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AI Competencies for Business Leaders: Building Sustainable Transformation Skills

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AI COMPETENCIES FOR BUSINESS LEADERS: BUILDING SUSTAINABLE TRANSFORMATION SKILLS

ABSTRACT

Artificial intelligence (AI) is increasingly integrated into business operations, influencing decisions across finance services industry, supply chains, energy sector, and beyond. Despite significant investments, many organisations struggle to scale pilot projects, ensure consistent governance, and fully embed AI into core strategy. Simultaneously, heightened expectations around sustainability and environmental, social, and governance (ESG) performance demand that leaders use AI not only for efficiency but also for responsible, long-term impact.

The primary objective of this research is to identify six essential competencies for executives leading AI-driven transformation: (1) AI and data literacy, (2) governance and risk management capability, (3) ethics and trust building, (4) sustainability-oriented systems thinking, (5) collaborative leadership, and (6) workforce enablement. These competencies are not merely abstract concepts. For example, finance leaders need the capacity to identify bias in lending models, supply chain executives must weigh predictive analytics against resilience, and/or energy leaders face trade-offs between efficiency and environmental responsibility. To support executives in building these capabilities, the authors propose a practical toolkit connecting each competency to governance processes such as risk registers, impact assessments, and ESG dashboards, offering actionable strategies rather than aspirational statements. The findings indicate that executives who build strength in these areas make sharper investment decisions, gain stakeholder trust, and deliver AI outcomes that align with sustainability commitments. This framework thus provides a practical pathway from small-scale experimentation to enterprise-wide responsible transformation.

Keywords: *AI governance, digital transformation, executive competencies, ethical AI, sustainability strategy*.
JEL: M10, M15, O32, M14, J24, Q56

1. INTRODUCTION

Artificial intelligence (AI) has evolved from small-scale pilots into a central part of business strategy across sectors including financial services, supply chains, energy and healthcare. For executives, the challenge is no longer whether to adopt AI, but how to integrate it responsibly and at scale so that technological progress aligns with ethical standards, social expectations and long-term organisational goals. Despite significant investment, many organisations remain stuck. They run pilots, see promise, then struggle to move beyond early stages. McKinsey's 2024 State of AI survey highlights that the major barriers are not technical but related to governance, oversight and leadership engagement (McKinsey & Company, 2024).

Regulation is also accelerating. The European Union's Artificial Intelligence Act (2024) requires organisations to conduct risk assessments, ensure explainability and implement formal governance structures (European Union, 2024). Compliance has become a strategic expectation rather than an optional commitment. At the same time, sustainability and ESG pressures are reshaping what stakeholders expect from AI adoption.

Investors, regulators and employees increasingly look for transparency, fairness and responsible long-term impact (World Economic Forum, 2025).

Leadership capability has not kept pace with these demands. Many executives rely heavily on technical teams without fully understanding the risks they are approving or the broader implications for trust, compliance and sustainability. This creates an accountability gap that exposes organisations to reputational, regulatory and operational risk. As Papagiannidis et al. (2025) note, frameworks for responsible AI are emerging, but the leadership dimension remains underdeveloped.

This paper addresses that gap by proposing six executive competencies needed to govern AI responsibly: (1) AI and data literacy, (2) governance and risk capability, (3) ethics and trust building, (4) sustainability-oriented systems thinking, (5) collaborative leadership and (6) workforce enablement. To support this objective, the paper adopts a structured research design that synthesises academic literature, international policy frameworks and industry analyses, as outlined in Section 1.1.

1.1. Research Design and Methodology

This paper uses a qualitative, conceptual approach. The aim was to bring together what is already known about AI governance, leadership capability and responsible adoption, and to identify the competencies that appear across different bodies of work. We reviewed recent academic publications (2016–2025) in the areas of AI governance, ethics, digital leadership and organisational transformation, using databases such as Scopus and Google Scholar. These sources were read closely and grouped into themes to identify capability areas that appeared consistently.

Alongside academic work, we examined major policy and standards documents, including the EU Artificial Intelligence Act (2024), the NIST AI Risk Management Framework (2023), ISO/IEC 42001 (2023), the OECD AI Principles (2024) and UNESCO's recommendations on AI ethics. These were used to understand expectations being placed on organisations and how leadership responsibilities are being defined internationally.

We also reviewed industry reports from organisations such as McKinsey, IBM, Accenture and the World Economic Forum to see how governance challenges are playing out in practice. Financial services, supply chains and the energy sector were selected as illustrative examples because they have mature AI use cases and clear documentation of risks and governance pressures. Insights from all sources were compared to form the six competencies presented in this paper.

Across all sources, recurring themes were grouped together and refined into six competencies that appeared consistently in academic, policy and industry materials.

2. FRAMEWORK FOR AI LEADERSHIP COMPETENCIES

Responsible use of AI requires leadership capabilities that reach beyond standard digital management. AI is not simply a technical tool but a socio-technical system with ethical, governance, sustainability, and cultural implications. Executives must, therefore, understand enough about AI to question assumptions, anticipate risks, and ensure technology decisions align with both organisational strategy and societal expectations. Drawing on research on competency frameworks (Blok et al., 2021), AI governance (Attard-Frost & Lyons, 2025; Batool et al., 2025), and studies on trust, collaboration, and workforce development (Lee et al., 2024; Engin, 2025; Schmutz et al., 2024; Vats et al., 2024), six competencies emerge as central to responsible executive leadership: (1) AI and data literacy, (2) governance and risk capability, (3) ethics and trust building, (4) sustainability-oriented systems thinking, (5) collaborative leadership, and (6) workforce enablement.

2.1. AI and Data Literacy

Executives do not need to be data scientists, but they must be literate enough to interpret model outputs, question assumptions, and identify risks. This involves understanding how data are collected and trained, what performance indicators mean, and where uncertainty lies. Failures in literacy can lead to significant consequences, as shown in studies of credit scoring where biased training data produced discriminatory results

(Kozodoi et al., 2022; de Castro Vieira et al., 2025). Similarly, logistics firms that relied heavily on algorithms without oversight were less resilient during supply disruptions (Culot et al., 2024). AI literacy also includes the ability to explain outcomes clearly to boards, regulators, and customers, reducing perceptions of AI as a "black box" (Burrell, 2016) and strengthening trust (Lee et al., 2024).

2.2. Governance and Risk Capability

AI brings distinctive risks, from embedded bias and privacy issues to cyber vulnerabilities and systemic dependencies. These must be integrated into enterprise-level risk management, not left solely to technical teams. Standards such as ISO/IEC 42001:2023 and the NIST AI Risk Management Framework (2023) provide useful structures for embedding oversight, but leadership is essential for assigning ownership, defining escalation processes, and monitoring emerging threats (Attard-Frost & Lyons, 2025). Governance capability, therefore, extends beyond compliance − it reflects a recognition that AI risk belongs alongside financial and operational exposure at board level.

2.3. Ethics and Trust Building

Ethics is a core requirement for sustainable AI, not an optional add-on. Public trust declines quickly when systems appear biased or opaque (Engin, 2025). Ethical governance means embedding fairness assessments, stakeholder consultations, and transparent reporting. Neglecting this can result in reputational and regulatory harm, as seen in finance and human resources (Kozodoi et al., 2022; de Castro Vieira et al., 2025). Conversely, structured evaluations such as the Assessment List for Trustworthy AI (ALTAI) (European Commission High-Level Expert Group on Artificial Intelligence, 2020) and international frameworks like UNESCO's Recommendation on the Ethics of AI (UNESCO, 2021) strengthen legitimacy. Papagiannidis et al. (2025) link transparent, ethical governance directly to resilience and stronger stakeholder relationships.

2.4. Sustainability-Oriented Systems Thinking

AI does not operate in isolation. Large-scale models consume energy and generate carbon impacts (Li et al., 2025; Wang et al., 2025). Efficiency gains in one area can create environmental or social costs in another. Executives must, therefore, connect AI adoption to broader sustainability goals. Accenture's (2025) Powering Sustainable AI warns that unchecked optimisation can undermine public trust and ESG commitments. Embedding AI indicators in ESG dashboards and lifecycle reporting helps balance innovation with accountability (OECD, 2024).

2.5. Collaborative Leadership

AI governance is inherently cross-functional, requiring coordination across data, compliance, operations, and external partners. Executives must bridge these domains, balancing commercial pressures with ethical and regulatory expectations. Evidence from healthcare shows that implementation succeeds when clinicians, IT specialists, and patients collaborate rather than when governance is imposed top-down (Lee et al., 2024). Mechanisms such as interdisciplinary review boards and advisory committees enhance transparency and legitimacy (Schmutz et al., 2024; Attard-Frost & Lyons, 2025).

2.6. Workforce Enablement

AI transforms work itself. Executives must guide this transition by prioritising upskilling, inclusion, and clear communication. As Raisch and Krakowski (2021) describe in the automation-augmentation paradox, AI should extend − not replace − human capability. The World Economic Forum (2025) notes that organisations investing in retraining achieve higher loyalty and adaptability. Workforce enablement requires structured impact assessments, retraining programs, and ongoing consultation to ensure that technological change supports both employee wellbeing and organisational resilience (OECD, 2024).

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Together, these six competencies create a practical foundation for responsible executive leadership. They complement technical standards and regulatory guidance by embedding accountability, transparency, and

sustainability into daily decision-making, helping leaders build trust, ensure compliance, and align AI adoption with long-term organisational and societal goals.

3. CASE ILLUSTRATIONS ACROSS SECTORS

The six competencies outlined in Section 2 appear in different ways across industries. The following examples − from financial services, supply chains, and the energy sector − show how leadership capability determines whether AI adoption enhances legitimacy, resilience, and sustainability when scaled.

3.1. Financial Services Industry

In the financial services sector, executives must balance technological innovation with fairness, compliance, and trust. AI tools are now central to credit scoring, fraud detection, and algorithmic trading, yet the opacity of many systems (Burrell, 2016) makes oversight difficult. Evidence highlights the risks. Kozodoi et al. (2022) found that biased training data in credit scoring can perpetuate discrimination against protected groups, while de Castro Vieira et al. (2025) documented the regulatory and reputational fallout from such cases. The 2019 Apple Card controversy, where an AI-based credit system was accused of gender bias, prompted U.S. regulatory investigations and damaged public trust. Similar incidents in Europe have since led regulators to require fairness testing in financial risk audits. Sustainability expectations are also reshaping accountability. Li et al. (2025) show that investors now link AI-enabled decision-making to ESG performance, expecting leaders to demonstrate transparency and responsible governance. The World Economic Forum (2025) likewise notes that stakeholder trust has become a key competitive differentiator. These findings make it clear that AI and data literacy, governance and risk capability, and ethics and trust building are no longer optional for financial leaders.

3.2. Supply Chains

Across global supply chains, AI-driven predictive analytics support forecasting, logistics routing, and supplier risk assessment. While efficiency gains are well-documented, these benefits can collapse when resilience and fairness are overlooked. Culot et al. (2024) warn that excessive reliance on algorithms can make supply networks brittle, while Jahin et al. (2023) demonstrate that biased supplier data can distort procurement decisions. The COVID-19 pandemic illustrated this clearly. Firms that optimised inventories solely through predictive algorithms struggled to adapt when borders closed, leading to shortages and reputational damage. By contrast, organisations that combined algorithmic insights with executive-led resilience planning were able to adjust suppliers and maintain operations. Leadership competency thus becomes a decisive factor in whether AI strengthens or undermines performance. As George et al. (2021) caution, efficiency-focused adoption without fairness and sustainability safeguards can erode stakeholder confidence.

3.3. Energy Sector

AI adoption in the energy sector has accelerated rapidly, particularly in grid management and renewable integration (Lamnatou et al., 2025). Applications in optimisation, demand forecasting, and energy storage promise substantial gains, yet they also create new dependencies that can limit operational flexibility. Wang et al. (2025) recognise AI's potential to speed the energy transition but caution against algorithmic "lock-in" − a situation where reliance on specific optimisation models constrains future policy choices. Olawade et al. (2024) make a related point: if lifecycle carbon impacts are ignored during deployment, efficiency improvements may actually work against net-zero commitments. Real cases illustrate the tension. Google DeepMind's work with the UK National Grid improved data centre efficiency substantially, yet regulators questioned the transparency of proprietary algorithms and the risk of long-term dependence on a single vendor. In Germany, smart grid pilots drew public criticism for failing to address fairness in how renewable energy access was distributed across communities. These cases highlight a persistent challenge: technical performance alone does not guarantee legitimacy. Public trust matters enormously in energy governance. George et al. (2021) note that energy innovations often meet resistance when distributional fairness is neglected, regardless of efficiency gains. The U.S. Department of Energy (2024) goes further, arguing that transparency is not simply desirable but necessary for maintaining public confidence in grid modernisation. The World Economic Forum (2025) reinforces this view, concluding that inclusive governance structures are essential if AI-driven energy systems are to gain lasting social acceptance.

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These sectoral examples show that leadership competencies directly influence AI outcomes. In financial services, neglecting fairness and transparency leads to regulatory scrutiny; in supply chains, poor governance undermines resilience; and in energy, ignoring sustainability and inclusion erodes legitimacy. Responsible AI leadership is not about technical optimisation alone − it rests on judgement, ethics, and systems awareness.

4. TOOLKIT: Linking Competencies to Governance Processes

The six competencies outlined in Section 2 provide a foundation for responsible executive leadership in AI, but without practical integration into governance systems, they remain aspirational. Executives need mechanisms that translate competencies into daily practice − tools, processes, and artefacts that make oversight visible and reviewable. This section offers a practical toolkit showing how each competency connects to familiar organisational structures. The goal is to shift AI governance from peripheral activity to core strategic practice.

4.1. Embedding Competencies in Governance Processes

Integrating AI competencies into existing governance routines helps position oversight as mainstream organisational accountability rather than specialist technical work. Consider how this might look in practice:

- AI and data literacy develops when executives participate directly in interpretability workshops, review AI dashboards with technical teams, and ask informed questions about model performance and limitations (Australian Institute of Company Directors & UTS Human Technology Institute, 2024; IBM Institute for Business Value, 2024). Regular engagement builds familiarity and reduces over-reliance on technical intermediaries.
- Governance and risk capability takes shape through established risk management channels. AI-related risks should appear in enterprise risk registers, escalate through board risk committees when thresholds are breached, and face scrutiny during internal and external audits (International Organization for Standardization, 2023; National Institute of Standards and Technology, 2023, 2024). This integration signals that AI risks deserve the same attention as financial or operational exposures.
- Ethics and trust building requires dedicated structures. Fairness assessments, stakeholder consultations, and independent ethics review boards help ensure that ethical considerations receive systematic attention rather than ad hoc treatment (European Commission High-Level Expert Group on Artificial Intelligence, 2020). Without formal mechanisms, ethics can easily become performative.
- Sustainability systems thinking means evaluating AI projects using lifecycle analyses, carbon modelling, and ESG reporting (OECD, 2024). This shifts the conversation from narrow efficiency metrics to broader environmental and social impacts, making trade-offs explicit.
- Collaborative leadership depends on creating spaces where different perspectives can be heard. Cross-functional review boards and interdepartmental committees provide forums for data scientists, compliance officers, operational managers, and external advisors to work through tensions between commercial objectives and ethical constraints (IBM Institute for Business Value, 2024; Attard-Frost & Lyons, 2025).
- Workforce enablement becomes concrete through workforce impact assessments, retraining programmes, and employee consultation processes built into transformation planning (Australian Institute of Company Directors & UTS Human Technology Institute, 2024). These mechanisms acknowledge that AI adoption affects people's livelihoods and identities, not just efficiency metrics.

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When competencies are woven into familiar processes, AI oversight stops being a separate exercise and becomes part of how organisations actually make decisions.

4.2. Artefacts as Anchors of Accountability

Processes matter, but so does documentation. Governance needs tangible outputs − records that boards can review, regulators can examine, and stakeholders can access. These artefacts provide evidence that oversight

is happening and create accountability trails. Different competencies generate different types of documentation:

- For AI and data literacy, organisations might produce bias summaries showing how training data were assessed, interpretability reports explaining model logic, and data quality assessments documenting accuracy and completeness.
- Governance and risk capability generates compliance logs tracking regulatory obligations, risk registers documenting identified threats and mitigation strategies, audit reports recording independent reviews, and regulatory filings demonstrating adherence to legal requirements.
- Ethics and trust building creates minutes from ethics board meetings, outputs from fairness audits, and records of ALTAI self-assessments (European Commission High-Level Expert Group on Artificial Intelligence, 2020). These documents show that ethical questions have been considered systematically.
- Sustainability systems thinking produces ESG dashboards integrating AI metrics with broader environmental and social performance, lifecycle impact analyses estimating carbon footprints, and sustainability reports communicating outcomes to external audiences.
- Collaborative leadership leaves traces in decision logs recording who was consulted and why, meeting minutes capturing different perspectives, and joint risk assessments showing how technical and non-technical expertise were combined.
- Workforce enablement appears in HR impact statements describing employment effects, reskilling plans outlining training commitments, and employee survey results gauging sentiment and concerns.

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Documentation quality matters substantially. A bias summary that simply states "no bias detected" provides little assurance. A meaningful assessment specifies which datasets were examined, which fairness metrics were applied (demographic parity, equalized odds, etc.), what mitigation strategies were implemented, and what residual limitations or uncertainties remain. Similarly, meeting minutes should capture substantive disagreements and reasoning, not just attendance lists.

4.3. Mapping Competencies, Processes, Artefacts, and Roles

Clarity about who is responsible for what prevents diffusion of accountability. While organisational structures vary, certain roles typically align with specific competencies. Table 1 provides an indicative mapping. This table is derived from the authors' synthesis of the academic literature, policy frameworks and industry reports reviewed in this study.

Table 1. *Mapping competencies to processes, artefacts, and roles*

Competency	Governance processes	Artefacts	Executive roles[1]
AI & data literacy	Dashboard reviews, interpretability sessions	Bias summaries, interpretability reports, data audits	CEO, CIO
Governance & risk capability	Risk registers, compliance audits, board risk updates	Risk registers, compliance logs, regulatory filings	CFO, CRO, COO
Ethics & trust building	Stakeholder consultations, ethics board reviews	Ethics reports, fairness audits, ALTAI assessments	CEO, CSO
Sustainability systems thinking	ESG tracking, lifecycle analyses	ESG dashboards, sustainability reports	CSO, COO
Collaborative leadership	Cross-functional review boards, interdepartmental committees	Meeting minutes, decision logs, joint risk records	CIO, COO
Workforce enablement	Workforce impact assessments, reskilling initiatives	Training plans, HR impact statements, employee surveys	CHRO, COO

This mapping should be adapted to organisational context − smaller firms may consolidate roles, while larger organisations might distribute them more finely. What matters is avoiding situations where everyone assumes someone else is responsible. Explicit ownership at executive level ensures competencies translate into practice rather than remaining good intentions.

[1] CEO = Chief Executive Officer; CIO = Chief Information Officer; CFO = Chief Financial Officer; CRO = Chief Risk Officer; COO = Chief Operating Officer; CSO = Chief Sustainability Officer; CHRO = Chief Human Resources Officer.

5. DISCUSSION AND IMPLICATIONS

The framework presented in this paper shows that executive competencies are central to responsible AI adoption. Technical expertise remains essential, but it cannot stand alone. Organisational legitimacy, regulatory compliance, and long-term sustainability depend on leaders who can connect technical, ethical, and social considerations. This section discusses the implications for theory, organisations, and governance.

5.1. Theoretical Implications

The framework contributes to leadership and governance scholarship by framing AI adoption as a socio-technical challenge rather than a purely technological one. Earlier studies often emphasised digital maturity and technical capability, yet these perspectives risk overlooking questions of legitimacy, fairness, and social responsibility (Brynjolfsson & McAfee, 2014; Davenport & Ronanki, 2018). By integrating ethics, trust, and sustainability alongside literacy and risk management, this model broadens the analytical focus and argues that AI governance requires both moral and technical judgment.

Suchman (1995) reminds us that legitimacy is maintained when pragmatic efficiency aligns with normative and cognitive expectations. The present framework operationalises this idea through competency-based leadership, showing how legitimacy is built through institutional practice rather than personal charisma. A second theoretical contribution lies in linking competencies to organisational artefacts and processes. Leadership research frequently highlights traits or behaviours, but without institutionalisation these qualities fade with turnover. Competencies gain durability only when embedded in mechanisms such as risk registers, fairness audits, and ESG dashboards. This approach aligns with work on accountability infrastructures, which stresses that genuine governance depends on routines, documentation, and transparency rather than individual intention (Power, 1997; Bovens, 2007).

5.2. Organisational Implications

The framework shows how executive competencies shape decision quality, stakeholder trust, and sustainability alignment. AI and data literacy enables leaders to interrogate vendor claims and avoid hype-driven investments. Governance and risk capability ensures algorithmic risks receive the same attention as financial exposures (International Organization for Standardization, 2023; National Institute of Standards and Technology, 2023, 2024). Ethics and trust competencies prevent oversight from becoming performative through fairness audits and stakeholder consultations. Collaborative leadership integrates diverse perspectives, reducing silos (European Commission High-Level Expert Group on Artificial Intelligence, 2020; Jobin et al., 2019). Sustainability-oriented thinking ensures environmental and social trade-offs are assessed systematically, while workforce enablement aligns AI with just transition principles (Accenture, 2025; World Economic Forum, 2025). Without these competencies, sustainability reporting risks becoming disconnected from operational reality (George et al., 2021).

These are not simply personal skills but institutional capacities. Embedding them within governance structures transforms responsible AI leadership into core organisational function.

5.3. Policy and Regulatory Implications

The policy environment is evolving quickly. The EU's Artificial Intelligence Act (European Union, 2024) introduces binding rules on risk categorization, transparency, and accountability. Early scholarly analysis of the Act's development (Veale & Zuiderveen Borgesius, 2021) highlighted the importance of its risk-based approach and the challenges of balancing innovation with protection. Complementary frameworks such as NIST's AI Risk Management Framework (2023) and ISO/IEC 42001 (2023) set international benchmarks, confirming compliance has become mandatory.

Two implications follow. First, regulatory alignment matters − without interoperability across jurisdictions, organisations face fragmented compliance burdens. OECD AI Principles (2024) call for harmonized standards to support cross-border deployment. Second, regulation needs adaptability. Because AI evolves rapidly, static frameworks soon become outdated. Scholars advocate for dynamic models incorporating sandboxes, feedback

loops, and multi-stakeholder dialogue (Attard-Frost & Lyons, 2025; Taeihagh, 2025). For executives, compliance must be a leadership concern, not merely a legal function.

5.4. Limitations and Directions for Future Research

This framework should be viewed as an initial conceptual step. It draws on literature, policy frameworks, and sectoral cases but lacks large-scale empirical validation. Future studies should test the competencies across industries and jurisdictions to assess practical impact. Another limitation concerns proceduralism. Power (1997) warns that governance artefacts can become "accountability theatre" signalling compliance without changing behaviour. Research should examine when competencies become genuinely institutionalized rather than symbolic.

The framework focuses on executive leadership given its strategic importance, yet effective AI governance depends on distributed capabilities throughout organisations. Studies tracing how competencies cascade through managerial and operational layers would provide fuller understanding of organisational capacity. The framework advances understanding by reframing AI leadership as socio-technical and institutional. For organisations, it shows competencies shape decision quality, legitimacy, and sustainability. For policymakers, it underscores harmonized yet adaptive regulation. For researchers, it offers conceptual grounding for empirical inquiry within evolving governance systems.

5.5. Practical Roadmap for Implementation

Building these competencies takes time. Organisations should approach development across three phases, though pace may vary by size, sector, and existing governance maturity. Initial efforts establish foundations within six months: baseline literacy through workshops, clear risk ownership for AI systems, and early fairness assessments. Organisations should map use cases, categorize risks, and establish basic documentation for board review. Integration occurs between six and eighteen months. AI risks appear in enterprise risk registers alongside other exposures. Cross-functional boards bring together technical, legal, and operational perspectives. Workforce consultation gives employees voice. Documentation becomes substantial: bias summaries, ethics board minutes, ESG dashboards tracking impacts.

Maturity arrives when practices become routine. Regular fairness audits replace one-off assessments. ESG integration becomes comprehensive. Workforce development shifts from reactive to proactive. Continuous improvement captures lessons from failures. This phase has no fixed endpoint as AI capabilities and risks keep evolving. This staged approach balances ambition with realism, acknowledging cultural change cannot be rushed while ensuring visible progress. Each phase builds on the previous, reducing risk that governance becomes disconnected from operations.

6. **CONCLUSION**

Executive leadership in the age of AI requires a blend of technical awareness, ethical judgement and organisational understanding. This paper outlined six competencies that can help leaders navigate these demands: AI and data literacy, governance and risk capability, ethics and trust building, sustainability-oriented systems thinking, collaborative leadership and workforce enablement. Together, they offer a way for leaders to consider the broader implications of AI rather than viewing it as a purely technical matter.

The examples from financial services, supply chains and the energy sector show how these competencies play out in real settings. Financial institutions that failed to address fairness issues have faced criticism and regulatory attention. Supply chains designed only for efficiency have proved vulnerable to disruption. Energy projects that focused narrowly on optimisation without considering distributional or environmental concerns have struggled with community acceptance. In contrast, organisations that involved their people early, communicated clearly and made space for workforce development managed AI adoption more smoothly.

A key contribution of this framework is its connection to the governance tools organisations already use. By linking leadership capabilities to risk registers, ESG dashboards, interpretability reviews and ethics processes, responsible AI becomes something that can be embedded in everyday practice rather than treated as an add-on or a compliance exercise. This also provides a clearer pathway for organisations trying to meet regulatory

expectations, and a useful foundation for researchers examining how leadership shapes the direction and impact of AI initiatives.

AI governance is ultimately not just a technical exercise. It touches on questions of judgement, accountability, values and long-term organisational resilience. Leaders who take these competencies seriously will be better placed to guide AI adoption in a way that maintains trust and aligns with organisational goals. Those who overlook them risk reputational damage, loss of legitimacy and stronger regulatory intervention. Although this paper brings together insights from multiple sources, there is still more to learn about how these competencies develop in practice, how they are used in real decision-making situations and how they evolve as AI systems and sustainability expectations continue to shift. These questions offer a helpful direction for future research and practical reflection.

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