into approximately thirty autonomous profit centres, assuming that internal competition would enhance accountability. In practice, store managers reported simultaneously to regional operations and multiple business unit heads, creating fragmented authority and coordination failures (Hoffman, 2013).

The result was organisational paralysis when business unit presidents refused cooperation because individual rewards discouraged it; also, bundling products across divisions was rejected as the apparel division claimed prime store space despite lower margins, and units competed for resources rather than collaborating to create value. Moreover, store managers

reporting to too many bosses received conflicting directives. Instead of focusing on customer service, they resorted to political navigation. Internal meetings devolved into zero-sum negotiations, with units competing for resources rather than collaborating to create value.

Critically, this dysfunction represents what systems thinking identifies as sub-optimisation, in which individual units refine their own goals at the expense of system-wide performance (Meadows, 2018; Deming, 2018). Lampert, therefore, created the kind of decision paralysis warned about by Johannessen (2019), that Sears' revenues declined continuously from 2013 until its bankruptcy in 2018, with former executives explicitly identifying the chaotic matrix structure as the primary cause.

Amazon: Single-Threaded Leadership as Matrix Alternative

Amazon therefore took a different path in its structural evolution. Instead of a matrix, Amazon developed the "Single-Threaded Leader³³" (STL) model, in which a senior leader is given full end-to-end ownership of an initiative, along with sufficient resources and authority to work independently, unconstrained by existing organisational boundaries (Bryar & Carr, 2021). This method fits with the "Brain" metaphor's idea of "Holographic Design", which means that each unit can act on its own and intelligently (Nonaka & Takeuchi, 2019). Its key distinction from matrix structures is the elimination of dependencies; in other words, cross-functional negotiation is removed. The measurable impact is clear: Amazon Prime launched in 2005 and reached 200 million subscribers by 2021 (Palmer, 2021; Bezos, 2021; Stone, 2021). Evidently, former executives attribute this speed to the STL model, as decisions that take weeks of interdepartmental consensus elsewhere can be made in days at Amazon.

The Accountability Paradox in Cross-Functional Models

³³ One person responsible end-to-end

Having said that, both matrix and cross-functional alternatives face a persistent problem, as the distribution of authority complicates accountability. At Sears, when sales declined, category heads, regional managers, and corporate functions shifted blame among one another, which is an example of organised irresponsibility, where systemic failures lack identifiable owners (Beck, 1992).

Amazon's STL model, on the other hand, solves this problem by making the “Single-Threaded Leader” 100% responsible for results. But there is a risk that putting too much power in one person's hands can lead to failure, as happened with the Fire Phone (Section 2.4). When power is too centralised and lacks countervailing input from other functions, which would exist in a matrix, leaders may pursue flawed strategies, resulting in losses of USD 170 million.

Comparing Sears and Amazon reveals that old management approaches have become obsolete, though deeper dynamics require analysis. The matrix structure represents an evolutionary step beyond pure hierarchy: instead of one boss, there are now two (one related to functional ability and one to projects), intended to increase flexibility, but it still rests on the “Machine” metaphor’s assumption that coordination requires formal authority relationships. This becomes a fatal weakness in the 4IR, where market velocity exceeds the speed of negotiated consensus. By contrast, Amazon’s STL model reflects distributed intelligence associated with the “Brain” metaphor and achieves the agility demanded by digital markets. Although this transition introduces challenges related to accountability, these do not invalidate the conclusion that traditional hierarchical and matrix structures are increasingly obsolete.

Coordination still plays a vital role, but the belief that it must be delivered through formal hierarchical mechanisms, whether pure or matrix-based, no longer holds. Structural transformation must therefore be accompanied by cultural evolution, redefining how coordination is achieved at digital speed.

4.3 Decentralisation and Empowerment

It is impossible to deny the critical role of cultural evolution (Section 4.2) in structural transformation, as well as how it is enacted in practice through decentralisation and empowerment. Classical management theory views decentralisation merely as the delegation of tasks within a hierarchical framework in which commands flow from the top down, while real power stays concentrated at the apex (Cole & Kelly, 2020). However, the 4IR has transformed decentralisation from a design choice into a structural imperative, meaning it is no longer a managerial option but a condition for organisational survival, because knowledge is now dispersed across global networks and market signals emerge at the periphery where employees interact with customers, rendering centralised control a systemic liability.

From Delegation to Data Democracy

The core distinction lies not in delegating authority but in democratising data (Brynjolfsson & McElheran, 2019; Bean & Davenport, 2019; Mikalef, 2020). Traditional empowerment often fails because organisations assign responsibility without providing the information required for decision-making. This is the “pseudo-decentralisation” being highlighted by Johannessen (2019), which means that something looks like it has autonomy when it really does not. Sears under CEO Eddie Lampert is a good example of this. Store managers were told to “increase profitability,” but they couldn't see integrated sales data, cross-unit inventory levels, or customer analytics. Former employees also said they only found out about inventory shortages when customers complained and about price changes by competitors days after they happened (Peterson, 2017). To truly empower someone, they need to have the same access to negative feedback loops (Wiener, 1948; Spreitzer, 1995; Dalio, 2017). Previously, Walmart store managers held nominal authority but operated within rigid headquarters parameters, so they were perceived as the decision executors rather than decision-makers.

The Control-Agility Paradox³⁴

Nevertheless, decentralisation also generates severe tensions. When the periphery is empowered, a key organisational risk is strategic fragmentation, where a coherent identity is lost as autonomous units optimise local objectives without systemic reference. Zappos' Holacracy experiment mentioned in Section 2.4 illustrates this risk, as the removal of hierarchy produced confusion rather than liberation (Bernstein et al., 2016). Furthermore, empowerment carries unavoidable surveillance implications: the same data systems that enable employees to make decisions also allow granular monitoring of those employees, commonly described as empowerment under observation (Zuboff, 2019; Kellogg, 2020; Parent-Rochelleau & Boudreau, 2020), which algorithms make possible. In this way, data democratisation coexists with intensified surveillance, echoing the "Surveillance Paradox" identified in Section 2.3.

5. Redefining Management Roles

The structural transformations discussed above require a corresponding redefinition of managerial roles. If hierarchical structures have become obsolete, this also entails the obsolescence of the managerial identity that was built upon them.

5.1 Transformational Leadership

When structure shifts from "Machine" to "Brain", leadership philosophy must change in parallel. Traditional headship, where authority derives from position rather than competence (Cole & Kelly, 2020), loses its foundation with flattened hierarchies and information democratisation. This is why management in the 21st century has changed from being based

³⁴ Control vs. Empowerment

on rank to being based on vision and trust. This change means that operations go from commanding to facilitating.

In e-business, knowledge workers frequently have greater expertise than their managers, making command-based authority ineffective (Drucker, 1999; Malone, 2004). Management is valuable because it helps people produce innovative ideas on their own. Jack Ma exemplified this by rejecting the commander role and shaping his vision and culture, allowing millions of merchants to work autonomously within strategic parameters (Erisman, 2015).

This corresponds to transformational leadership, which differs from transactional management because influence is exercised through inspiration, not reward and punishment mechanisms (Burns, 1978; Bass, 1985; Bass & Riggio, 2006). Crucially, this transition requires a cognitive shift from System 1 intuition to System 2 analysis, as shown in Figure 5 (Kahneman, 2011). Facilitators cannot use experiential heuristics because in the 4IR, market conditions change too quickly for experience to build up. So, they need to be able to make decisions based on data while also giving others the power to do the same.

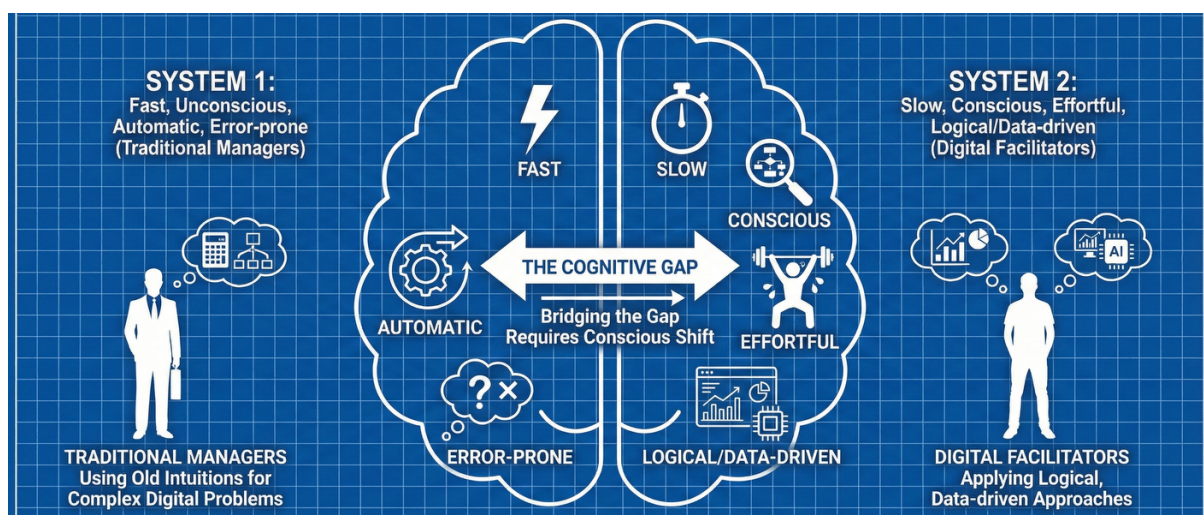


Figure 5: Cognitive Architecture (System 1 vs. System 2). Adapted from Kahneman (2011).

5.2 Embracing Technological Literacy

In the 4IR world, things are always changing, so change management is something you have to do all the time, not just once. Lewin's Unfreeze-Change-Refreeze model assumes that things stay the same during transitions, but this does not work in digital markets (Lewin, 1947). Spotify institutionalises continuous adaptation through "Hack Weeks", where employees work on unusual ideas and failure is seen as a way to learn (Kniberg & Ivarsson, 2012).

Managers need to be more like people who help others learn than people who carry out plans. Managers also need technical literacy, not so they can do tasks themselves, but so they can have honest conversations with specialist teams (Drucker, 1999; Edmondson & Harvey, 2018; Iansiti & Nadella, 2022). Conversely, managers who cannot participate meaningfully in discussions about data analytics, algorithmic logic, or platform dynamics lack the vocabulary needed to avoid a credibility gap, resulting in situations where formal authority exists without substantive influence.

At the same time, the downside of continuous adaptation cannot be ignored, as it can produce change fatigue, where human capacity is depleted by prolonged uncertainty (Bernerth, 2011; McMillan & Overall, 2016; Rafferty & Jimmieson, 2017; Gartner, 2020). An effective facilitator is therefore one who can balance demands for flexibility with organisational sustainability and who recognises that the "Organism" metaphor includes biological limits alongside adaptive capacity.

5.3. Ethical and Social Responsibility

The vertical integration of the ecosystem throughout this report makes the expansion of managerial responsibility clear. It goes beyond Friedman's (1970) Shareholder Theory, which was the main idea behind the "Machine" metaphor era. Instead, it becomes the job of managing stakeholders, which is what Freeman's (1984) Stakeholder Theory says managers should do for

customers, employees, suppliers, and the community as a whole. Companies are like nodes in a very interconnected network, and if one of them does something wrong, it can hurt the whole system's reputation. In 2011, Brazilian authorities found that subcontractors working for Zara were doing so under conditions that were similar to slavery (Brazilian Ministry of Labour, 2011). Although Zara did not directly run these workshops, the brand bore full reputational damage, and international media framed it as 'Zara slave labour'.

A further example can be found in Amazon's warehouse operations, where algorithmic management systems increase operational efficiency by tracking productivity in real time and issuing automated performance warnings. At the same time, these systems create conditions that critics describe as digital Taylorism (Bloodworth, 2018). In other words, workers are dehumanised in a way that Morgan's "Psychic Prison"³⁵ metaphor (Morgan, 2006) shows, where technology limits people (Zuboff, 2019; Kellogg, 2020). This is similar to the "Surveillance Paradox" we talked about in Section 2.3, where digital power both helps and hurts.

In addition, global e-business must deal with institutional duality, which is the tension between universal business standards and local cultural values (Kostova & Roth, 2002; Hill & Hult, 2023). Ethical frameworks cannot be universally applied in a state of semi-globalisation. Managers need to make decisions that are right for the situation while still keeping the system together. This is what stakeholder theory requires, but shareholder theory cannot handle it because it only cares about making money. When managers are under pressure to make sales, they often choose System 1 shortcuts that make things easier for them but are not ethical (Bazerman & Tenbrunsel, 2011; Shalvi, 2012). They also put speed ahead of safety.

³⁵ Trapped in old mental models

In summary, the 21st century requires slow and analytical System 2 thinking, expressed through mechanisms such as ethical review processes and stakeholder impact assessments (Kahneman, 2011; Freeman, 2018; Stahl, 2021). More fundamentally, ethical reasoning must be institutionalised, not left to individual conscience alone.

6. Challenges and Opportunities

6.1 Overcoming Resistance to Change

It is not technology that constitutes the primary barrier to transformation; the barrier is cognitive. The cases of Sears and the Amazon Fire Phone prove this, as both failed to abandon assumptions that were deeply embedded in legacy structures. Sears possessed sufficient capital and technology to develop online retail earlier than Amazon, yet executives remained trapped in the belief that physical stores were paramount. This resistance happens on three levels: senior leaders who are afraid of losing their hierarchical power, middle managers who are afraid of being replaced by algorithms, and employees who are used to clear instructions (Kotter, 1995; Oreg, 2003; Shrestha, 2019) and do not like the ambiguity of autonomous accountability.

Johannessen's *Death of Hierarchies* thesis illuminates structural dimensions (Johannessen, 2019), but Morgan's "Psychic Prison" metaphor clarifies the psychological: that members become trapped by mental models that once enabled success. Sears' leadership, conditioned by System 1 thinking to believe in physical store dominance, could not recognise digital retail as legitimate. Overcoming resistance requires a cognitive shift toward System 2 processing (Kahneman, 2011; Day & Schoemaker, 2016; Loeb, 2018), challenging personal identity as much as operational competence.

6.2 Navigating the Surveillance Paradox and Achieving Requisite Variety

The “Surveillance Paradox” persists that technology can liberate or constrain depending on managerial choice. Amazon's patented vibrating wristbands are designed to direct workers' hands toward bins, which exemplifies how efficiency can reduce humans to remotely controlled “Machines” (Lecher, 2018; Solon, 2018; Amazon Technologies, 2018). It is very essential to acknowledge that ethical management requires deliberate restraint despite technological capability.

In summary, challenges are inseparable from opportunity. Here, the opportunity lies in achieving “Requisite Variety”. The cases examined demonstrate that this is feasible. Zara’s feedback integration discussed in Section 3.3, Spotify’s squad autonomy in Section 4.1, and Walmart’s data democratisation in Section 4.3 all represent organisations whose internal agility matches market velocity. Furthermore, the common thread across these successful transformations is not any specific structural form, but the capacity for continuous adaptation through “Double-Loop Learning”. Technology makes this possible by doing three things that people and traditional systems cannot do on their own. It exposes false assumptions quickly and clearly, reduces the cost of trial and error, and shortens feedback loops. However, this capacity is only a necessary technical condition. Organisational culture is the decisive condition that decides whether digital capability produces genuine agility or merely accelerated rigidity (Westerman & McAfee, 2014; Schein, 2017; Denning, 2018).

7. Conclusion

7.1. Summary

This report has critically evaluated the claim that technological advances in e-commerce and electronic business have rendered traditional organisational structures and management theories obsolete. The author draws on evidence from the retail sector to substantiate this argument while also revealing its finer nuances. Sears' collapse provides decisive evidence that mechanistic structures cannot achieve “Requisite Variety” for the 4IR survival. From rigid hierarchy through matrix dysfunction to cognitive entrapment, the “Machine” metaphor becomes a “Psychic Prison” when complexity exceeds adaptive capacity.

The STL model from Amazon, the Squads from Spotify, and the Zhongtai from Alibaba all show distributed intelligence by dividing up tasks instead of putting all the power in one place. Zara and Walmart also show how internal agility can be in line with market speed. These cases show that what is no longer useful is not management itself, but the idea that coordination has to go through hierarchical command structures.

However, the evidence also reveals an unresolved duality. Amazon’s warehouse surveillance shows that digital Taylorism persists alongside “Brain”-like strategic agility. The darker side of the 21st-century enterprise is that it is no longer a unified whole but is split into two layers. At the strategic core, it operates like a “Brain” where humans think, learn, decide, and create, but at the outer operational layer, it functions like a “Machine” (O’Reilly & Tushman, 2013) where worker behaviour is measured, monitored, and directed by algorithms in real time. This opposition generates the “Surveillance Paradox”. Technology is used to empower groups at the core while simultaneously stripping autonomy from those at the periphery. This is the central ethical contradiction of digital transformation.

In short, the argument for obsolescence is true, but only under certain conditions. Traditional structures are no longer useful for strategic adaptation, but mechanistic control elements are still present in operational areas. The manager's job has changed from giving orders with a “Visible Hand” to helping with a “Digital Hand”. But this change raises new issues and questions that need to be answered, such as who is to blame when an algorithm fails, how to keep an eye on employees without invading their privacy, and how to keep organisations from getting tired of constant change. These questions are still unanswered for the future.

7.2 Implications for Future Research

Future research should examine the following three cores: (1) whether algorithmic management genuinely empowers workers or represents digital Taylorism in disguised form; (2) whether AI-supported decisions reduce bias or merely automate System 1 cognitive shortcuts at scale (Kahneman, 2016; O’Neil, 2016); and (3) how stakeholder theory must evolve to govern algorithms as organisational actors that require ethical rules instead of wages.

8. Recommendations

Embrace Strategic Ambidexterity

Companies need to pursue structural ambidexterity, which means having a mechanistic core to handle standard operations and exploitation, as well as autonomous “Holographic” units to drive innovation and exploration. This makes it possible to achieve both operational reliability and strategic flexibility at the same time.

Democratise Data Access

Companies must ensure that real-time analytics tools are accessible at all organisational levels, not concealed at the top of the leadership pyramid. This facilitates the functioning of peripheral units (e.g., stores, branches) as self-correcting systems instead of dependent executors.

Cultivate Dynamic Capabilities

Managers need to be developed in dynamic capabilities as shown in Figure 6: First, they must sense market change through data analysis. Second, they must seize opportunities through empowered teams that bypass bureaucratic bottlenecks. Third, it is critically important to transform organisational structures before they become “Psychic Prisons” of past success.

Transition to Facilitative Leadership

Leadership development must prioritise a cognitive shift from System 1 intuition to System 2 analysis, in parallel with ethical stewardship to resist the temptations of digital Taylorism when technology is used to exploit employees. In this direction, managers should be redefined as ecosystem architects who support autonomous innovation, not as commanders enforcing compliance through hierarchical control.

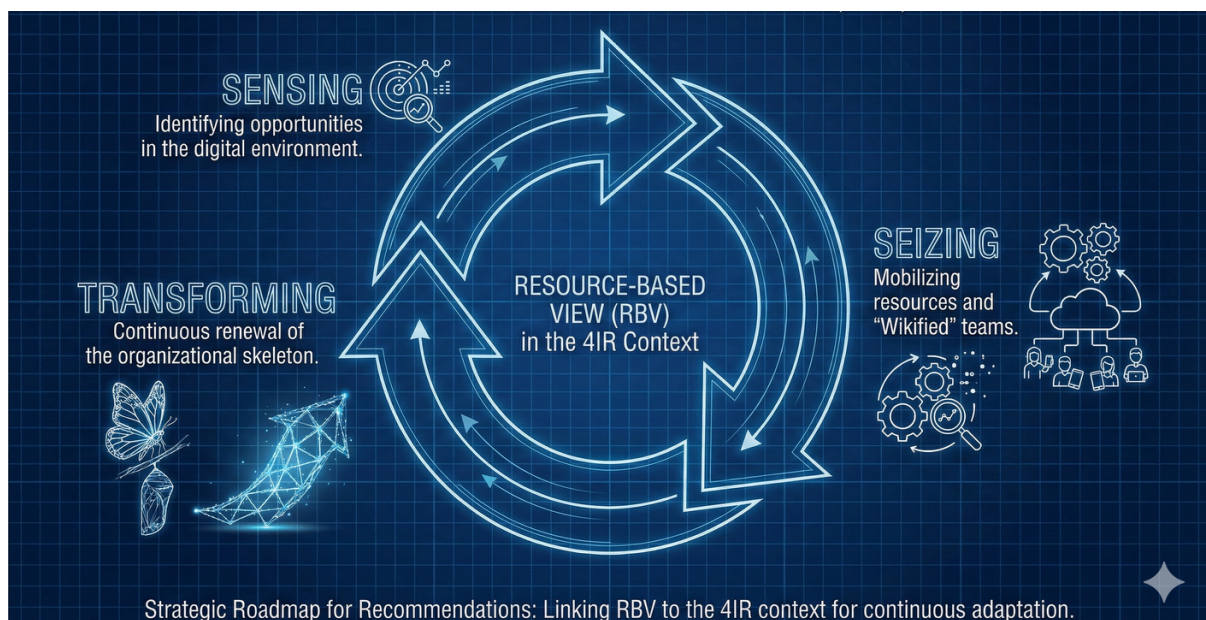


Figure 6: The Dynamic Capabilities Framework (Sense-Seize-Transform). Source:

Adapted from Teece et al. (1997) and Teece (2025).

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