



FUTURE-READY SUPPLY CHAIN: LIFE SCIENCES

**Discover the future of Life Sciences and plan
your future-ready transformation.**



Introduction

The future of Life Sciences is rapidly taking shape. Traditional 'outcome-focused' business models are already transitioning not just to 'patient-focused' but 'consumer-focused', influenced by the consumerisation of healthcare. With stakeholder relationships and expectations blurring and being influenced across industry and regions, future Life Sciences organisations are set to push the boundaries even further.

Future-ready supply chains will push boundaries further beyond 'consumer-focused' to 'person-focused'. To achieve this shift, leaders continue to challenge the boundaries and shift the degree of separation from customer to the manufacturing floor.

Life Sciences supply chains can transform into a new reality of:

1. person-focused products and services,
2. platform-enabled business models,
3. digitally-enabled operating models and
4. brand-powered value propositions.

In this report, originated in Australia, we explore the future in detail, then outline how you can design your own future-ready transformation.

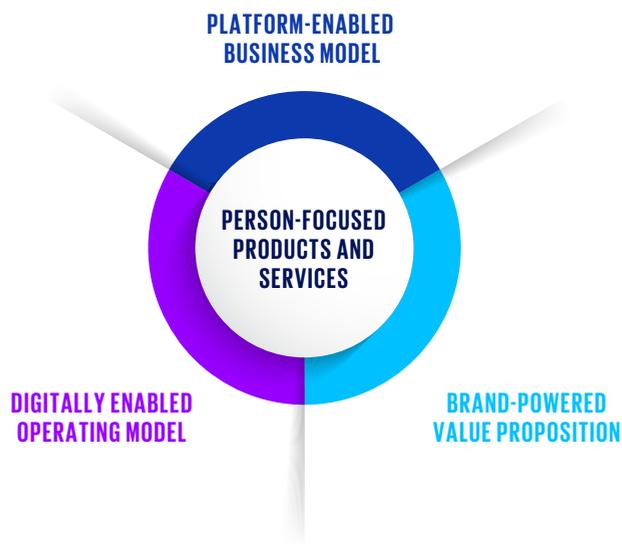


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Person-focused products and services



The days of targeting broad traditional demographics and segments are numbered. In the new era of ‘hyper-personalised’ products and services, future demand and customer needs will be driven by the individual.

Precision medicine

Precision medicine meets this need for person-focused products and services; shifting treatment focus from a ‘one to many’ generalised offering to a ‘one-to-one’ targeted offering. This new treatment modality provides individualised precise treatments – based on an individual’s cells or genes – and even the promise of a ‘cure’ for previously untreatable diseases. Currently, manufacturers are grappling with the commercial viability of precision medicine due to the:

- long lead times and regulatory burden across the product development cycle (i.e. from clinical trial to commercial production).
- operational complexity (due to supply chains dependent on supply of an individual’s genes or cells)
- high CoGS (due to manufacturing labour intensity and high start-up costs).
- complexity with treatment scale and translation across disease areas

With the growing burden of disease spurred by an ageing population and growing pressure on regulators for patient-centric healthcare, policymakers must review regulation to improve access and speed to market of precision therapies.

We have already seen the ability for policymakers to initiate rapid reform to meet societal health pressures under Covid-19. This regulatory-enablement and improved technology readiness for manufacture will likely increase operational efficiency and supply of precision therapies. Expect to see supply chains literally ‘put the customer first’ by sourcing and leveraging an individual’s genes or cells upfront in the supply chain.

Personalised products

Current product offerings will likely also be transformed to meet customer demand for hyper-personalisation. Enabled by additive manufacturing and IoT, products can be produced on-demand and even on-site at clinics, reducing turnaround time from diagnosis to treatment and improving outcomes through tailored offerings.

For example, Luxcel has developed 3D printed prescription lenses, enabling cheap and quick trial lens development and testing for customers in store – or even home delivery. This is not restricted to medical devices – even pharmaceutical companies are starting to develop ‘polypills’ leveraging 3D printing to support patients managing multiple diseases through a single pill.

In future, Life Sciences can move beyond traditional single site mass production to a distributed footprint and network of micro-supply chains. Products can be produced in market and in clinic, reducing the distance and time from manufacturer to customer and enabling market and individual customisation.

Service bundling

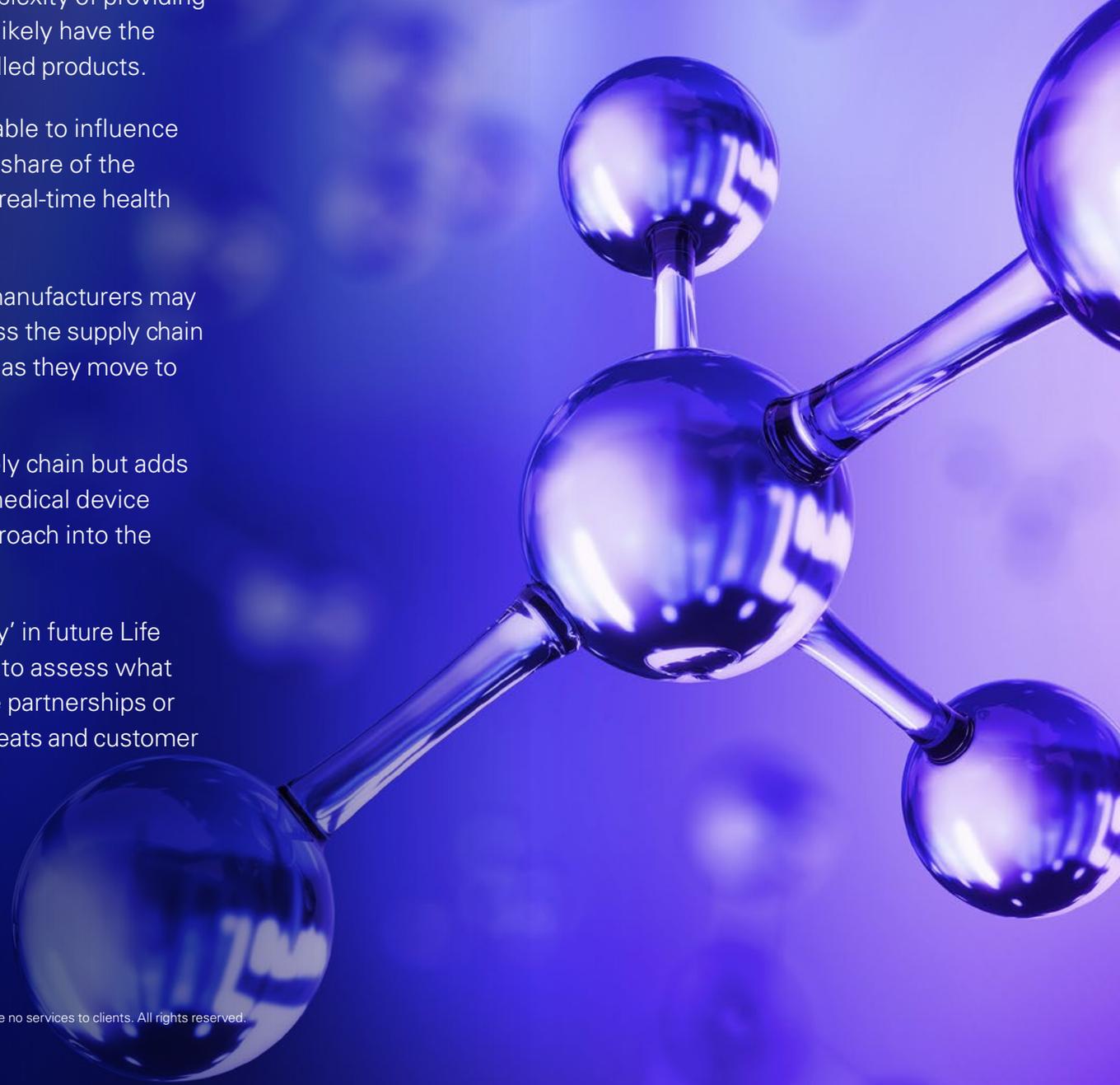
Future manufacturing supply chains may not have the complexity of providing precision treatments and personalised products, but will likely have the added complexity of integrating and enabling service-bundled products.

By leveraging companion apps, Lifesciences leaders are able to influence patient health habits and behaviour and capture a greater share of the value chain by providing services such as gamification and real-time health indicator monitoring.

To achieve scale and rapid enablement of new capability, manufacturers may increasingly partner with or acquire these capabilities across the supply chain to achieve scale and leverage cross-industry specialisation as they move to add value 'beyond the pill'.

This not only introduces new opportunity across the supply chain but adds new competitive threats, where the line blurs between medical device and technology device, as technology players start to encroach into the healthcare ecosystem.

Service-enabled products will likely become a 'ticket to play' in future Life Sciences manufacturing supply chains. Leaders will need to assess what to retain as core capability versus where they can leverage partnerships or acquisitions – optimising their ability to address external threats and customer opportunities.



Platform-enabled business model

The future of Life Sciences manufacturing supply chains may not only see a shift in products and services, but also new person-focused business models to deliver personalised products and services.

With the consumerism of healthcare and Me-Commerce, one such disruptive play that will become dominant in future-ready supply chains is platform based ecosystems (PBE); an interconnected platform facilitating exchanges between healthcare ecosystem players along the end-to-end healthcare value chain.

Me-Commerce

Platform models will facilitate e-commerce – or more specifically ‘Me-Commerce’ tailored to individual’s needs – across the supply chain and value chain, enabling a new era of B2C or B2B2C in Life Sciences. With Covid-19, we have already seen the use of low-touch digital distribution such as ePrescriptions and home delivery.

Future supply chains will likely avidly embrace e-commerce and leverage other emerging technologies such as AI-enabled diagnostics, tele-health and AR/VR-enabled remote fitting and guidance. This can enable greater health equity through enhanced patient access, minimising barriers to entry due to mobility, geography or income. The shift is already happening in the healthcare ecosystem. For example, Santiz – a Dutch Hospital Group – has created an aligned strategy for ‘hospitals at home’ and ‘hospitals for long-term care’ for less complex cases¹.

This is leading to the democratisation of healthcare; where patients can access healthcare how, when and where they want it. Regional patients will be able to remotely access local – or even international – specialist care previously restricted to metropolitan residents or reducing costly and burdensome travel times. As a result, future Life Sciences supply chains will move from traditional on-site, in-clinic purchasing and delivery and move towards B2C and B2B2C business models and support home-care models.

Platform-based ecosystems (PBE)

Future supply chains will foster and leverage platform based ecosystems (PBE) supported by omni-channel experiences between ecosystem participants, and a seamless integrated supply chain, enabled within a single platform. This can bring new supply chain opportunities such as real-time troubleshooting between manufacturers and clinicians, tailored content delivery, personalised product and services and tele-health HCP-Patient, holistic health through HCP-HCP and patient support through patient-patient, patient-advocacy group or even patient-funder.

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¹ COVID-19: Recovery and resilience in healthcare - KPMG Global (home.kpmg)

EXAMPLES OF TRANSFORMING CHANNELS INCLUDE:



AI-enabled chatbots which support patient screening prior to physician assessment or handling of physician FAQs



real-time HCP-patient or HCP-HCP communication across channel of choice such as chat, video, form or email



care pathway automation and triaging such as addressing procedure backlogs

WE'RE ALREADY SEEING LEADERS USE EXTERNAL AND INTERNAL DATA POINTS AND 'BIG DATA' TO:

1.

ensure business continuity by proactively identify supply chain risks – such as material shortages, product flow delays and external disruptions (such as Covid-19)

2.

visualisation and scenario planning for proactive and predictive commercial decision-making across the product development lifecycle and supply chain enabled by digital twins

3.

monitor end-to-end supply chain quality – such as cold chains and packaging

4.

create bespoke tailored products and services delivered through 'Me-Commerce' channels

Future supply chains may no longer be driven solely by the manufacturers but through a series of exchanges across the ecosystem where solutions and support are crowd-sourced, and feedback is on-demand and in real-time. This is already occurring in new product and service development, where manufacturers are co-creating with healthcare professionals and patients. This is enhanced by new-technology omni-channel modalities – moving from in clinic to tele-health. Specifically, omni-channel has become 10-channel; with customers expecting modalities across social media, email, video, portals, chat bots, forums, phone, forms and face to face.

Examples of transforming channels include:

- AI-enabled chatbots which support patient screening prior to physician assessment
- basic chat FAQ handling
- addressing procedure backlogs by separating care pathways – such as Covid-related from business as usual.

This provides a powerful asset for future supply chains both as:

- a customer-centric pull mechanism – where external feedback and support loops have greater reach and efficiency, and issue resolution is no longer dependent on the manufacturer
- a push mechanism – where quality control issues or network outreach can be achieved rapidly and efficiently at scale by manufacturers.

Data as an asset

By interconnecting internal operations, the external value chain and the healthcare ecosystem via a platform based ecosystem (PBE), organisations will gain connectivity and efficiency but also data – and lots of it. Data is the new currency of future supply chains, giving leaders a 360 view of their customers and extended value chain participants. Led by cognitive and predictive machine learning, they will be able to drive new personalised services and precision products, influence consumer behaviour, and proactively forecast and manage demand and supply variability to promote supply chain agility and resilience.

We're already seeing leaders use external and internal data points and 'big data' to:

1. ensure business continuity by proactively identifying supply chain risks – such as material shortages, product flow delays and external disruptions (such as Covid-19)
2. create visualisation and scenario planning for proactive and predictive commercial decision-making across the product development lifecycle and supply chain enabled by digital twins
3. monitor end-to-end supply chain quality – such as cold chains and packaging
4. create bespoke tailored products and services delivered through 'Me-Commerce' channels.

To ensure competitive advantage, future leaders can leverage and partner with hyper-scalers to gain a data advantage and rapidly expand supply chain reach. Future manufacturing ecosystem partnerships and alliances will likely be founded and traded on mutually beneficial data leverage points, and market leadership will likely be based on data share of the value chain.

Digitally-enabled operating model

Today's emerging technologies of Industry 4.0 may or will likely become the new normal, introducing an era of Life Sciences 4.0 digitally-enabled operating models. In the wake of the pandemic, leaders are moving toward a smarter, faster future; quickly realising the value of Artificial Intelligence and Machine Learning (AI/ML).

AI/ML may or will likely become a core operational component to leverage data assets and ensure commercial viability in the new complex era of personalisation. Covid-19 has showcased the realm of possibilities of this technology such as AI technology unmasking virus genomics, identifying virus candidates prior to human testing and rapid analysis of clinical trial data to support speed to market².

This has opened the Industry's doors - and eyes- to the realm of possibility with AI/ML. In fact, 55% of organisations state Covid-19 has accelerated their operational digitisation efforts by months or years³. Future-ready leaders can lean into the broad applications and value propositions of this technology, coupling it with other supplementary Life Sciences 4.0 technology – such as IoT, RPA and Digital Twins – enmeshing AI into the DNA of the Life Sciences supply chain and operations.

² Life Sciences: Thriving in an AI World (kpmg.us)

³ Digital Fuel (assets.kpmg)

24%

OF MANUFACTURERS ARE LOOKING TO ADVANCE DIGITISATION AND CONNECTIVITY OF ALL FUNCTIONAL AREAS⁴.

23%

OF MANUFACTURERS EXPECT TO DOWNSIZE THEIR ORGANISATION'S FOOTPRINT IN THE NEXT 3 YEARS⁵.

Remotisation

Future-ready operations will be highly automated, modular and remote to address the added complexity of hyper-personalised products, services and new business models.

We are already seeing manufacturers look toward remote 24/7 operations by leveraging supervisory control systems and in-line IoT coupled with highly automated modular operations. This supports future operation commercial viability and resiliency of future operations by mitigating against workforce pressures, improving production utilisation and enhancing speed to market.

This also opens a new realm of possibility for manufacturing site selection; with modular remotised supply chains allowing for reduced footprint requirements of individual sites and reduced dependency on local workforce capability and availability.

Additionally, the remotisation capability of emerging technology expands beyond operational processing; with AR and VR enabling leaders to onboard and upskill operational staff remotely and AI-enabled predictive maintenance enhancing machine up-time.

The uptake of production remotisation has been constrained in Life Sciences due to stringent product 'design for manufacturing' processing sensitivities and quality-control constraints. However, future operations will likely become increasingly remotised with advancements in technology readiness of new processing capabilities and product design for manufacture, fuelled by a need for speed to market and commercial viability.

Scenario modelling

Covid-19 has heavily disrupted global supply chains, heightening the importance of supply chain resilience.



25% of manufacturers see supply chain risk as the greatest threat to organisational growth⁶



31% of manufacturers are looking to diversify their input sources⁷



68% of manufacturers say their supply chains are resilient in the event of a global lockdown and restrictions in the next 3 years



Are your supply chains future-ready?

A key digital-enabler is digital twins – supporting organisations to harness big data and AI/ML capability to proactively manage supply chain and operational risks. Digital twins are already being used to identify and manage diversified input locations to enable supply chain resilience. Supply chain prediction enhances operational and financial performance and promotes supply chain visibility.

Recently, Asia Pacific worked with a leading global bio pharma company to enable a proactive execution model. This model identified key factors influencing target performance variation, expected improvements and evaluation of potential improvement scenarios – while also providing tactical decision support for unexpected production events⁸. The capability of digital twins in operations expands even further, with future-ready leaders leveraging digital twins to enable scenario planning, root cause analysis, probabilistic scheduling analysis, dynamic rescheduling and schedule optimisation capability 'off-line' and in real time.

⁴ Global Manufacturing Prospects 2022 (home.kpmg)

⁵ Global Manufacturing Prospects 2022 (home.kpmg)

⁶ Global Manufacturing Prospects 2022 (home.kpmg)

⁷ Global Manufacturing Prospects 2022 (home.kpmg)

⁸ ai-enabled-digital-twin-life-sciences (1).pdf

Proactive quality

To enhance commercial viability, leaders will not just seek to improve efficiency and resilience of their operations and supply chains, but also leverage AI to improve and reduce the costs of quality. With real-time feedback in line and in the field to detect issues and faults, feedback can be directly provided and addressed across the supply chain to rapidly respond to issues and non-conformances.

Additionally, these diagnostics can be fed up the line through to R&D to inform future product design and enhance manufacturing – improving quality and yield. In-line detection enabled by IoT and machine learning enables real-time detection and resolution of errors. Initially, these errors can be flagged to a human respondent – on the floor or remotely – to action. Eventually, these algorithms will be trained to proactively address errors without or with minimal human intervention.

High availability and quality of operational data and analytics is also enhancing quality management, compliance and regulatory communication. Future leaders will leverage digital assets to streamline quality management to optimise operational risks and costs.

Brand-powered value proposition

Future Life Sciences supply chains will shift from a traditional cost centre to a brand influencer.

Secure by design

We know data security threats are one of the biggest challenges facing organisations.

Healthcare is particularly susceptible with the industry incurring the highest average cost per breach (\$7.13 million USD⁹) and with data security heavily influencing brand loyalty. Healthcare data is in demand, reportedly selling for an average of \$250 USD¹⁰ on the black market.

Future supply chains will likely integrate data security into standard ways of working ensuring transparent privacy policies and robust data security as a core capability. Blockchain capability holds promise for enabling secure and efficient cross-organisation and cross-ecosystem communication by:

1. **creating a distributed workflow for matching candidates and patients**
2. **tracking, monitoring and managing patient healthcare and data**
3. **monitoring adoption rates – such as vaccinations**
4. **distribution of limited resources where needed most¹³.**

This is already occurring with IBM announcing an alliance with KPMG International, Merck and Walmart to develop a pharmaceutical blockchain platform for tracking drugs across the global supply chain.

Leaders can leverage new data encryption standards, cloud security and emerging technology – such as blockchain trackable ledger – to enhance data security and enable the balance between value chain personalisation, connectivity and security.

ESG is key

ESG is becoming increasingly important for investors and customers. New research by KPMG International in the report *Net Zero Readiness Index* shows industry – including manufacturing – has the highest degree of variability by country in terms of decarbonisation progress and government action. Specifically, future Life Sciences leaders should focus on including the efficiency of energy consumption and reducing scope 3 emissions in the supply chain.

Consumers are also demanding traceability of products and their sustainability and social impact and origins. So, future leaders should move to enhance product traceability across the supply chain, by leveraging digital age...and enable sustainable sourcing by reviewing manufacturing inputs, material flows and operations footprint.

One emerging technology holding promise is digital twins for ESG compliance and uplift; where it is expected that the manufacturing sector will lead the way using digital twins to simulate work environments and reduce ESG compliance costs¹⁴. Leaders will need to not just consider cost-optimisation when designing or optimising their manufacturing operations, but also consider ESG impacts – and potential uplifts – of their operating models across people, processes and systems if they are to remain viable.

CEOs say dealing with cyber vulnerability is a top 5 challenge in the next



3 – 5 years¹¹.



84%

of customers are more loyal to companies that demonstrate strong security controls¹².

Is your data secure?

⁹ ITONICS_Trend-Report_Where-to-Play-2021+.pdf (sharepoint.com)

¹⁰ <https://trustwave.azureedge.net/media/15350/2018-trustwave-global-security-report-prt.pdf?>

¹¹ Keeping us up at night (assets.kpmg)

¹² ITONICS_Trend-Report_Where-to-Play-2021+.pdf (sharepoint.com)

¹³ Emerging tech solutions to consider - KPMG Global (home.kpmg)

¹⁴ Looking Ahead: ESG 2030 Predictions (assets.kpmg)

How to future-ready your Life Sciences organisation

Although the future may seem far-reaching, we recommend you focus on three key areas to become future-ready and remain competitive.

1. Leverage and protect your greatest asset

With data as the future currency, begin measures to build and protect your data assets.

- 1.1 Review your data strategy, capability and availability against future needs.**
- 1.2 Identify opportunities to leverage data value such as strategic partnering value propositions, new revenue generation opportunities or AI-enabled cognitive value chains and operations.**
- 1.3 Build strong data foundations – establishing a plan for improving maturity and ensure AI/ML efforts can be realised, operationalised and sustained.**

Start by setting clear data objectives and outcomes and ensuring data hygiene by reviewing current data management, data investment and divestment practices and data security measures. From there, look to improve along the maturity curve by exploring opportunities to standardise and leverage platforms, moving toward predictive and then cognitive analytics to drive supply chain decision making and monetisation.

Remember, data can be your greatest strength and value proposition; but also your greatest weakness if faced with a breach and subsequent brand erosion.

2. Disrupt or be disrupted

85% OF LIFE SCIENCES LEADERS SAY DIGITAL TRANSFORMATION WILL LEAD CHANGING ROLES IN THE ECOSYSTEM¹⁵.

With 67% of businesses saying Covid-19 has accelerated their digital transformation and 63% increasing their digital transformation budget¹⁶, a transformation agenda is no longer a competitive advantage but a competitive requisite to stay relevant. Future supply chains are rapidly evolving and heavily interconnected. This requires more than an incremental step change. A focused and proactive transformation agenda that extends beyond the supply chain to value propositions, business and operating models, and products and services is a must to ensure transformation success and enablement.

Start by clarifying your strategy, setting a clear transformation objective and sharing it across the leadership team – including alignment of KPIs. From here, define your future business model, value proposition, products and services, and operating model. This includes reviewing key operating model layers across people, process, technology, governance, and data and insights for supply chains to ensure they are future ready. Furthermore, stay 'person-focused' and ensure your transformation is rightsized to organisational capacity and capability. This includes building capability and capacity by aligning hiring and talent strategies to empower a future-ready workforce with data acumen and and prioritising initiatives based on your organisations capacity to deliver.

¹⁵ Digitalization in life sciences (assets.kpmg)

¹⁶ Impact of COVID-19 on digital transformation - KPMG (home.kpmg)

3. You're not alone

With the added complexity of future Life Sciences supply chains, focus on strengthening core capability while expanding additional capability reach through ecosystem partnerships or acquisitions. Review the future capability requirements and assess alternative investment strategies to build buy or partner – identifying mutually beneficial partnerships or acquisition opportunities to maximise value while continuously optimising core capability.

Strategies could include:



industry partnerships such as exploring opportunities to leverage technology hyper-scalers that can help rapid expansion across the value chain



private-public partnerships (PPP) with hospitals to improve healthcare ecosystem integration, resourcing and access



patient or professional co-design to provide personalised offerings designed by and for patients and/or professionals to improve outcomes, uptake and trust.

Remember, a partnership or acquisition should be value creating (not value-eroding) for both parties. Ensure you review and assess both the strategic value and strategic threat of the partnership and capability.

How KPMG can help

Preparing for the future of Life Sciences may feel overwhelming but you're not alone. KPMG firms in the Asia Pacific region can support as a trusted advisor to collaborate and co-design your future-ready Life Sciences transformation agenda.

Breadth and depth of specialisation

- Access to specialists across global and local healthcare ecosystems.
- Utilisation of deep technical specialisation across commercial, finance and logistics.

Dedicated operational specialisation

- Reimagine your operations with deep supply chain and manufacturing specialisation.
- Leverage and implementation of emerging Industry 4.0 technologies for future-ready operations.
- Learn from real-time, customer-driven insights.

Tried, tested and tailored systematic approach

- Utilise our robust approach informed by real-world successes and failures.
- Access capability across sectors, industry and services to achieve business outcomes.

Wide-ranging support

- Get support across all aspects of your transformation agenda to strategise, define, implement and operationalise.
- Upskill and empower your teams to embed and sustain the strategy.

Ecosystem relationships

- Understand stakeholder value propositions across the healthcare and life sciences ecosystem with tailored specialisation.
- Achieve optimised value for you, your partners and stakeholders.

Value-focused frameworks and accelerators

- Turbo-charge your transformation with our proprietary operating model and technology accelerators.
 - Target and realise ROI with tools and methodologies.
 - Reduce sunk-cost risks and achieve fit-for-purpose outcomes.
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Learn more about our our Life Sciences Services.

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