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ITTI IMPACT SURVEY REPORT 2025

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01

Executive Summary

01

EXECUTIVE SUMMARY

The UAE manufacturing sector is at an inflection point in its digital transformation journey. As global competitiveness increasingly depends on productivity, resilience, and sustainability, manufacturers are under pressure to move beyond isolated digital pilots toward structured, value-generating Industry 4.0 programs. Against this backdrop, the **Industrial Technology Transformation Index (ITTI)** has emerged as a central policy and execution mechanism to accelerate digital maturity across the sector.

This report presents findings from a comprehensive survey of **103 manufacturing facilities**, comprising **67 ITTI-assessed** and **36 non-ITTI-assessed** factories. The analysis evaluates how ITTI participation influences digital readiness, technology adoption, capital allocation, operational performance, workforce capability development, and sustainability outcomes. The evidence demonstrates that ITTI functions not merely as a diagnostic tool, but as a **catalyst for disciplined execution and value realization**.

Key Findings of ITTI Impact

01 ITTI creates structure and planning discipline where it did not previously exist

Factories that have undergone ITTI assessment are more than twice as likely to operate with a formal digital transformation roadmap compared to non-assessed peers. ITTI converts intent into structured prioritization by clarifying maturity gaps, sequencing initiatives, and aligning investments to operational objectives. This planning discipline is a critical enabler of execution at scale.

02 ITTI-assessed factories commit materially higher capital to digital transformation

ITTI participation is associated with a step-change in both historical and forward-looking digital investment. Median digital CAPEX among ITTI factories is approximately **3× higher historically and 4× higher on a forward-looking basis** than among non-ITTI factories. Importantly, this investment is not confined to enterprise IT, but extends into shopfloor and operational technologies that directly influence productivity and quality.

03 ITTI accelerates adoption of advanced, shopfloor-relevant Industry 4.0 technologies

While core enterprise systems such as ERP are widely adopted across the sector, ITTI-assessed factories show significantly deeper penetration of advanced technologies including automation and SCADA systems, Manufacturing Execution Systems (MES), AI/ML, and Industrial IoT. On average, ITTI factories report approximately **50% greater breadth of implemented technologies** than non-assessed factories, indicating faster progression along the digital maturity curve.

Key Findings of ITTI Impact

04 Operational impact is materially stronger among ITTI participants

Factories assessed under ITTI consistently report higher improvements across critical operational KPIs, including quality, manufacturing process efficiency, maintenance effectiveness, production flexibility, and time-to-delivery. These gains indicate that ITTI-supported initiatives are translating into tangible shopfloor outcomes rather than remaining conceptual or experimental.

05 Financial value capture remains the next frontier

Despite widespread operational improvements, a large share of manufacturers—particularly those earlier in their transformation journey—have yet to systematically translate performance gains into EBITDA impact. This reflects gaps in benefit tracking, financial linkage, and performance management rather than failure of digital initiatives themselves. ITTI provides the foundation to close this gap, but further emphasis on value capture mechanisms is required.

06 Workforce capability is the primary structural bottleneck

Across the sector, digital and operational technology talent remains constrained. While ITTI factories demonstrate stronger hiring of automation engineers, data professionals, and digital transformation leaders, advanced skills such as AI/ML, digital twin, and robotics remain scarce. Many manufacturers continue to rely heavily on vendors rather than building internal digital operating capabilities, limiting scalability and sustainability of transformation.

07 ITTI embeds sustainability into the digital transformation agenda

Beyond productivity and efficiency, ITTI participation correlates with higher adoption of structured sustainability strategies and initiatives. ITTI-assessed factories are significantly more likely to be implementing programs related to water and wastewater management, emissions reduction, and material circularity, positioning digital transformation as an enabler of long-term environmental performance.

Overall Impact on the UAE Manufacturing Sector

When extrapolated to the broader manufacturing base, the survey findings indicate that ITTI adoption has the potential to generate **thousands of Industry 4.0 projects**, **billions of dirhams in digital investment**, and **hundreds of high-skilled jobs** across the sector. The cumulative effect is a more productive, resilient, and sustainable industrial ecosystem aligned with the UAE's national competitiveness agenda.

Implications

For manufacturers

ITTI offers a proven pathway from fragmented digital experimentation to structured, value-driven transformation.

For policymakers

scaling ITTI adoption represents a high-leverage intervention to accelerate sector-wide productivity and capability development.

For the broader ecosystem

the findings highlight sustained demand for advanced industrial technologies, system integration, and skills development.

Overall, the evidence is clear: **ITTI materially improves the probability that digital transformation efforts move from ambition to execution, and from execution to impact.**



02

Study Context & Objectives

2.1 | Context: Digital Transformation as a Strategic Imperative for UAE Manufacturing

The UAE manufacturing sector is undergoing a structural transition driven by rising global competition, increasing cost pressures, and growing expectations around resilience and sustainability. Manufacturers are expected to deliver higher productivity, shorter lead times, improved quality, and lower environmental impact—often simultaneously. Traditional operational improvement levers alone are no longer sufficient to meet these demands at scale.

In response, **digital transformation and Industry 4.0 adoption have emerged as critical enablers**. Technologies such as industrial automation, advanced analytics, AI/ML, IoT, and Manufacturing Execution Systems (MES) offer manufacturers the ability to optimize end-to-end value chains, enhance decision-making, and unlock step-change improvements in performance. However, global experience shows that many manufacturers struggle to translate digital ambition into consistent execution and measurable value.

Within the UAE, this challenge is particularly pronounced among small and mid-sized manufacturers. While awareness of digital technologies is relatively high, adoption is often fragmented, vendor-driven, and insufficiently linked to business priorities. Digital initiatives frequently remain at the pilot stage, lacking clear roadmaps, governance, and performance management structures.

2.2 | Role of the Industrial Technology Transformation Index (ITTI)

The Industrial Technology Transformation Index (ITTI) was introduced to address these execution challenges by providing manufacturers with a structured, standardized approach to assessing and advancing their digital maturity. ITTI is designed not only to benchmark current capabilities, but also to act as a strategic guide for transformation, helping manufacturers:

Understand their current digital and operational maturity across key dimensions

Identify priority improvement areas and technology gaps

Align digital initiatives with business and sustainability objectives

Develop actionable roadmaps for Industry 4.0 adoption

Unlike ad-hoc digital assessments, ITTI integrates **technology, operations, workforce, and sustainability considerations** into a single framework. This holistic perspective is intended to reduce fragmentation, improve investment prioritization, and accelerate the transition from experimentation to scaled deployment.

As ITTI adoption has expanded across the UAE manufacturing base, an opportunity has emerged to rigorously evaluate its real-world impact. In particular, there is a need to move beyond anecdotal evidence and assess whether ITTI participation correlates with superior planning discipline, higher investment levels, deeper technology adoption, and improved operational outcomes.

2.3 | Purpose of the Study

This study was commissioned to provide an **evidence-based assessment of technology adoption and digital transformation outcomes** within the UAE manufacturing sector, with a specific focus on the role played by ITTI. The analysis draws on primary survey data collected from manufacturers at varying stages of digital maturity and compares outcomes between ITTI-assessed and non-assessed factories.

Key Findings of ITTI Impact

- 01 Does ITTI materially influence how manufacturers plan and structure their digital transformation journeys?**
Get better information on cost of the solution, its likely impact on business, thereby facilitating informed decision-making on Industry 4.0 investments.
- 02 Does ITTI participation translate into higher levels of investment, technology adoption, and operational impact?**
The study evaluates both the scale and nature of digital investments, as well as their reported impact on operational and financial performance.
- 03 What is the broader sector-level implication of ITTI adoption for the UAE manufacturing ecosystem?**
This includes potential impacts on Industry 4.0 project volumes, capital investment, workforce transformation, and sustainability outcomes.

2.4 | Scope of Analysis

The analysis covers **six dimensions of digital and sustainability maturity**, reflecting the full lifecycle of transformation from intent to impact:

Key Findings of ITTI Impact

- 01 Digital Readiness**
Clarity of digital maturity, foundational systems, and readiness for adoption.
- 02 Digital Adoption & Investment**
Technologies implemented, planned investments, and capital allocation patterns.

Key Findings of ITTI Impact

03 Operational & Financial Impact

Translation of digital initiatives into measurable performance improvements.

04 Workforce & Skills Development

Availability of specialist roles, hiring trends, and capability gaps.

05 Sustainability

Integration of digital technologies into environmental and resource-efficiency initiatives.

06 Future Outlook & Digital Ambition

Forward-looking plans to scale and sustain Industry 4.0 adoption.

By examining these dimensions holistically, the study aims to distinguish between **digital activity** and **digital effectiveness**, and to identify where ITTI adds the most value.

2.5 | Intended Audience and Use of Findings

The findings of this report are intended to inform three primary stakeholder groups:

Manufacturers

by providing benchmarks and practical insights on how structured assessments and roadmaps can accelerate value capture.

Policymakers and Regulators

by quantifying the impact of ITTI and informing decisions on scaling, refining, and targeting future interventions.

Technology and Ecosystem Partners

by highlighting demand patterns, capability gaps, and areas where support is most needed.

Ultimately, the study seeks to support a shared objective: **building a digitally advanced, competitive, and sustainable manufacturing sector in the UAE.**



03

Methodology & Data Overview

3.1 | Research Design

This study is based on a structured, quantitative survey designed to assess the state of digital transformation and technology adoption within the UAE manufacturing sector. The survey captures both **current-state metrics** and **forward-looking intentions**, enabling assessment of digital maturity, investment behavior, and realized impact.

The research design deliberately differentiates between **manufacturers that have undergone an ITTI digital maturity assessment** and those that have not. This comparative structure allows for isolation of ITTI's role as an enabling mechanism, while controlling for broader sector-wide trends in digital adoption.

The analysis emphasizes **outcome-oriented indicators**—such as roadmap presence, capital allocation, technology deployment, operational improvements, workforce capability development, and sustainability initiatives—rather than focusing solely on stated intent or awareness.

3.2 | Survey Sample and Coverage

The survey comprises responses from **103 manufacturing facilities operating in the UAE**, representing a broad cross-section of industrial activity and digital maturity levels.

67 factories have completed an ITTI assessment

36 factories have not undergone an ITTI assessment

This split provides sufficient sample depth to identify meaningful differences between ITTI-assessed and non-assessed manufacturers, while still reflecting the diversity of the manufacturing base.

Respondents include senior leaders and functional owners with direct accountability for operations, technology, and transformation initiatives, ensuring that responses reflect actual implementation status and performance outcomes rather than theoretical plans.

3.3 | Analytical Framework

To ensure a holistic assessment of digital transformation, survey questions and subsequent analysis were structured around six core dimensions:



This framework reflects the end-to-end nature of successful digital transformation—from strategy and investment through execution, capability building, and impact realization.

3.4 | Data Treatment and Comparative Analysis

The analysis applies a **side-by-side comparative approach** between ITTI-assessed and non-assessed factories across all six dimensions. Key metrics are presented in both **absolute terms** (e.g., number of factories, percentage adoption) and **relative terms** (e.g., ITTI vs non-ITTI deltas).

Where appropriate, median values are used—particularly for investment data—to reduce distortion from outliers and reflect typical behavior within the manufacturing base. Distributions and ranges are also examined to identify skewness, concentration effects, and structural gaps.

Operational impact metrics are based on **self-reported outcomes** following implementation of digital initiatives. While these are not externally audited financial results, consistency of patterns across multiple KPIs and dimensions strengthens confidence in directional findings.

3.5 | Extrapolation Logic for Sector-Level Impact

In addition to factory-level analysis, the study estimates the **potential aggregate impact of ITTI adoption across the UAE manufacturing sector**. This is achieved by extrapolating survey results from ITTI-assessed manufacturers to the broader population of factories that have undertaken digital maturity assessments.

Extrapolated metrics include:

-  Total number of Industry 4.0 technology projects initiated.
-  Aggregate investment value in digital and advanced manufacturing technologies.
-  Number of high-skilled digital and operational technology jobs created.

These extrapolations are intended to illustrate order-of-magnitude impact rather than precise forecasts. They provide policymakers and stakeholders with a directional view of the economic and capability implications of scaling ITTI adoption.

3.6 | Interpretation Principles and Limitations

Several principles guide interpretation of the findings:

Correlation, not causation

While strong performance differentials are observed between ITTI and non-ITTI factories, results should be interpreted as indicative of ITTI's enabling role rather than proof of direct causality.

Self-reported data

Impact metrics reflect manufacturers' assessments of outcomes; however, consistency across responses and dimensions supports their reliability.

Heterogeneous starting points

Manufacturers enter ITTI at different maturity levels; observed improvements reflect both ITTI guidance and individual execution capability.

Despite these considerations, the dataset provides a robust basis for evaluating how structured digital maturity assessments influence behavior, investment, and outcomes in the UAE manufacturing sector.



04

ITTI Framework as a Digital Transformation Catalyst

4.1 | From Diagnostic Tool to Transformation Enabler

The Industrial Technology Transformation Index (ITTI) was designed to address a common structural challenge in manufacturing digitalization: while awareness of Industry 4.0 technologies is widespread, execution is often fragmented, unprioritized, and weakly linked to business outcomes. In practice, many manufacturers struggle not with identifying technologies, but with **deciding where to start, how to sequence initiatives, and how to sustain momentum**.

Survey evidence indicates that ITTI plays a materially broader role than a one-time diagnostic. Manufacturers that have undergone the assessment consistently report that ITTI acts as a **catalyst for disciplined transformation**, converting abstract digital ambition into concrete execution plans. This catalytic effect manifests across four core dimensions: strategic alignment, prioritization, execution discipline, and performance orientation.

4.2 | Creating Strategic Alignment and Shared Direction

A primary contribution of the ITTI framework is its ability to create **clarity and alignment around digital transformation objectives**. By assessing manufacturers across technology, operations, workforce, and sustainability dimensions, ITTI forces an explicit articulation of where the organization stands today and where it aims to go.

Survey results show that ITTI-assessed factories are significantly more likely to operate with a clearly defined digital transformation roadmap than non-assessed peers. This suggests that ITTI serves as an organizing mechanism, aligning leadership teams around a common fact base and shared priorities. Rather than pursuing isolated technology initiatives driven by individual functions or vendors, ITTI encourages manufacturers to frame digitalization as an integrated, enterprise-wide transformation effort.

This alignment effect is particularly important in environments where digital initiatives have historically been opportunistic or reactive. ITTI provides a structured lens through which manufacturers can evaluate trade-offs, balance short-term operational improvements with longer-term capability building, and ensure coherence across initiatives.

4.3 | Enabling Prioritization and Focused Investment

Beyond alignment, ITTI materially improves prioritization discipline. The framework highlights gaps in digital maturity and benchmarks manufacturers against peer performance, enabling leaders to focus investment on the highest-impact areas rather than dispersing resources across too many initiatives.

The survey indicates that ITTI-assessed factories commit higher levels of digital capital expenditure, but—more importantly—allocate this capital differently. Investments are more frequently directed toward **shopfloor-relevant and capability-forming technologies**, such as automation, MES, AI/ML, and industrial IoT, rather than being concentrated solely on enterprise IT systems. This shift reflects a clearer understanding of which technologies directly influence productivity, quality, and responsiveness.

In this way, ITTI helps manufacturers move from a technology-led mindset (“which tools should we buy?”) to a value-led investment logic (“which capabilities do we need to build to achieve our performance objectives?”).

4.4 | Translating Roadmaps into Execution

A recurring challenge in digital transformation is the gap between planning and implementation. The survey findings suggest that ITTI materially narrows this gap. ITTI-assessed factories not only report higher prevalence of digital roadmaps, but also demonstrate significantly higher levels of executed and planned capital expenditure.

This indicates that ITTI roadmaps are not static documents, but living execution tools that translate into action on the ground. By sequencing initiatives, defining enablers, and clarifying interdependencies, ITTI-supported roadmaps reduce execution risk and increase the likelihood that projects move beyond pilot stages.

Importantly, this execution effect appears to compound over time. Factories that begin with structured roadmaps are better positioned to absorb subsequent waves of technology adoption, creating a virtuous cycle of learning, confidence, and scaled deployment.

4.5 | Embedding Performance Measurement and Accountability

Another critical dimension of ITTI’s catalytic role is its emphasis on **key performance indicators (KPIs)** and measurable outcomes. The assessment explicitly links technology adoption to operational efficiency, sustainability metrics, and broader business performance

Survey results show that ITTI-assessed factories report stronger improvements across a wide range of operational KPIs, including quality, manufacturing process efficiency, maintenance effectiveness, and time-to-delivery. While not all manufacturers have yet translated these gains into EBITDA impact, the presence of measurable operational uplift indicates that ITTI helps establish the foundation for systematic value capture.

By encouraging manufacturers to define success metrics upfront, ITTI shifts digital transformation away from experimentation toward **performance accountability**. This is a necessary precondition for scaling digital initiatives and justifying continued investment.

4.6 | Integrating Sustainability into the Transformation Agenda

A distinctive feature of the ITTI framework is its explicit integration of sustainability considerations into digital transformation planning. Rather than treating environmental initiatives as standalone compliance efforts, ITTI positions sustainability as an

outcome that can be enabled and accelerated through digital technologies.

Survey evidence indicates that ITTI-assessed factories are more likely to define and implement sustainability strategies across water and wastewater management, emissions reduction, and material circularity. This suggests that ITTI broadens the definition of transformation success beyond productivity alone, reinforcing a more holistic, long-term perspective.

4.7 | Summary: Why ITTI Acts as a Catalyst

Taken together, the findings indicate that ITTI's impact lies less in prescribing specific technologies and more in changing how manufacturers approach transformation. ITTI:



Creates strategic clarity and alignment



Improves prioritization and investment focus



Converts roadmaps into execution



Encourages performance measurement and accountability



Integrates sustainability into core transformation efforts

As a result, ITTI increases the probability that digital transformation efforts progress from intent to execution—and from execution to sustained impact. This catalytic role explains the consistently stronger outcomes observed among ITTI-assessed manufacturers across planning, investment, technology adoption, and operational performance.



05

Digital Readiness & Roadmap Maturity

5.1 | Digital Readiness as the Foundation for Scaled Transformation

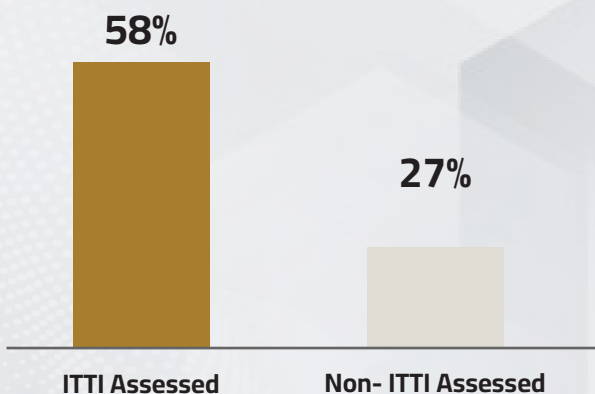
Digital transformation in manufacturing is not constrained primarily by technology availability, but by **organizational readiness and clarity of direction**. Readiness encompasses an understanding of current digital maturity, alignment between business objectives and technology priorities, and the presence of a structured roadmap to guide execution. Without these elements, digital initiatives tend to remain opportunistic, fragmented, and difficult to scale.

The survey results indicate that the UAE manufacturing sector has established a **solid foundational base** for digital transformation. Core enterprise systems and automation technologies are already present in a large share of factories, and awareness of Industry 4.0 concepts is relatively widespread. However, the ability to translate this foundation into coherent, multi-year transformation programs varies significantly across manufacturers.

5.2 | Presence of Digital Transformation Roadmaps

A defining indicator of digital readiness is whether a factory operates with a **formal digital transformation roadmap**. Such roadmaps articulate priority use cases, sequencing of initiatives, enabling capabilities, and performance metrics. They are a prerequisite for disciplined execution and sustained value creation.

Manufacturers with defined digital roadmap



Survey results reveal a pronounced gap between ITTI-assessed and non-assessed manufacturers:

Approximately 58% of ITTI-assessed factories report having a defined digital transformation roadmap

By contrast, only **around 25–27% of non-ITTI factories** operate with a comparable level of formalization. This more than twofold difference underscores the role of ITTI as a **catalyst for structuring digital intent into actionable plans**. The assessment process appears to convert general interest in digital technologies into explicit priorities and timelines, reducing ambiguity and execution inertia.

5.3 | ITTI as an Organizing Mechanism for Digital Strategy

The ITTI assessment plays a distinct role in moving manufacturers from awareness to action. Rather than focusing solely on technology benchmarking, the process:

Forces explicit articulation of current-state maturity

Highlights gaps across technology, operations, workforce, and sustainability

Encourages prioritization of initiatives based on impact and feasibility

Anchors digital initiatives to operational and strategic objectives

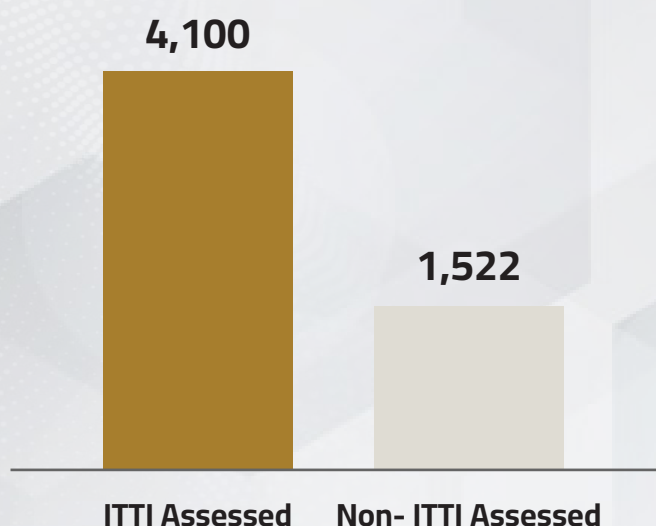
As a result, ITTI-assessed factories are materially more likely to adopt a **programmatic approach** to digital transformation, as opposed to isolated pilots or vendor-driven implementations. This organizing effect is particularly important for manufacturers at early to intermediate stages of maturity, where the risk of fragmentation is highest.

5.4 | Roadmaps Translate into Execution and Capital Commitment

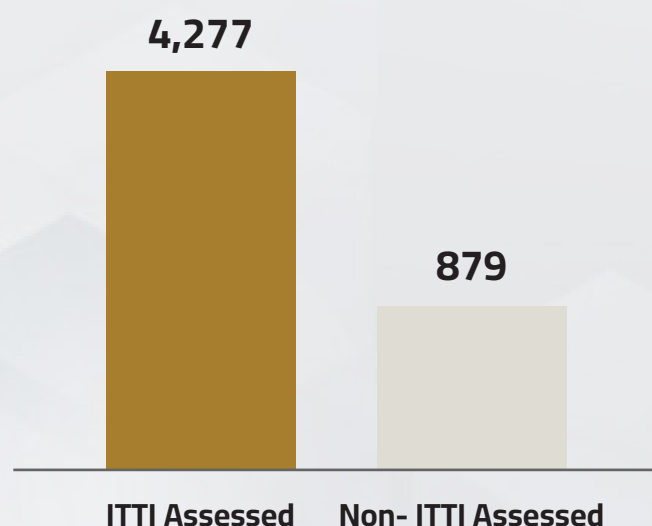
Importantly, the presence of a roadmap is not merely a theoretical exercise. The data shows a strong relationship between roadmap maturity and actual execution on the ground.

Roadmap Translates into Capex

Average Capex Done (KAED)



Average Capex Planned (kAED)



Factories with defined roadmaps—predominantly ITTI-assessed—demonstrate:

Significantly higher levels of historical digital CAPEX

Substantially larger planned investments over the next three years

On average, ITTI-assessed factories report **multiple times higher executed and planned digital capital expenditure** compared to non-assessed peers. This indicates that roadmaps serve as a mechanism to unlock funding, align stakeholders, and sustain momentum over time.

In contrast, non-ITTI factories without structured roadmaps tend to exhibit lower activation levels. Even where interest in digital technologies exists, the absence of formal prioritization limits the scale and consistency of investment.

5.5 | Headroom for Systematization Across the Sector

While the performance of ITTI-assessed factories is strong, the survey also highlights substantial **untapped headroom across the broader manufacturing base**. Nearly half of surveyed factories still operate without a formal digital roadmap, indicating that a significant share of the sector remains in an ad-hoc or exploratory phase of transformation.

For these manufacturers, the path forward does not necessarily require large increases in spending or advanced technologies at the outset. Instead, the primary opportunity lies in:

Structuring existing initiatives into a coherent roadmap

Defining a small set of high-impact, prioritized use cases

Establishing clear KPIs and governance mechanisms

The evidence suggests that even “light structuring” through assessment-led roadmap development can shift factories from fragmented experimentation toward sustained execution.

5.6 | Implications for Scaling Digital Transformation

The findings from this section point to a clear implication: **digital readiness is less about technology access and more about strategic clarity**. ITTI demonstrates measurable effectiveness in providing this clarity, particularly by enabling manufacturers to formalize direction and commit to execution.

Scaling ITTI adoption across the remaining manufacturing base could therefore:

More than double the number of factories operating with structured digital transformation plans

Increase the consistency and effectiveness of digital investments

Accelerate sector-wide progress from foundational readiness to measurable impact

In this sense, roadmap maturity represents a critical leverage point for accelerating the UAE’s industrial digital transformation agenda.



06

Digital Investment Patterns & Capital Allocation

6.1 | Overview of Digital Investment Behavior

Digital transformation in manufacturing ultimately manifests through **capital allocation decisions**. While intent and planning are necessary precursors, sustained progress toward Industry 4.0 maturity requires consistent investment in technologies, systems integration, and enabling capabilities. The survey data provides clear visibility into how UAE manufacturers are currently allocating capital to digital initiatives—and how these patterns differ materially between ITTI-assessed and non-assessed factories.

Overall, the findings indicate that **investment intent across the sector is meaningful but uneven**. A subset of manufacturers is committing significant capital to digital transformation, while a large portion continues to operate with minimal or highly constrained digital budgets. This divergence creates a risk of widening capability gaps across the manufacturing base.

6.2 | Historical Digital CAPEX: A Clear ITTI Premium

An analysis of digital CAPEX over the past three years reveals a pronounced difference between ITTI-assessed and non-assessed manufacturers.

The median historical digital CAPEX among ITTI-assessed factories is approximately AED 300,000, compared to AED 100,000 for non-ITTI factories.

This represents a threefold difference in realized investment, indicating that ITTI participation is associated with earlier and more decisive capital commitment.

Importantly, this differential is not explained by firm size alone. Rather, it reflects differences in **investment confidence and prioritization**, suggesting that ITTI assessments help manufacturers justify digital spending by linking investments to operational and strategic objectives.

6.3 | Forward-Looking Investment Intent: Acceleration, Not Saturation

The gap between ITTI and non-ITTI manufacturers widens further when examining **planned digital CAPEX over the next three years**:

ITTI-assessed factories report a median planned CAPEX of approximately AED 500,000, versus AED 125,000 among non-assessed peers.

This fourfold differential signals that ITTI does not merely front-load investment, but sustains momentum by providing a longer-term transformation roadmap.

At the aggregate level, survey responses indicate that **planned digital investment exceeds historical spending**, confirming that the sector is still in a growth phase rather than approaching saturation. However, without structured prioritization, there is a risk that incremental investments may remain fragmented and fail to scale.

6.4 | Investment Distribution: Concentration Risk Across the Sector

While median values provide directional insight, the underlying distribution of digital investment is highly skewed:

A small number of manufacturers report **planned investments exceeding AED 5 million**, indicating ambitious, multi-year transformation programs.

Conversely, many factories report **planned digital CAPEX below AED 250,000**, levels that are unlikely to support anything beyond isolated pilots or basic system upgrades.

This polarization highlights a structural challenge for the sector. Without intervention, digital maturity is likely to advance rapidly among a leading cohort while the long tail of manufacturers struggles to move beyond foundational adoption.

ITTI plays a critical role in mitigating this risk by **lowering the barrier to structured investment**, particularly for mid-sized and smaller manufacturers that lack in-house transformation expertise.

6.5 | Roadmaps as the Bridge Between Strategy and Spend

The analysis shows a strong linkage between **roadmap maturity and capital deployment**:

Nearly **six in ten ITTI-assessed factories** operate with a formal digital transformation roadmap, compared to just over **one in four non-assessed factories**.

Factories with defined roadmaps consistently report **higher CAPEX already deployed** as well as **higher forward-looking investment plans**.

This pattern confirms that roadmaps are not merely planning artifacts; they function as **investment activation mechanisms**. By sequencing initiatives, clarifying dependencies, and aligning stakeholders, roadmaps reduce execution risk and unlock funding that would otherwise remain uncommitted.

6.6 | Nature of Digital Spend: From Enterprise IT to Shopfloor Impact

Beyond quantum, the **composition of digital investment** differs meaningfully between ITTI and non-ITTI manufacturers.

Non-ITTI investment is often concentrated in enterprise systems (e.g., ERP, CRM), driven by compliance, reporting, or transactional efficiency needs.

ITTI-assessed factories allocate a larger share of capital toward **shopfloor and operational technologies**, including automation upgrades, MES, industrial IoT, and AI-enabled process optimization.

This shift in spend profile is critical. Shopfloor-oriented investments are more directly linked to productivity, quality, and throughput improvements, and therefore offer faster and more visible operational returns when properly implemented.

6.7 | Implications for Value Creation

Despite higher investment levels among ITTI participants, the survey also reveals that **financial value capture remains uneven**:

More than half of surveyed factories report no direct EBITDA impact to date, even where operational improvements are evident.

This suggests that the constraint is not insufficient investment, but rather **weak linkage between operational KPIs and financial performance**.

ITTI provides a strong foundation for closing this gap by encouraging KPI definition and benefit tracking. However, manufacturers must complement technology investments with governance, performance management, and financial attribution mechanisms to fully realize returns.

6.8 | Key Takeaways

ITTI participation is associated with **materially higher and more sustained digital investment**, both historically and forward-looking.

Digital CAPEX across the sector is **highly skewed**, creating risks of uneven maturity and competitiveness.

Roadmap discipline is the strongest predictor of capital activation, reinforcing ITTI's role as a catalyst rather than a diagnostic alone.

The next phase of impact depends less on increasing spend and more on **improving investment quality and value capture**.



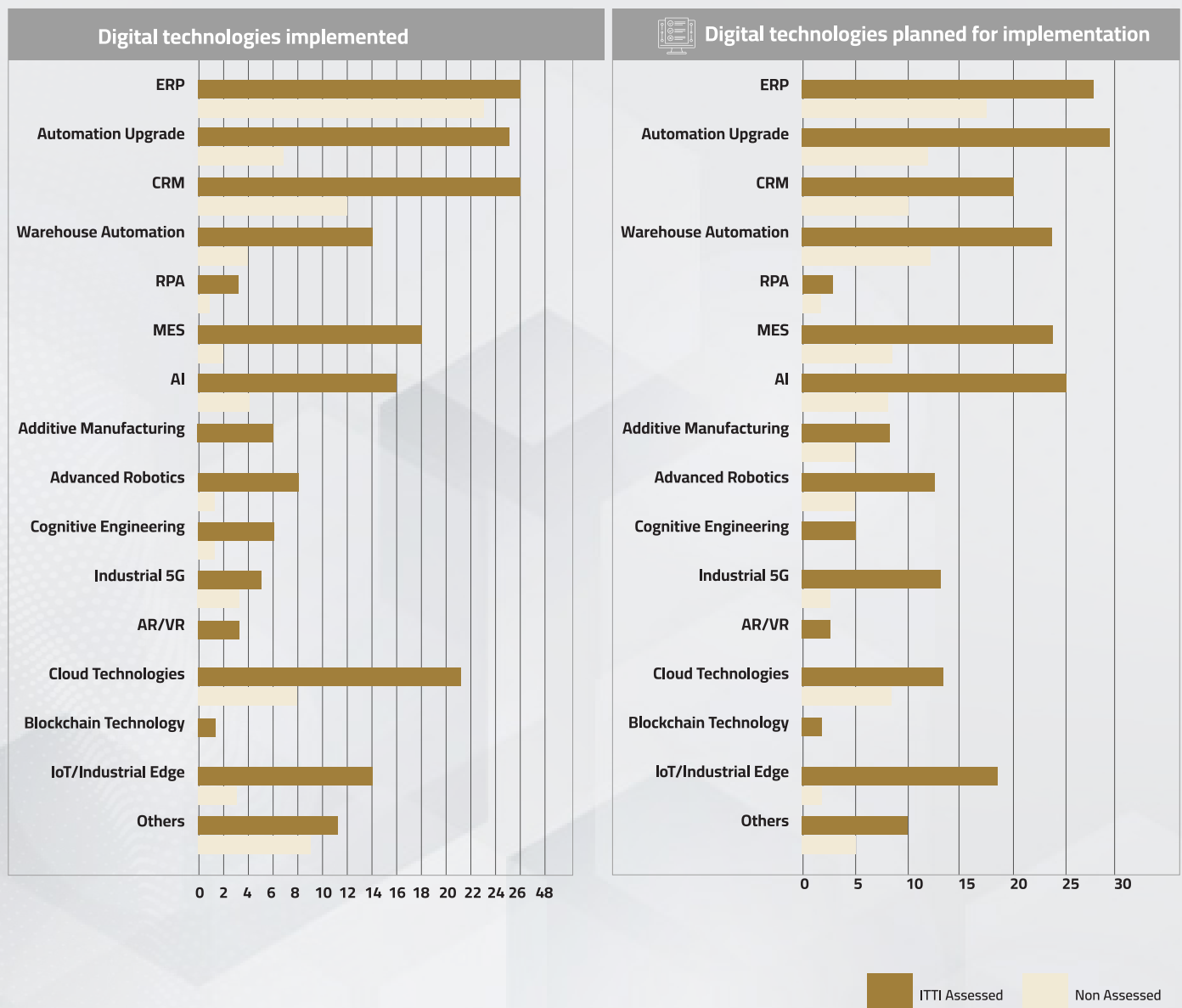
07

Technology Adoption Landscape

7.1 | Overview: From Enterprise Digitization to Shopfloor Transformation

Technology adoption across the UAE manufacturing sector has progressed meaningfully over recent years, with most factories having established a foundational digital backbone. Core enterprise systems are now relatively well penetrated, creating a baseline level of transactional and data visibility. However, the survey results indicate that **the true differentiator between manufacturers lies not in basic digitization, but in the depth and operational relevance of technologies deployed.**

ITTI-assessed factories consistently demonstrate a more advanced and balanced technology stack—one that spans enterprise systems, operational technologies (OT), and advanced analytics—while non-assessed factories remain concentrated in narrower, IT-led deployments. This distinction is critical, as value creation in manufacturing is disproportionately driven by shopfloor integration rather than back-office digitization alone.



7.2 | Current Technology Adoption: Established Core, Uneven Depth

Across the full sample, **Enterprise Resource Planning (ERP)** systems form the most widely adopted technology, reflecting their role as a foundational requirement for scale and operational control. Customer Relationship Management (CRM) systems, cloud platforms, and basic automation upgrades follow, indicating growing attention to data integration and process efficiency.

However, adoption drops sharply for **advanced Industry 4.0 technologies**—including Manufacturing Execution Systems (MES), Industrial IoT, AI/ML, advanced robotics, and digital twins—particularly among non-ITTI manufacturers. These technologies are precisely those most directly linked to productivity, quality, and flexibility at the shopfloor level.

On average:

ITTI-assessed factories report **3.37** implemented digital technologies

Non-ITTI factories report only **1.97** technologies implemented

This ~50% differential in technology breadth highlights ITTI's role in accelerating progression beyond basic digitization toward more sophisticated operational transformation.

7.3 | ITTI as an Accelerator of Advanced Technology Adoption

A closer comparison between ITTI-assessed and non-assessed factories reveals **material adoption gaps across nearly all advanced technologies**:

Automation and SCADA systems

are significantly more prevalent among ITTI factories, reinforcing ITTI's focus on operational efficiency and real-time control.

Manufacturing Execution Systems (MES)

show one of the largest relative gaps, reflecting ITTI's emphasis on connecting planning systems with shopfloor execution.

AI/ML and Industrial IoT

adoption is more than twice as high among ITTI participants, suggesting that structured assessments increase confidence to invest in higher-complexity technologies.

Warehouse automation and intralogistics technologies

are also more common among ITTI factories, supporting improvements in inventory accuracy, throughput, and delivery performance.

Importantly, this pattern indicates that ITTI does not simply increase the number of technologies adopted—it **shifts the portfolio toward shopfloor-relevant, value-generating use cases**, rather than incremental IT upgrades.

7.4 | Planned Technology Investments: Clear Direction Toward Smart Operations

Looking forward, manufacturers across the sample express strong intent to continue investing in digital technologies over the next three years. Planned investments are heavily skewed toward **process automation and smart operations**, including:

Automation upgrades	Warehouse automation and ASRS
Manufacturing Execution Systems	AI and advanced analytics

These priorities signal a sector-wide recognition that the next wave of value will come from tighter integration between physical operations and digital intelligence.

Once again, ITTI-assessed factories stand out. Their forward-looking technology plans are:

Broader spanning multiple layers of the technology stack	More advanced with higher emphasis on AI, MES, and connected operations	More execution-oriented aligned with clearly defined roadmaps and capital allocation plans
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Non-ITTI factories, by contrast, tend to concentrate planned investments in a smaller number of technologies, often without clear sequencing or integration logic.

7.5 | From Technology Adoption to Capability Formation

A critical insight from the analysis is that technology adoption alone is not sufficient to deliver sustained impact. The distinguishing feature of ITTI-assessed factories is that their technology investments increasingly form part of a coherent operating capability rather than isolated deployments.

ITTI guidance appears to encourage:

-  Integration across enterprise and shopfloor systems
-  Standardization of technology architecture
-  Alignment between technology, processes, and KPIs

As a result, ITTI factories are more likely to move from vendor-driven pilots to **repeatable, scalable digital capabilities** embedded within operations.

7.6 | Key Implications

The technology adoption landscape points to three clear implications:

- 01 The UAE manufacturing sector has established a solid digital foundation, but advanced Industry 4.0 adoption remains uneven.
- 02 ITTI materially accelerates both the scale and sophistication of technology deployment, particularly in shopfloor and OT domains where value creation is highest.
- 03 The next phase of transformation will depend on integration and capability building, not incremental tool adoption.

In this context, ITTI plays a critical role in helping manufacturers progress from “having digital tools” to **operating digitally enabled factories**.



08

Operational & Financial Impact Realization



8.1 | From Digital Adoption to Operational Performance

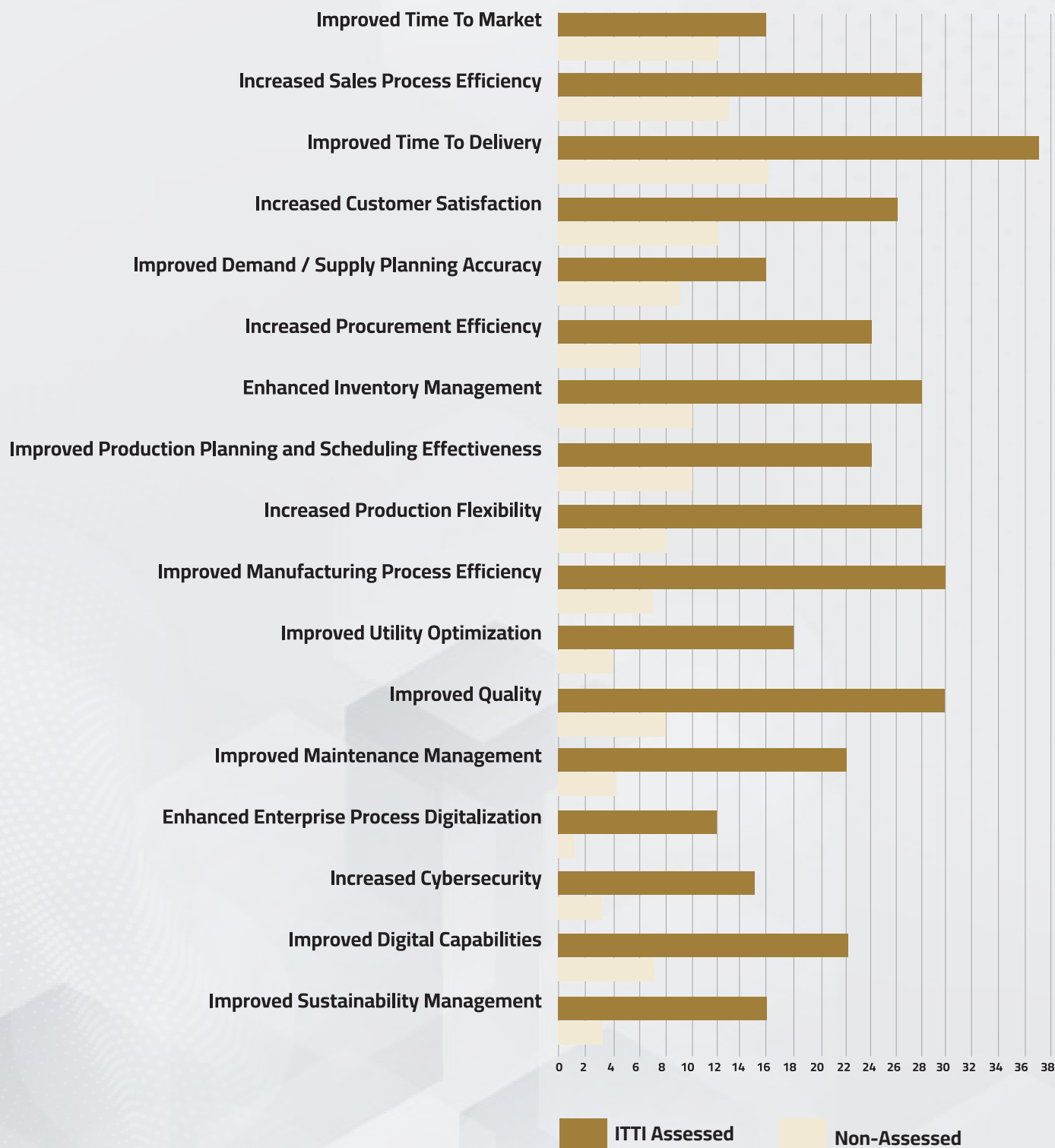
A central question for manufacturers and policymakers alike is whether digital transformation efforts translate into **measurable improvements in factory performance**, rather than remaining confined to technology deployment or isolated pilots. The survey results indicate that, across the UAE manufacturing sector, digital initiatives are already delivering **tangible operational benefits**, particularly among ITTI-assessed factories.

More than half of surveyed manufacturers report improvements across core operational KPIs, including manufacturing efficiency, quality, time-to-delivery, and maintenance effectiveness. These results confirm that Industry 4.0 technologies—when deployed on the shopfloor and integrated into daily operations—are generating real performance uplift rather than theoretical value.

However, the depth and consistency of impact vary materially between ITTI-assessed and non-assessed factories, highlighting the role of structured transformation frameworks in converting digital investments into operational outcomes.



Operational impact reported (# factories)



8.2 | Comparative Operational Impact: ITTI vs Non-ITTI Factories

Across nearly all measured KPIs, **ITTI-assessed factories consistently outperform non-assessed peers**. The most pronounced differences are observed in areas directly linked to shopfloor execution and process control:

Manufacturing process efficiency:

ITTI-assessed factories report more than double the improvement rate of non-assessed factories, reflecting more effective use of automation, MES, and data-driven process optimization.

Quality improvement:

Nearly half of ITTI factories report improved quality outcomes, compared with roughly one in five non-ITTI factories. This suggests stronger deployment of closed-loop quality systems, real-time monitoring, and root-cause analytics.

Time-to-delivery and production flexibility:

ITTI factories show materially higher gains, indicating better synchronization between planning, execution, and logistics enabled by digital tools.

Maintenance management:

Improvements are significantly higher among ITTI factories, consistent with greater adoption of condition monitoring, predictive maintenance, and asset performance management technologies.

Importantly, the impact of ITTI is not limited to production alone. ITTI-assessed factories also report stronger improvements in **inventory management, planning accuracy, procurement efficiency, customer satisfaction, and enterprise process digitalization**. This indicates that ITTI-supported transformations tend to be **end-to-end in nature**, rather than narrowly focused on isolated operational silos.

8.3 | Value Zones: Where Digital Delivers the Most Today

The survey highlights several **clear value zones** where digital initiatives are currently delivering the strongest returns:

01 Operational efficiency and productivity

This is the most mature impact area, with the vast majority of respondents reporting at least medium impact. Automation, SCADA, MES, and production analytics are translating into throughput gains, reduced downtime, and more stable operations.

02 Quality and process stability

Digital quality management, sensor-driven monitoring, and standardized workflows are driving measurable improvements, particularly in ITTI-assessed factories.

03 Time-to-delivery and responsiveness

Improvements in planning accuracy, scheduling effectiveness, and production flexibility are enabling faster response to customer demand and reduced lead times.

These findings suggest that UAE manufacturers are successfully capturing operational value, especially where digital technologies are tightly coupled with core production processes.

8.4 | The Financial Impact Gap: EBITDA Capture Remains Uneven

Despite strong operational signals, financial value capture remains uneven across the sector. A significant proportion of manufacturers — more than half of surveyed factories — report no direct or measurable EBITDA impact to date, even where operational improvements are evident.

This gap does not indicate failure of digital initiatives. Rather, it reflects structural challenges in how benefits are measured, tracked, and linked to financial outcomes:

Operational KPIs (e.g., OEE, downtime, yield) are often not explicitly translated into P&L metrics

Benefit realization frameworks are inconsistently applied across initiatives

Financial ownership of digital programs is frequently unclear, with initiatives remaining IT- or engineering-led rather than business-led

ITTI-assessed factories are better positioned to close this gap, as they exhibit stronger planning discipline and clearer linkage between initiatives and strategic objectives. However, even among ITTI participants, systematic benefit tracking and value governance remain underdeveloped.

8.5 | ITTI's Role in Improving Impact Realization

The evidence indicates that ITTI contributes to stronger operational outcomes through three reinforcing mechanisms:

Prioritization:

ITTI helps manufacturers focus on use cases with direct operational relevance, rather than diffuse or experimental deployments.

Integration:

ITTI encourages alignment across production, maintenance, planning, and enterprise processes, enabling cross-functional impact rather than localized gains.

Execution discipline:

Factories with ITTI assessments demonstrate higher activation rates, with roadmaps translating into implemented projects and sustained operational change.

As a result, ITTI-assessed factories are more likely to move beyond “technology for technology’s sake” and toward **repeatable, impact-oriented digital execution**.

8.6 | Implications

The findings from the operational and financial impact analysis suggest three clear implications:

Digital transformation is already delivering operational value in UAE manufacturing, particularly in efficiency, quality, and responsiveness.

ITTI materially increases the likelihood that digital initiatives translate into consistent operational improvements, rather than isolated successes.

The next frontier is financial value capture, requiring stronger linkage between operational KPIs and financial outcomes, clearer ownership, and standardized benefit realization practices.

In this context, ITTI provides a strong foundation, but maximizing its impact will require complementary focus on performance management, value tracking, and financial accountability.



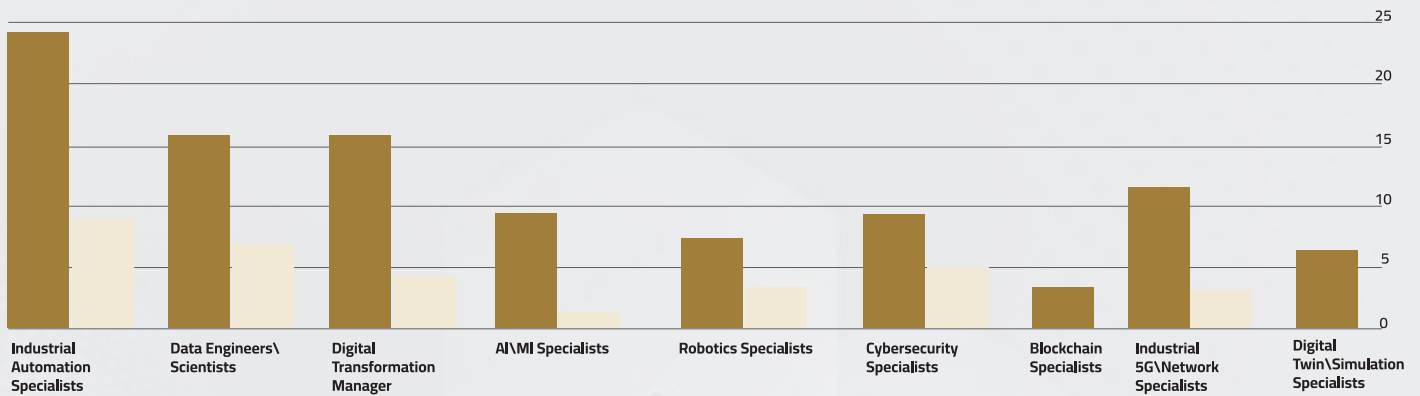
09

Workforce & Skills Transformation

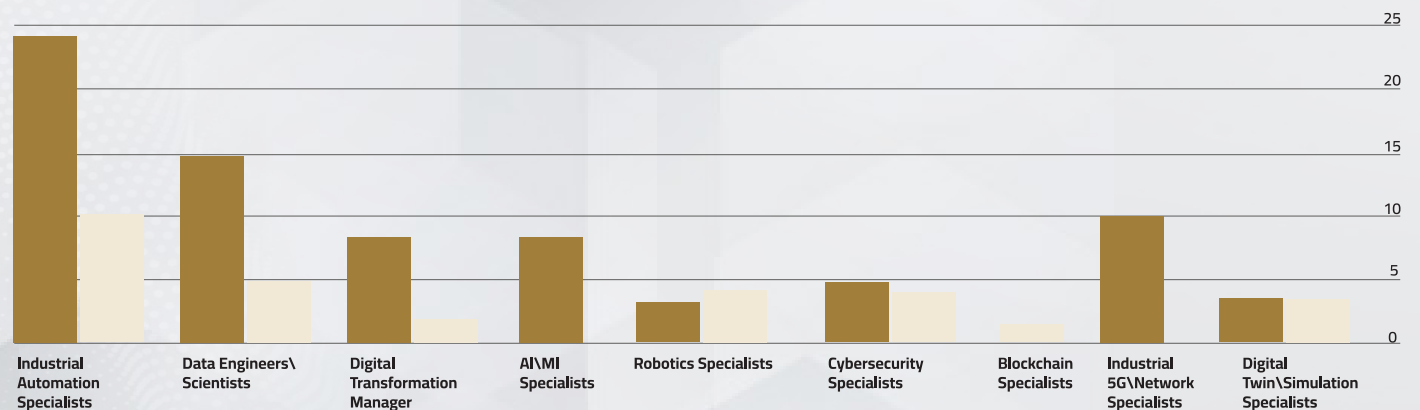
9.1 | Workforce Capability as the Critical Enabler of Digital Transformation

While technology investment is a necessary condition for Industry 4.0 adoption, workforce capability ultimately determines whether digital initiatives scale and sustain impact. Across the UAE manufacturing sector, the survey results indicate that talent availability—particularly in digital and operational technology (OT) roles—represents the most significant structural constraint to transformation.

Many manufacturers have begun deploying advanced systems such as automation platforms, MES, and analytics tools. However, the depth of internal capability required to operate, optimize, and continuously improve these systems often lags technology deployment. This creates a dependency on external vendors and limits the ability to embed digital transformation into day-to-day operations.



Roles hired in the last 3 Years



Planned Hiring For Next 3 Years



ITI Assessed



Non Assessed

9.2 | Current State of Digital and OT Talent

The survey reveals material differences in workforce maturity between ITTI-assessed and non-assessed factories. ITTI participants demonstrate a stronger baseline of specialist roles, reflecting a more deliberate approach to capability building alongside technology adoption.

Across the full sample, the most commonly present specialist roles include:

Industrial automation specialists,

supporting PLCs, SCADA,
and control systems

Data engineers and data scientists

focused on data integration
and analytics

Digital transformation managers

responsible for coordinating
cross-functional initiatives

However, even among ITTI-assessed factories, the absolute penetration of advanced digital roles remains relatively low. A significant share of manufacturers report that specialist digital roles are “not applicable” within their current operating model, indicating that digital responsibilities are often layered onto traditional engineering or IT functions rather than treated as standalone capabilities.

9.3 | ITTI’s Impact on Capability Development

ITTI-assessed factories consistently outperform non-assessed peers in both **current staffing levels and future hiring intent** across critical roles.

Key differences include:

Industrial automation specialists

are more prevalent in ITTI factories, reflecting deeper shopfloor technology adoption and a stronger OT focus.

Digital transformation managers

are significantly more common among ITTI participants, suggesting improved governance, coordination, and execution discipline.

Advanced roles such as AI/ML specialists and digital twin or simulation experts

while still limited in absolute terms, are disproportionately concentrated within ITTI-assessed factories.

This pattern indicates that ITTI assessment acts as a trigger for manufacturers to recognize workforce gaps and begin formalizing digital roles. Rather than treating digital initiatives as isolated IT projects, ITTI-assessed manufacturers are more likely to embed transformation responsibilities within their organizational structure.

9.4 | Hiring Trends and Forward-Looking Plans

Looking ahead, the divergence between ITTI and non-ITTI factories becomes more pronounced. ITTI-assessed manufacturers report **materially higher planned hiring** across nearly all digital and OT roles over the next three years, particularly in:

Industrial automation and controls

Data engineering and analytics

AI/ML and advanced analytics

Cybersecurity and industrial networking

In contrast, non-ITTI factories show more limited forward hiring intent, often constrained to incremental additions rather than capability-building at scale. This suggests that ITTI not only influences current-state maturity, but also shapes **longer-term ambition and workforce planning**.

Importantly, even among ITTI factories, future hiring plans indicate that demand for digital skills is expected to accelerate faster than current supply, reinforcing the need for proactive workforce development strategies.

9.5 | Persistent Capability Gaps

Despite positive momentum, the survey highlights several systemic gaps that continue to limit transformation outcomes:

Advanced digital skills remain scarce:

AI/ML, digital twin, robotics, and advanced simulation capabilities are present in only a small minority of factories.

Upskilling and reskilling programs are underdeveloped:

Many manufacturers focus on external hiring rather than structured internal capability development, increasing cost and execution risk.

Vendor dependency remains high:

Reliance on system integrators and technology vendors limits internal learning and reduces the ability to iterate and scale solutions independently.

These gaps help explain why many manufacturers report operational improvements without corresponding financial impact. Without strong internal ownership, digital solutions are harder to optimize, standardize, and link to value capture mechanisms.

9.6 | Implications for Manufacturers and Policymakers

The findings underscore a critical insight: **workforce transformation is the binding constraint on digital transformation maturity.**

For manufacturers, this implies a need to:

Move from project-based staffing to permanent digital and OT roles

Invest in internal capability building alongside technology deployment

Clarify accountability for digital value realization

For policymakers and ecosystem stakeholders, the results point to the importance of:

Supporting industry-wide upskilling and reskilling initiatives

Strengthening talent pipelines for advanced industrial digital skills

Complementing ITTI assessments with targeted workforce development programs

9.7 | Key Takeaway

ITTI participation is strongly associated with **more mature workforce planning, deeper specialist talent pools, and greater ambition for future capability building.** However, the sector as a whole remains constrained by shortages in advanced digital skills. Closing this gap will be essential for sustaining Industry 4.0 adoption and translating technology investments into long-term competitive advantage.



10

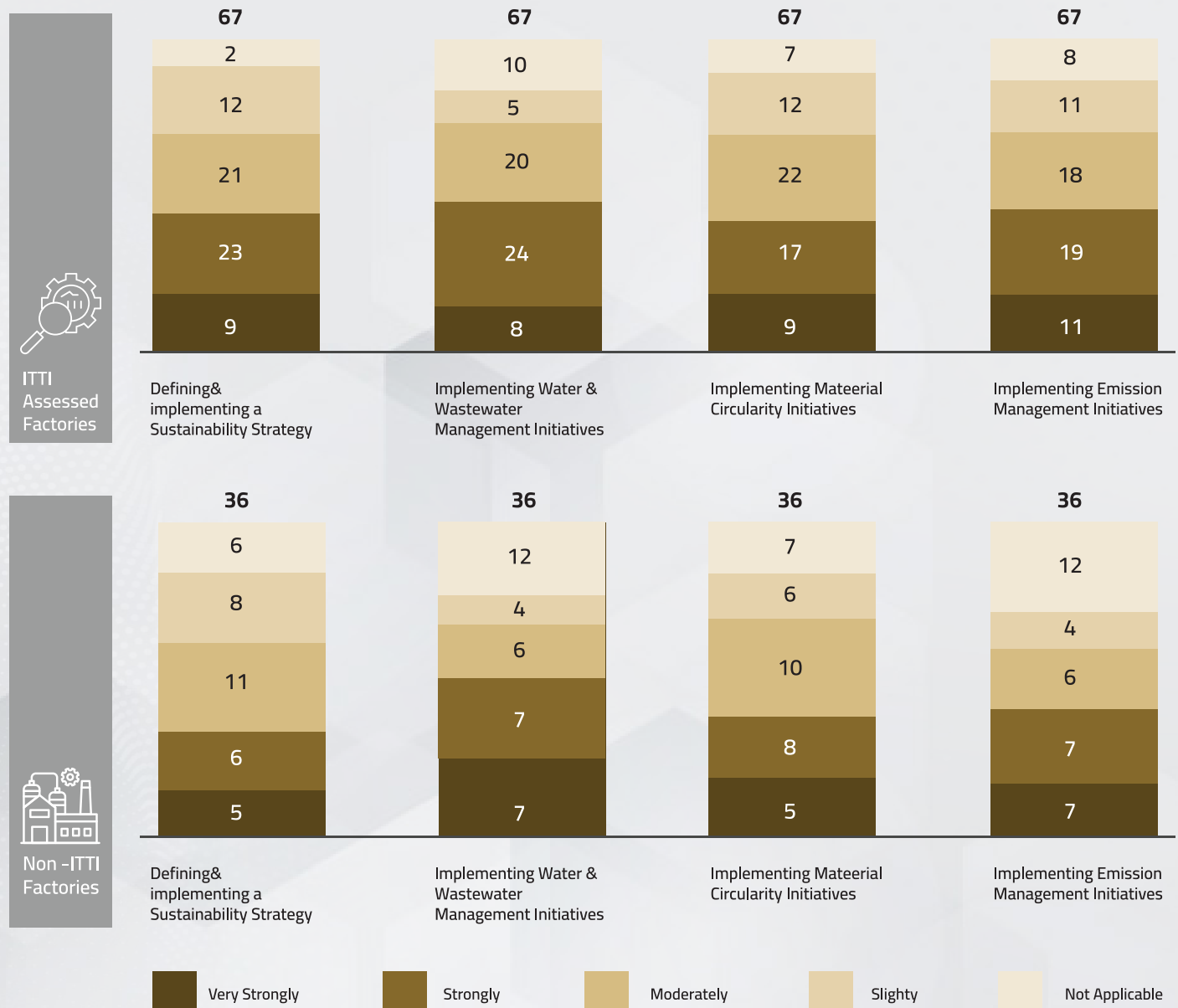
**Sustainability
Integration Through
Digital Transformation**

10.1 | Sustainability as an Emerging Strategic Priority in Manufacturing

Sustainability is increasingly becoming a core dimension of competitiveness for manufacturing organizations. Regulatory expectations, customer requirements, and cost pressures related to energy, water, and raw materials are converging to make environmental performance a business imperative rather than a compliance exercise. In this context, digital technologies play a critical enabling role by improving measurement, control, and optimization of resource-intensive processes.

Within the UAE manufacturing sector, sustainability adoption remains uneven. While awareness of sustainability concepts is widespread, execution maturity varies significantly across manufacturers. Many factories continue to approach sustainability initiatives in isolation—often disconnected from broader operational and digital transformation efforts—limiting both scale and impact.

The ITTI framework explicitly incorporates sustainability as a pillar of digital maturity, positioning it not as a parallel agenda, but as an **integrated outcome of digitally enabled operations**.



10.2 | Impact of ITTI on Sustainability Strategy Definition

Survey evidence indicates that ITTI participation is strongly associated with higher levels of sustainability strategy formalization. A significantly larger share of ITTI-assessed factories report having **defined and actively implementing a formal sustainability strategy** compared to non-assessed peers.

This distinction is critical. Manufacturers with articulated sustainability strategies are better positioned to:

Prioritize initiatives based on material impact

Allocate capital more effectively

Align sustainability objectives with operational KPIs and digital

In contrast, non-ITTI factories are more likely to report fragmented or ad-hoc sustainability actions, often driven by isolated compliance requirements rather than integrated operational improvement goals.

10.3 | Implementation of Sustainability Initiatives

Beyond strategy definition, ITTI-assessed factories demonstrate **materially higher execution maturity** across key sustainability domains:

Water and wastewater management:

More than 70% of ITTI-assessed factories report active implementation of water-related initiatives, compared to approximately 55% among non-ITTI factories. Digital monitoring and control systems are increasingly used to reduce consumption, improve reuse, and enhance compliance.

Material circularity initiatives:

ITTI participants show stronger adoption of practices aimed at waste reduction, recycling, and material efficiency. These initiatives are often enabled by improved data visibility across production and inventory systems, allowing manufacturers to identify loss points and optimize material flows.

Emissions management:

A higher proportion of ITTI-assessed factories report initiatives targeting emissions tracking and reduction. While most outcomes are currently reported at moderate impact levels, the presence of digital measurement infrastructure establishes the foundation for more advanced optimization over time.

Across all sustainability dimensions, ITTI-assessed factories consistently report higher levels of “strong” or “very strong” impact, while non-ITTI factories are more concentrated in moderate or early-stage implementation categories.

10.4 | Digital Enablement of Sustainability Outcomes

The sustainability advantage observed among ITTI factories is closely linked to their broader digital maturity. Technologies such as automation systems, MES, IoT sensors, and advanced analytics enable manufacturers to move from static, manual sustainability reporting to real-time, operationally embedded sustainability management.

Key mechanisms through which digital transformation supports sustainability include:

Continuous monitoring of energy, water, and material usage

Integration of sustainability KPIs into operational dashboards

Identification of process inefficiencies and abnormal consumption patterns

Data-driven decision-making for process optimization and investment prioritization

ITTI's emphasis on aligning technology adoption with operational and sustainability objectives ensures that environmental initiatives are not treated as standalone projects, but as extensions of core manufacturing excellence programs.

10.5 | Maturity Gaps and Headroom for Value Creation

Despite measurable progress, sustainability outcomes remain largely concentrated at **medium to high impact levels**, with relatively few factories reporting "very high" impact. This indicates that while foundational capabilities are being established, most manufacturers are still in the early phases of value capture.

Key gaps include:

Limited use of advanced analytics and AI for sustainability optimization

Insufficient linkage between sustainability performance and financial metrics

Lack of standardized governance and accountability for sustainability outcomes

These gaps represent significant headroom. As manufacturers build on the digital foundations established through ITTI, sustainability initiatives can evolve from compliance-oriented efforts into **sources of cost reduction, resilience, and competitive differentiation**.



10.6 | Implications

The findings suggest that ITTI plays a meaningful role in **embedding sustainability into the digital transformation agenda** of UAE manufacturers. By integrating sustainability into maturity assessments and roadmaps, ITTI shifts the conversation from isolated environmental initiatives to system-level operational improvement.

For policymakers, this underscores ITTI's value as a dual-purpose instrument—supporting both industrial competitiveness and national sustainability objectives. For manufacturers, the evidence highlights the importance of treating sustainability as an outcome of digitally enabled operations rather than a parallel track.

In sum, ITTI accelerates not only digital adoption, but the institutionalization of sustainability as a core element of modern manufacturing performance.



11

Forward Outlook & Digital Ambition

11.1 | Transition from Foundation Building to Scaled Transformation

The survey results indicate that the UAE manufacturing sector is entering a **second phase of digital transformation**. The initial phase—focused on establishing foundational systems, experimenting with automation, and digitizing core processes—is largely underway for a meaningful subset of manufacturers. The forward outlook is increasingly characterized by intent to scale, deepen integration, and extract sustained business value from prior investments.

This shift is particularly evident among ITTI-assessed manufacturers. Having established clearer visibility into their digital maturity gaps, these factories demonstrate stronger ambition to move beyond isolated initiatives toward **coordinated, multi-year Industry 4.0 programs**. In contrast, non-ITTI manufacturers remain earlier in the journey, with future plans that are more incremental and less tightly coupled to an overarching transformation vision.

11.2 | Planned Technology Priorities: From Systems to Intelligence

Across the sample, manufacturers' three-year investment plans reveal a consistent prioritization of technologies that directly enhance shopfloor intelligence and operational automation. Planned adoption is concentrated in:

Automation and control upgrades

Reflecting a push to stabilize and standardize core production processes

Manufacturing Execution Systems (MES)

Signaling a desire to improve real-time visibility, scheduling, and performance management

Warehouse and intralogistics automation

Driven by inventory accuracy, throughput, and labor productivity objectives

Artificial intelligence and advanced analytics

Increasingly viewed as the next lever to unlock predictive and prescriptive capabilities

Notably, ITTI-assessed factories demonstrate **broader and more ambitious technology roadmaps**, with higher planned adoption across advanced use cases such as AI/ML, Industrial IoT, and integrated operations platforms. This suggests a transition from technology deployment as an end in itself toward technology as a **decision-making and optimization layer** across the value chain.

11.3 | Scaling Ambition Constrained by Capability Readiness

Despite strong stated ambition, the survey highlights a clear execution risk: **organizational and capability readiness is not yet keeping pace with technology aspirations**. While capital investment plans are increasing, particularly among ITTI factories, workforce strategies lag behind.

A significant proportion of manufacturers—especially non-ITTI participants—continue to report “not applicable” when asked about specialist digital roles in their forward hiring plans. Even among ITTI-assessed factories, hiring intent is heavily skewed toward industrial automation and data engineering, with limited planned expansion in more advanced capabilities such as AI/ML, digital twin, and systems integration.

This imbalance suggests that, without targeted intervention, the next wave of digital investments may encounter bottlenecks related to:

Over-reliance on external vendors

Limited internal ownership of digital solutions

Challenges in scaling pilots into repeatable operating models

The forward outlook therefore reflects **high ambition, but uneven readiness** to sustain and scale transformation.

11.4 | Financial Value Capture as the Next Strategic Frontier

Another defining feature of the forward outlook is a growing recognition that **operational improvements must be translated into financial outcomes**. While many manufacturers report improvements in quality, efficiency, and delivery performance, relatively fewer have embedded robust mechanisms to track EBITDA impact or cash-flow benefits.

Looking ahead, leading manufacturers—again disproportionately ITTI-assessed—are beginning to articulate a shift toward:

Linking digital initiatives to P&L owners

Embedding KPI governance into transformation roadmaps

Standardizing benefit measurement and post implementation reviews

This evolution marks a transition from **technology-led transformation to value-led transformation**, where digital investments are prioritized based on their ability to generate measurable economic returns.

11.5 | Sustainability as a Permanent Component of Digital Ambition

Sustainability considerations are increasingly embedded in manufacturers’ forward-looking digital agendas. Rather than being treated as standalone compliance initiatives, areas such as energy optimization, emissions management, water efficiency, and material circularity are being integrated into broader digital programs.

ITTI-assessed factories, in particular, demonstrate stronger intent to scale sustainability initiatives using digital enablers. This reflects an emerging understanding that long-term competitiveness will depend not only on cost and quality, but also on environmental performance and regulatory alignment..

As sustainability expectations intensify globally, digital transformation is becoming a **strategic mechanism to balance productivity growth with environmental responsibility**.

11.6 | Outlook Summary

In aggregate, the forward outlook for UAE manufacturing can be summarized as follows:

Ambition is rising with manufacturers planning higher digital investment and broader technology adoption

ITTI participation materially strengthens the coherence and scale of future plans

Capability gaps—particularly in advanced digital skills—pose the most significant risk to execution

Financial value capture and sustainability integration are emerging as defining priorities of the next transformation phase

The next stage of digital transformation will therefore be less about introducing new technologies and more about **institutionalizing digital capabilities, governance, and value realization mechanisms**. Manufacturers that successfully make this transition are likely to pull further ahead in productivity, resilience, and competitiveness, while others risk stagnating at the pilot stage.



12

**Aggregate Impact on
the UAE Manufacturing
Sector**

12.1 | From Factory-Level Outcomes to Sector-Level Impact

While earlier sections of this report focus on factory-level behaviors and outcomes, the true significance of ITTI lies in its **aggregate impact on the UAE manufacturing ecosystem**. By comparing ITTI-assessed and non-assessed manufacturers and extrapolating survey findings to the broader industrial base, the analysis provides a forward-looking estimate of how structured digital maturity assessments can reshape sector-wide performance.

The results indicate that ITTI adoption does not merely improve individual factories in isolation. Instead, **it creates systemic momentum**—increasing the volume of Industry 4.0 projects, expanding capital deployment into advanced technologies, accelerating job creation in high-value roles, and embedding sustainability practices across the industrial landscape.

12.2 | Industry 4.0 Project Activation at Scale

Survey respondents reported initiating approximately **400 Industry 4.0 technology projects** across the participating factories. These initiatives span automation upgrades, MES deployments, AI/ML use cases, industrial IoT, warehouse automation, and advanced analytics.

When extrapolated to the full UAE manufacturing base of firms that have undertaken digital maturity assessments, this translates into an estimated **~3,000 Industry 4.0 projects** nationally. This scale of activity reflects a meaningful shift from experimentation toward execution and deployment, signaling that digital transformation is increasingly becoming embedded in core manufacturing operations rather than remaining peripheral.

Crucially, the evidence suggests that **ITTI-assessed factories contribute disproportionately to this project pipeline**. Their higher likelihood of having formal roadmaps and larger digital CAPEX budgets directly translates into higher activation rates and more complex, multi-year initiatives.

12.3 | Capital Investment in Advanced Manufacturing Technologies

At the financial level, surveyed manufacturers reported a cumulative **technology investment value exceeding AED 330 million** across their digital transformation initiatives. These investments are concentrated in operationally impactful technologies, including automation systems, MES, AI-enabled applications, and digital infrastructure.

Extrapolated to the broader manufacturing base, the analysis estimates **a potential sector-wide investment of over AED 2.1 billion in Industry 4.0 technologies**. This represents not only a substantial capital commitment, but also a reallocation of investment toward assets that enhance productivity, flexibility, and resilience.

Importantly, ITTI plays a role in improving the **quality of capital allocation**. Rather than fragmented or opportunistic spending, ITTI-assessed manufacturers show a clearer linkage between investment decisions, operational priorities, and long-term capability building. This increases the likelihood that deployed capital translates into sustained competitive advantage.

12.4 | High-Skilled Job Creation and Workforce Transformation

Digital transformation in manufacturing is inherently labor-shaping rather than labor-reducing. Survey responses indicate the creation of approximately **250 high-skilled digital and operational technology roles** among participating manufacturers, with a further **~400 roles planned** over the next three years.

When extrapolated, this implies **thousands of high-skilled roles** across the UAE manufacturing sector, spanning profiles such as:

-  Industrial automation specialists
-  Data engineers and data scientists
-  Digital transformation managers
-  AI/ML specialists

These roles are critical enablers of sustainable digital adoption. They support internal ownership of technology platforms, reduce long-term dependency on external vendors, and improve the scalability of digital initiatives. ITTI-assessed factories are materially more advanced in this transition, indicating that structured assessments accelerate not only technology uptake but also **organizational capability formation**.

12.5 | Operational Performance Uplift at National Scale

At the outcome level, ITTI-assessed manufacturers report strong improvements across a set of core operational KPIs:

More than **50% report improvements in time-to-delivery**

Approximately **45% report improved quality**

Over **40% report gains in manufacturing process efficiency**

More than **40% report improved inventory management**

When applied across a larger population of manufacturers, these improvements imply a **meaningful uplift in national manufacturing productivity and service levels**. Even modest percentage improvements at factory level compound into significant economic impact when aggregated across hundreds or thousands of sites.

Notably, these gains are concentrated in operational domains that directly influence customer competitiveness, such as reliability, responsiveness, and cost efficiency—key differentiators for UAE manufacturers competing in global markets.

12.6 | Sustainability and Long-Term Competitiveness

Beyond near-term productivity gains, ITTI's aggregate impact extends into sustainability performance. ITTI-assessed factories are significantly more likely to have defined and be executing sustainability strategies covering emissions management, water and wastewater optimization, and material circularity.

At sector level, this indicates that digital transformation—when guided by structured frameworks such as ITTI—can act as a **multiplier for national sustainability** objectives. Digital tools enable better measurement, control, and optimization of resource use, supporting regulatory compliance while also reducing long-term operating costs.

12.7 | Implications for the UAE Industrial Agenda

Taken together, the aggregate impact analysis highlights ITTI as a **high-leverage intervention** for advancing the UAE's manufacturing sector. The combination of increased project activity, higher-quality investment, skilled job creation, and measurable operational gains positions ITTI as a foundational element of the country's Industry 4.0 strategy.

As adoption expands, the cumulative effects are expected to accelerate:

Faster diffusion of advanced manufacturing technologies

Stronger domestic industrial capabilities

Improved resilience to supply chain and demand volatility

Enhanced alignment between productivity growth and sustainability

In this context, scaling ITTI participation is not merely a programmatic choice—it represents a strategic opportunity to **systematically upgrade the competitiveness of UAE manufacturing at national scale.**



13

**Key Insights & Strategic
Implications**

The survey findings point to a clear conclusion: **digital transformation in UAE manufacturing is no longer constrained by awareness or intent, but by structure, capability, and value capture discipline.** ITTI plays a decisive role in addressing these constraints, though important gaps remain. The following insights and implications are drawn across manufacturers, policymakers, and the broader industrial ecosystem.

13.1 | Key Insights

Insight 1: Structure, not technology, is the primary differentiator of impact

Across nearly every dimension measured—roadmap presence, investment levels, technology depth, and operational impact—the strongest differentiator between high- and low-performing manufacturers is **whether transformation is structured**. ITTI-assessed factories consistently demonstrate clearer prioritization, stronger sequencing of initiatives, and tighter alignment between strategy and execution.

Importantly, this structure does not arise organically. The data indicates that ITTI acts as an external forcing mechanism, converting broad digital ambition into actionable plans. Where such structure is absent, digital efforts tend to remain fragmented and opportunistic.

Implication:

Digital maturity is less about access to technology and more about disciplined transformation governance. Assessment-led structuring is a prerequisite for scale.

Insight 2: Capital follows clarity—and clarity drives execution

Manufacturers with defined digital roadmaps invest materially more in digital transformation, both historically and in future plans. The gap between ITTI and non-ITTI factories in planned digital CAPEX is particularly pronounced, indicating that **confidence in execution drives willingness to invest**.

At the same time, the wide dispersion of planned investments highlights a bifurcation in the sector: a subset of manufacturers is positioning for meaningful scale-up, while a long tail remains in low-investment, incremental mode.

Implication:

Roadmaps unlock capital. Without structured prioritization and credible execution pathways, manufacturers systematically underinvest in digital transformation.

Insight 3: Operational value is being created—but not fully monetized

More than half of surveyed factories report improvements in operational KPIs such as quality, efficiency, maintenance, and delivery performance. These improvements are significantly stronger among ITTI-assessed factories, confirming that digital initiatives are delivering real shopfloor value.

However, a substantial share of manufacturers still report limited or no EBITDA impact. This disconnect suggests that **value leakage occurs after operational gains are achieved**, driven by weak benefit tracking, limited financial integration, and lack of ownership for value realization.

Implication:

The next phase of digital transformation must shift from “technology deployment” to “value capture,” embedding financial accountability into digital programs.

Insight 4: Talent, not funding, is the binding constraint to scale

While investment intent is rising, workforce capability is not keeping pace. Many manufacturers report either no specialist digital roles or heavy reliance on external vendors. Advanced capabilities—AI/ML, digital twin, robotics, advanced analytics—remain scarce across the sector.

Even among ITTI-assessed factories, talent depth is uneven, with capability concentrated in automation and basic data roles rather than next-generation digital skills.

Implication:

Without deliberate internal capability building, manufacturers risk stalling at pilot scale and remaining dependent on vendors, limiting long-term competitiveness.

Insight 5: Sustainability is increasingly embedded—but still early in value realization

ITTI-assessed factories are materially more advanced in defining and executing sustainability strategies, particularly in water management, emissions reduction, and material circularity. Digital tools are increasingly used as enablers of these initiatives.

However, sustainability outcomes tend to cluster at “medium” impact levels, indicating that many initiatives are still in early stages, with limited measurement of economic or environmental return.

Implication:

Sustainability transformation is underway, but requires stronger linkage between digital tools, operational processes, and measurable outcomes to reach full potential.

13.2 | Strategic Implications for Manufacturers

Manufacturers seeking to accelerate and scale digital transformation should focus on four priorities:

01 Move from projects to programs

Shift from isolated pilots to integrated transformation programs anchored in a clear roadmap, governance model, and KPI framework.

02 Institutionalize value tracking

Explicitly link digital initiatives to financial metrics (e.g., cost, margin, working capital), with named owners accountable for realization.

03 Build internal digital operating capability

Prioritize hiring and upskilling in automation, data, and digital operations to reduce vendor dependency and enable sustained scaling.

04 Use sustainability as a value lever, not a compliance exercise

Integrate sustainability initiatives with productivity and efficiency objectives, using digital technologies to unlock dual economic and environmental returns.

13.3 | Strategic Implications for Policymakers

For policymakers, the findings reinforce ITTI as a **high-impact policy instrument**:

Scaling ITTI adoption

can rapidly increase the share of manufacturers operating with structured transformation plans.

Targeted capability interventions

e.g., talent programs, shared digital platforms, centers of excellence) are required to address workforce bottlenecks.

Outcome-based incentives

can encourage manufacturers to move beyond adoption toward value realization and sustainability impact.

The data suggests that marginal expansion of ITTI coverage can generate disproportionate gains at the sector level.

13.4 | Strategic Implications for the Industrial Ecosystem

For technology providers, system integrators, and training institutions, the findings highlight clear opportunity areas:

Demand is shifting from standalone IT systems toward **shopfloor-integrated, outcome-oriented solutions**.

Manufacturers increasingly need **end-to-end support**, spanning roadmap design, implementation, and value realization.

There is a growing market for **capability development**, not just technology deployment.

Ecosystem players that align offerings to these needs will be best positioned to support the next phase of UAE industrial transformation.

13.5 | Synthesis

Taken together, the evidence underscores a central message: **ITTI materially increases the probability that digital transformation efforts translate into sustained operational and economic impact**. However, unlocking the full potential of Industry 4.0 in the UAE will require a deliberate shift from adoption to execution excellence, from pilots to scale, and from operational improvement to financial value capture.



14

Recommendations & Way Forward

The survey findings demonstrate that the Industrial Technology Transformation Index (ITTI) is already delivering tangible benefits across planning discipline, technology adoption, operational performance, and sustainability integration. However, the analysis also highlights clear structural gaps that, if addressed, could significantly amplify impact. This section outlines **practical, prioritized recommendations** to strengthen ITTI's role as a transformation engine and to accelerate value creation across the UAE manufacturing sector.

14.1 | Recommendations for Manufacturers

01 Move from roadmap existence to execution rigor

While ITTI has successfully increased the number of manufacturers with defined digital roadmaps, execution quality remains uneven. Manufacturers should:

- Translate roadmaps into time-bound portfolios of use cases, each with a clear business owner
- Establish governance mechanisms (steering committees, quarterly reviews) to sustain momentum
- Explicitly link digital initiatives to operational KPIs and financial outcomes

The priority is not more initiatives, but fewer, higher-impact programs executed consistently.

02 Institutionalize value capture and performance tracking

A significant proportion of factories report operational improvements without measurable EBITDA impact. To close this gap, manufacturers should:

- Define baseline metrics prior to implementation
- Track benefits through standardized value-tracking templates
- Link operational KPIs (OEE, scrap, lead time) to P&L levers

This shift will enable manufacturers to move from "proof of concept" to proof of value.

03 Rebalance investments toward capability-forming technologies

ITTI-assessed factories already show stronger adoption of shopfloor-relevant technologies. Going forward, manufacturers should:

- Prioritize MES, automation, advanced analytics, and AI-enabled use cases that directly influence throughput and quality
- Avoid over-indexing on isolated enterprise tools without operational integration
- Design architectures that allow incremental scaling rather than one-off deployments

04 Build internal digital and OT capabilities alongside vendor support

Vendor-led delivery has enabled early progress, but long-term scalability requires internal ownership. Manufacturers should:

- Identify a small set of core digital roles critical to their operating model
- Invest in targeted upskilling for existing engineers and operations leaders
- Treat digital talent as a strategic asset, not a project resource

14.2 | Recommendations for Policymakers and ITTI Program Owners

01 Scale ITTI adoption across the remaining manufacturing base

The comparative evidence between ITTI and non-ITTI factories presents a compelling case for wider adoption. Policymakers should:

- Actively target non-assessed factories, particularly SMEs, for ITTI onboarding
- Position ITTI as a default entry point for national digital and sustainability programs
- Use ITTI participation as a qualifier for selected incentives and support mechanisms

Scaling ITTI could materially increase the share of manufacturers operating with structured transformation roadmaps.

02 Strengthen ITTI's focus on execution and value realization

To move beyond assessment, ITTI can be further enhanced by:

- Embedding standardized roadmap templates with financial impact logic
- Introducing post-assessment follow-ups to track implementation progress
- Providing guidance on benefit measurement and value capture

This would reinforce ITTI's role as a **longitudinal transformation companion**, not a one-time diagnostic.

03 Address sector-wide digital talent constraints

Talent shortages represent the most binding constraint to sustained transformation. Targeted interventions could include:

- National upskilling programs focused on industrial automation, data engineering, and AI
- Shared talent or center-of-excellence models for SMEs
- Partnerships with academia and vocational institutions aligned to Industry 4.0 needs

Without parallel investment in skills, technology adoption risks plateauing.

04 Integrate sustainability metrics more explicitly into ITTI scoring and guidance

ITTI has already embedded sustainability into the assessment framework. This can be further strengthened by:

- Linking sustainability initiatives more directly to digital enablers
- Highlighting best-practice sustainability use cases within ITTI guidance
- Encouraging manufacturers to quantify environmental and resource-efficiency gains

14.3 | Recommendations for Technology and Ecosystem Partners

01 Shift from technology delivery to outcome-based engagement

Survey findings suggest manufacturers value solutions that deliver operational impact. Ecosystem players should:

- Frame offerings around measurable outcomes (quality, efficiency, energy)
- Support roadmap-driven, multi-year transformation programs
- Co-invest in pilots that demonstrate clear value pathways

02 Support capability transfer, not just implementation

Partners that enable skill transfer and internal capability building will be better positioned to sustain long-term relationships as manufacturers mature digitally.

14.4 | Way Forward: From Momentum to Systemic Impact

The UAE manufacturing sector has established a solid digital foundation. Core systems are in place, early operational gains are visible, and investment intent is rising. The next phase of transformation will be defined not by awareness or experimentation, but by **systematization and scale**.

ITTI has proven its effectiveness as an organizing and accelerating mechanism. By expanding adoption, strengthening execution support, and addressing talent and value-capture gaps, ITTI can evolve from a maturity assessment into a **cornerstone of national industrial competitiveness**.

The opportunity ahead is clear: move from fragmented progress to coordinated, high-impact transformation—ensuring that digital technologies translate into sustained productivity, resilience, and sustainability gains for the UAE manufacturing sector.