LTI
Let's Solve

A Larsen & Toubro Group Company

POV

LTI Battery 360

Battery Lifecycle Management Platform

With global electric vehicle sales expected to reach 20.6 million in 2025, the lifecycle management of EV batteries is set to become a very critical area. If handled effectively, both from a production and environmental standpoint, it will indeed accelerate the adoption.

During our conversation with Battery Manufacturing companies, we have come across three decisive vectors that the manufacturers are working on:
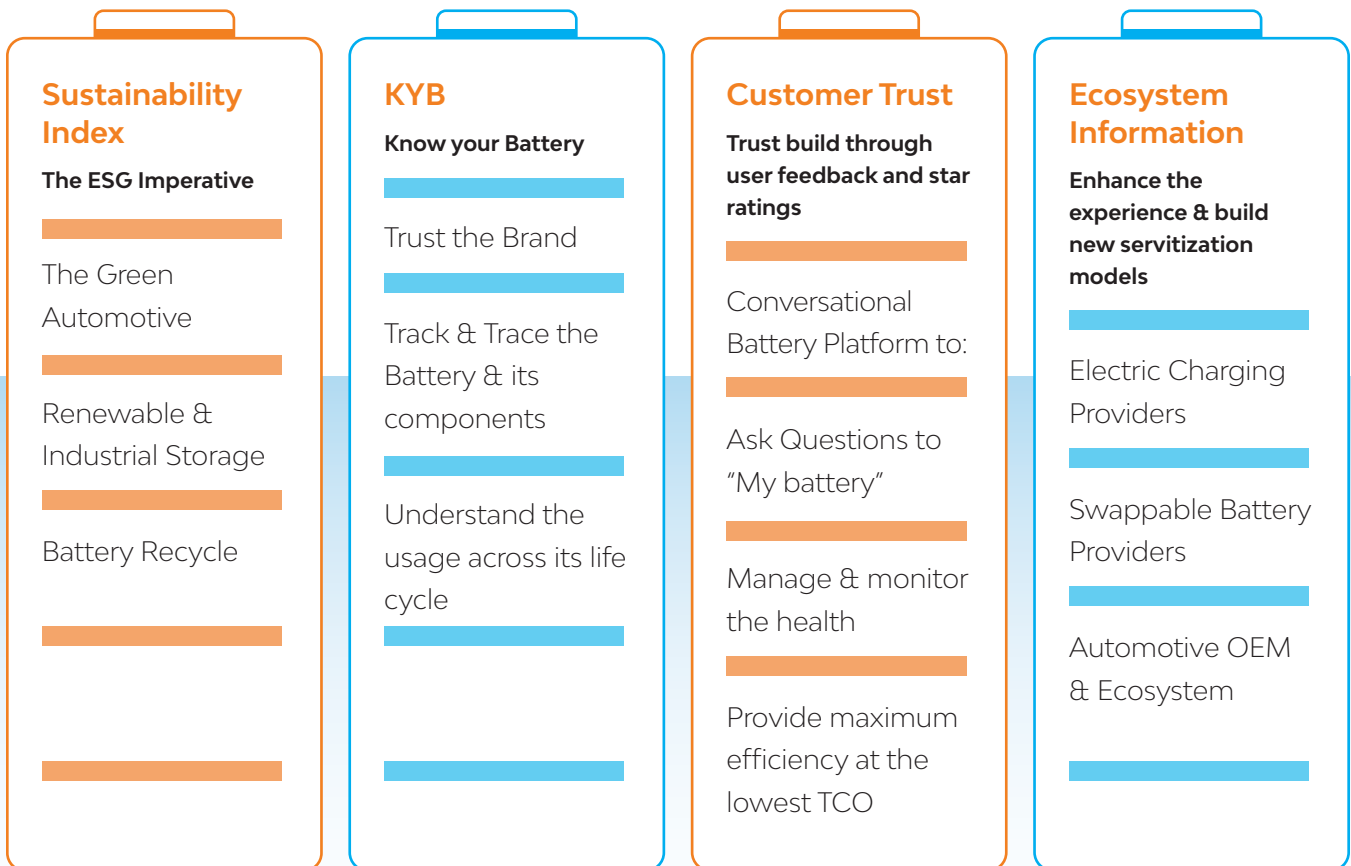
⚡ Capitalizing on the growth in the EV market while effectively managing the battery lifecycle.

⚡ Creating an agile & flexible factory with a resilient supply chain driven through a Hybrid workforce.

⚡ Managing the disruption through digital customers from a B2B model of Battery to a B2C model much like the disruption, which Tesla has successfully mastered.
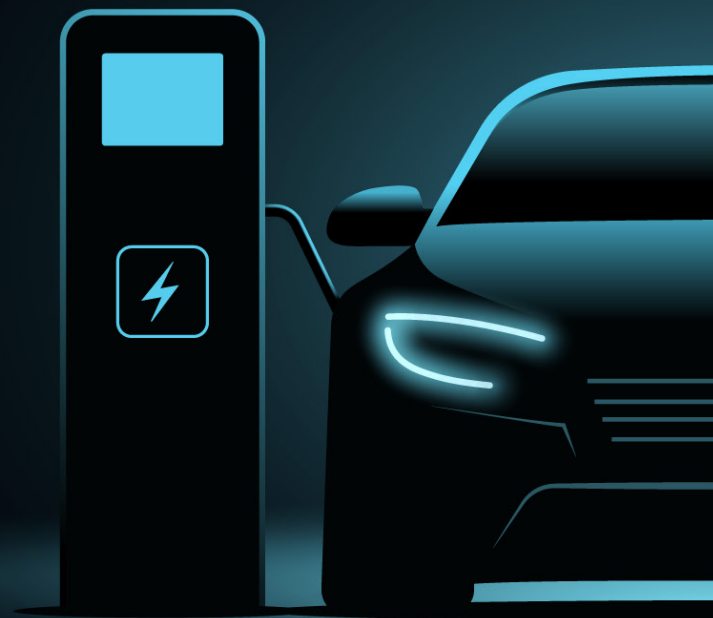
LTI 360
LTI IXC (Industry X.0 Canvas) Offering

LTI SMEs conducted design thinking workshops and hackathons to construct an end-to-end solution that can help battery manufacturers in addressing the above vectors. This comprehensive exercise led to the conceptualization of the Battery 360 offering, which basically means changing the heart of the vehicle from ICE to Battery. This also stemmed from the fact that Battery will drive the complete ecosystem play of automotive disrupting the decade of the monopoly of the oil-based ICE drives. The way client 360 drives the core of banking, Battery 360 would drive the core of the Automotive EV industry and hence, what it meant was a complete biography of the Battery, which is illustrated as a sample in Fig. 2

Sustainability Index

The ESG Imperative

The Green Automotive

Renewable & Industrial Storage

Battery Recycle

KYB

Know your Battery

Trust the Brand

Track & Trace the Battery & its components

Understand the usage across its life cycle

Customer Trust

Trust build through user feedback and star ratings

Conversational Battery Platform to:

Ask Questions to "My battery"

Manage & monitor the health

Provide maximum efficiency at the lowest TCO

Ecosystem Information

Enhance the experience & build new servitization models

Electric Charging Providers

Swappable Battery Providers

Automotive OEM & Ecosystem
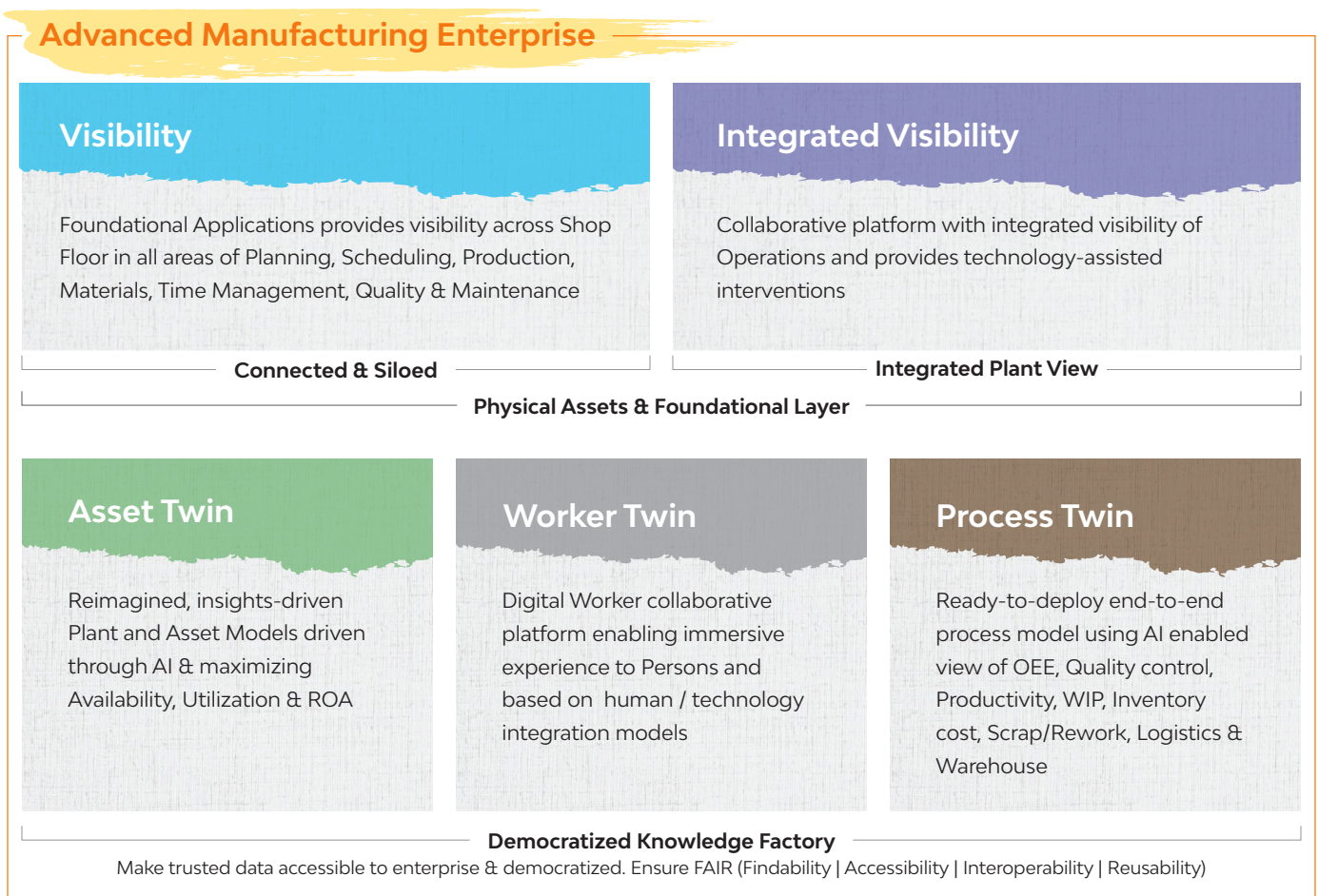
Drivers of Battery 360

The biggest market shift driven by the pandemic is the need to shift to a B2C model and the key question which is driving the Digital Customer imperative is "How do I enhance my customer connects to bring innovation in B2C sales, service as well new business models through servitization of my products as part of NPI & Product Life Cycle view". As the future of Battery value creation shifts toward information-rich services it is important to understand the Battery Life Cycle Value Chain shown in Fig 3

| Battery Cell/ Pack Manufacturing	EV Manufacturing & Aftersales	Battery Pack End-of-Life
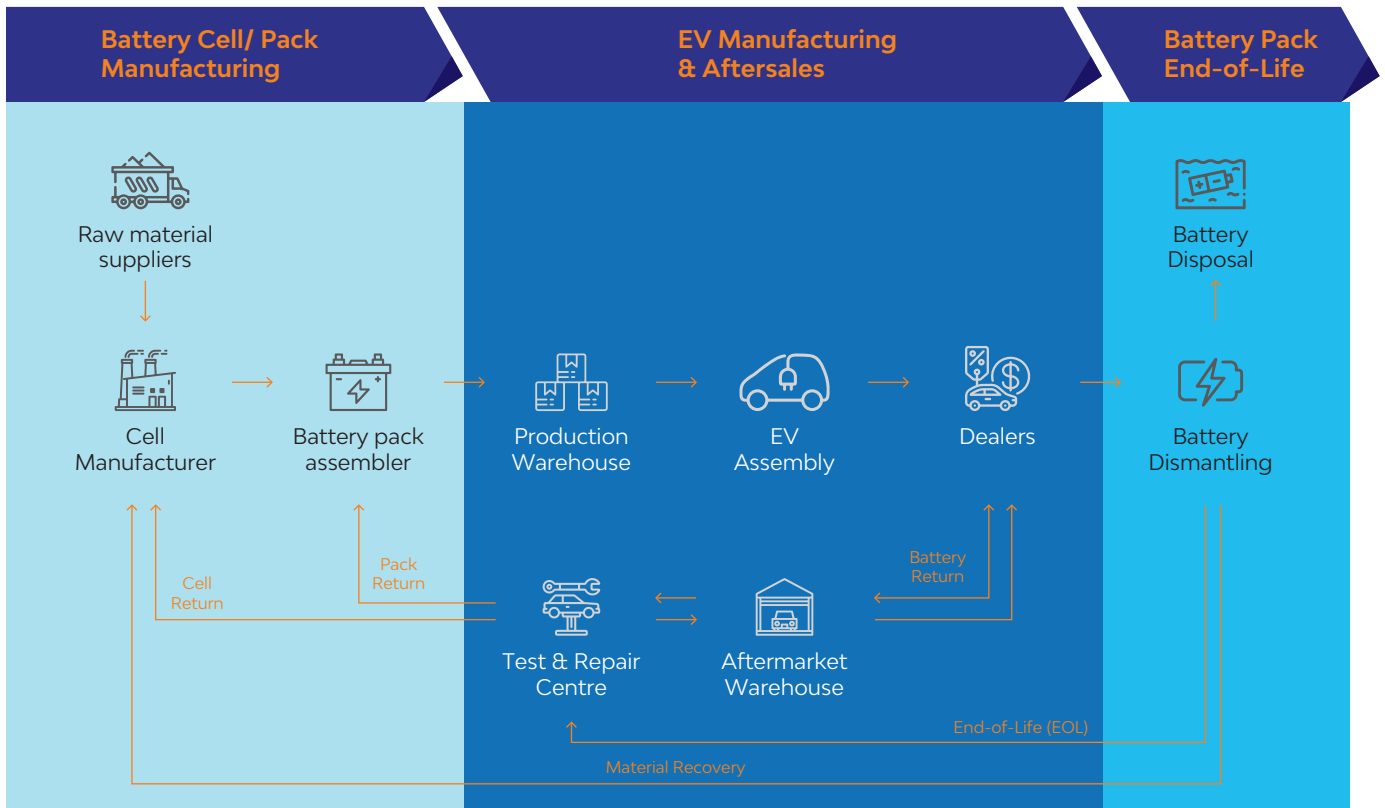
A Battery goes through different stages in its complete lifecycle right from Design to Manufacturing to Sales to After market and final - dispose off. Multiple data points and associated transactions get associated with the battery unique serial number and it also starts influencing the behavior of the brand, its ecosystem players like the automotive companies, the charging stations, swappable battery ecosystem based on the key metrics of performance, efficiency and the need to drive value-driven insights about itself.

Solution Approach for a Battery 360
Battery Management Platform

LTI leverages its Industry X.0 Canvas (IXC) Framework that helps organizations transform their operating model in line with the dynamic business scenarios. LTI IXC framework is designed to capitalize on current investments, augment scale, and bring together capabilities across the Manufacturing enterprise to derive meaningful insights and fuel digital innovation for the new enterprise operating model.

Advanced Manufacturing Enterprise

Visibility

Foundational Applications provides visibility across Shop Floor in all areas of Planning, Scheduling, Production, Materials, Time Management, Quality & Maintenance

Connected & Siloed

Integrated Visibility

Collaborative platform with integrated visibility of Operations and provides technology-assisted interventions

Integrated Plant View

Physical Assets & Foundational Layer

Asset Twin

Reimagined, insights-driven Plant and Asset Models driven through AI & maximizing Availability, Utilization & ROA

Worker Twin

Digital Worker collaborative platform enabling immersive experience to Persons and based on human / technology integration models

Process Twin

Ready-to-deploy end-to-end process model using AI enabled view of OEE, Quality control, Productivity, WIP, Inventory cost, Scrap/Rework, Logistics & Warehouse

Democratized Knowledge Factory
Make trusted data accessible to enterprise & democratized. Ensure FAIR (Findability | Accessibility | Interoperability | Reusability)

Battery companies are in a unique position to integrate the data from various point applications as well as partner ecosystems, build a foundation layer through data Catalogs to define unique, common, and unified data models.
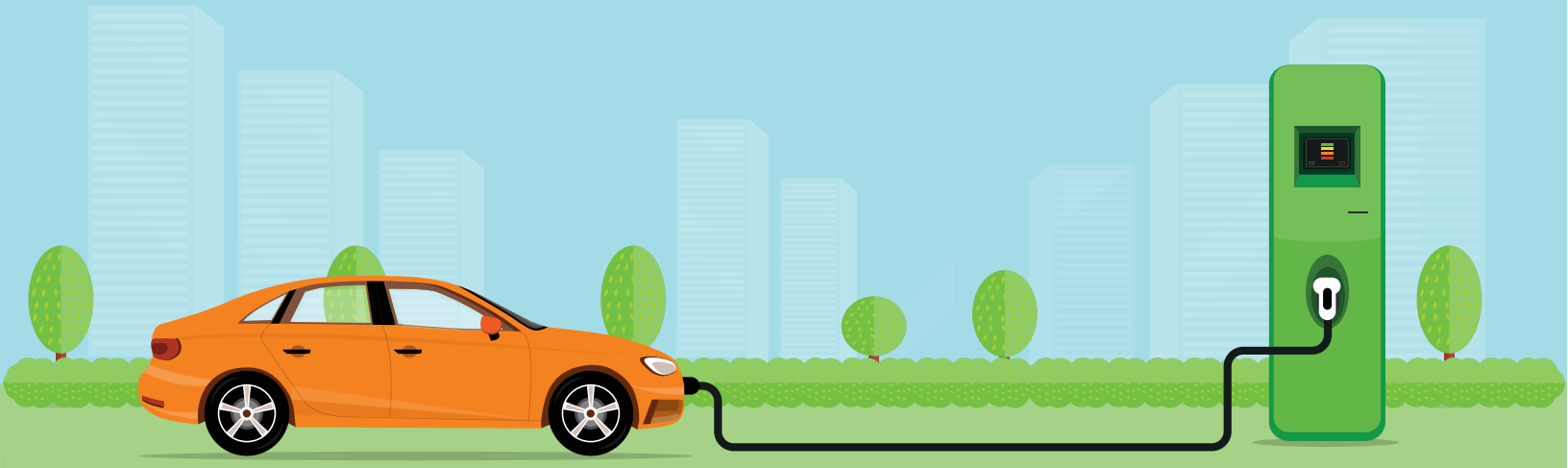
Battery Data Ecosystem

Customer Success Team

Value creation shift towards information-rich services & conversational AI (example Fig 3.)

Other Ecosystem Players

Swappable Battery Providers, Charging Stations

Battery Management System (OE)

Cell Pack parameter sensing, Performance, Protection, Optimization, Remaining Useful Life, etc.

After Sales

Bill-to-Party, Ship-to-Party, Customer/OEM. Sales Date, Value, Country, Promotions, etc.

Traceability

Serial No, (Module & Housing Pack Level) QR Codes, Component Batch Traceability, Production Order, Test Data, etc.

Sales

Bill-to-Party, Ship-to-Party, Customer/OEM. Sales Date, Value, Country, Promotions, etc.

Manufacturing

Plant, Manufacturing date, Warranty, RCCA, Battery Size, Weight, Terminal type etc.

Battery Specification

OEM Name, Brand, Technology Type, IP X rating, Explosion Rating.

With the expertise of the SMEs, powerful insights through AI/ML coupled with conversation AI Layers, manufacturers can offer information services providing valuable insights to its end customers as shown below.

Catalyzing Growth & Product Management Innovation

Ability to drive Customer Success using autonomous insights.

KPIs to track battery life, service records, etc. across countries, battery technology, workshop, vehicle & usage, etc.

Quick analysis of anomalies in the data to find out alerts, events, fraud, or inconsistency in data.

Nudge & questions to get insight and drive growth through ecosystem players

What are top 3 workshop/swappable stations/fast charging stations in Germany in 2021?

Show me any fraud across invoiced country and serviced country in 2021?

What is service record basis technology across batteries in 2021?

Which provides the best TCO basis a swappable battery v/s charging station?

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QR Code

LTI N60 BLUE EFB DYNAMIC

Technical Specification	
Brand	LTI
Serial	LN2 560 901 068
Terminal Style	Stud Terminal
CCA	680 A
Ah(20HR)	60 Ah
RC	100 Min

Ask your question here — **Ask**

All | People | Document | Knowledge

Mark Web
Product Manager

Plant information — Made in Dallas Plant, BMC sec on

Manufacturing Date — 24 June 2012 11:00:35

Warranty — 48 Months Warranty expired on 24 June 2016

Sales category — Retail Product Sold as White label

Product category — Car Battery Non Batch Product

Status — Remanufactured On 22 Mar 2021

Manufacturing Process Log

PL-1

| S1 Pasting Station 1 — Status | S2 Pasting Station 2 — Status | S3 Insertion Station — Status | S4 Welding Station 1 — Status |

PL-2

| S8 Lamination Station — Status | S7 Acid Filling Station — Status | S6 Cast Terminal Station — Status | S5 Welding Station 2 — Status |

PL-3

| S9 High Rate Discharge Station — Status | S10 Lid Sealing Station — Status | S11 Cleaning Station — Status | S12 Labelling and Finishing Station — Status |

PL-4

● Assembly
● Formation
● Charging
● Testing
● Sealing
● Finishing

After sales touch points

Service 1
Service done date: 13 Mar 2013   12:00:00
Dealer: BatteryKing , L A

Service 2
Service done date: 24 Apr 2014   11:05:00
Dealer: BatteryKing , L A

Service 3
Service done date: 07 Mar 2015   02:14:30
Dealer: BatteryKing , L A

Service 4
Re acquire date: 18 Dec 2020   12:45:00
Dealer: BatteryKing , L A

Re Manufacture:
Remanufacture date: 22 Mar 2021 07:06:10
Dealer: Delkor Plant, Dallas

Information Exchange

Sustainability score

Made in Plant Dallas under ESR Version 1.0 update

Recycling Plane:- 1A-034-0022
Recycling Status:- Re-Manufactured
Sustainability rating:- 0.74

Sales Transaction

Sr. No.	Date	Time	Invoice No	Description	Transaction ID	Quantity	Price	Line Total
1	01-12-2021	07:23	A0001	Battery Delkor Sold to Warehouse Warehouse No 13	0000ca2d2602	1.00	$135	$135
2	01-26-2021	18:31	A0002	Battery Delkor Sold to Dealer Dealer name BatteryKing L A	0000ca2d2603	1.00	$135	$135
3	01-28-2021	11:07	A0003	Battery Delkor Sold to OEM	0000ca2d2604	1.00	$135	$135
4	01-26-2021	02:45	A0004	Battery Delkor Sold to customer Customer name Randy Romans	0000ca2d2605	1.00	$135	$135

To learn more about **Battey 360-Battery Management Platform** and connect to our experts, please reach out to us on info@lntinfotech.com or contact your account representative in case you are a LTI existing customer.

LTI with its unique blend of digital transformation services and a rich data products IP of Mosaic & Leni is the right partner to drive your journey toward a Breakaway Enterprise.

Author Profile

Venkat Sarma

Principal Director
Global Manufacturing & Energy Vertical and Industry 4.0

Venkat Sarma is Lead for Smart Plant & Operations Group with experience of over 24 years in building Practice & Teams along with engaging Global Clients for sales, marketing, business development, digital, IoT & project management combined with deep Domain understanding across Industries. He has over 19 years of experience in core industry having worked in L&T Parent Group in projects which include Plant process & automation systems as well as shop floor.