

"Overcoming the Innovator's Dilemma: Applying U.S. Lessons in Japan and Asia".

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- 25 years Corporate Venture/Business Development Manager (Dow Chemical) – US, Brazil/Argentina, Singapore/Malaysia
- 15+ years M&A experience at NewCap Partners – Series 79 License
- Industry Global Commercial Scale-up Experience
 - Advance Materials – composites, resins, carbon fiber, nanotechnology, ceramics, chemicals, plastics, manufacturing (3D/additive manufacturing, injection molding, extrusion, other)
 - Energy & Cleantech–water, fuel cells/hydrogen, energy storage, biomaterials/biofuels/biochemicals
 - Healthcare/Life Sciences—Medical Devices, Diagnostics, Mobile Healthcare, Pharma, CRO's
 - Industrial Manufacturing and Distribution
- Sell-Side M&A Representative Transactions
 - Sale of Burtin Urethanes to BASF (Germany)
 - Sale of Boride Products (Ceramics-Nanotech) to Kennametal (US)
 - Sale of Shanghai Genomics (China) to GNI, Ltd. (Japan)
 - Sale of APTwater to Kleiner Perkins
- Buy-Side M&A Advisory
 - Teijin, Ltd. (Japan)-US Advisory Services (4 years) for Nanotech, Biotech, Biomaterials
 - OM Group-Materials Advisory Services for China/S. Korea
- Equity Financing/Joint Venture Partnerships
 - \$25 million Funding of Oxford Performance Materials (Additive manufacturing) by Hexcel
 - 50/50 Bioplastics (NatureWorks) Joint Venture between Teijin (client) & Cargill
 - Funding of Scinor Water (Beijing) by Kleiner Perkins (China & US)
- Speaking Engagements
 - 2018/2019/2020-East Bay Economic Development Alliance Intl Committee/Mfg. Awards
 - 2019-Commercial Reviewer-U.S. Dept. of Energy Grants
 - Cleantech for Pacific Rim Countries 2017-Moderator/Speaker

Creative Destruction

Creative destruction refers to the incessant product and process **innovation** mechanism by which new production units replace outdated ones. It was coined by Joseph **Schumpeter** (1942), an economist, who considered it 'the essential fact about capitalism'.

Issues to overcome to change the Company Direction

- Culture
- Makeup of the work force
- Capital Investment deployed in Key profitable Business Divisions
- Sales & Distribution Channels
- Changes in Geographic Markets
- Political Changes affecting Company's markets
- Technology Changes affecting Company's markets
- Social Changes

Change in Carbon Fiber Markets-New Strategy Required

- ❖ Carbon fiber producers include Toray, Teijin, Mitsubishi Chemical, Solvay, and others
- ❖ Existing Markets include Wind turbine blade, aircraft assembly; Future potential market is transportation (cars and Light trucks)
- Toray Strategy-Toray carbon fibers → carbon fiber composites →run qualification for final aircraft body qualification for their carbon fiber for Boeing's 787 plane.
 - Toray made decision in early 2000's to go from producing carbon fiber materials to also making carbon fiber thermoset composites and then designing and qualifying their composites for final aircraft parts for Boeing and Airbus as well as for wind blades. Originally similar sales as Teijin but became market leader in carbon fiber sales with this strategy.
- Initial Teijin Strategy-carbon fiber production as raw material supplier → limited to working with 3rd party composite producers and did not qualify for Boeing 787 aircraft (2012 launch). They did qualify as one of carbon fiber suppliers to Airbus
 - In 2017-Teijin made a major investment (\$825 million dollars) to enter automotive lightweight composites marketplace by buying Continental Structural Plastics Holdings
- Mitsubishi Chemical carbon fiber production → carbon fiber composites → carbon fiber and composite parts and assembly for all markets after losing out to Toray on Boeing 787 aircraft.

Internal Combustion Engine cars vs Electric Vehicles

- Major Car Companies-Toyota, Honda, VW, Ford, GM
- Electric Car/light truck Vehicles –batteries →Tesla, Nio, Xpeng, VW JV, GM, new entrants, Japanese companies?
- Electric Car/Light truck vehicles—hydrogen → Toyota, Honda, Hyundai, Chinese firms
- Electric Heavy duty (Trucks/Bus/Train) Vehicles-Hydrogen based→Gas companies (e.g., Shell, BP), Toyota, Honda, Hyundai, Truck companies, new entrants (e.g., Siemens Energy)

Internal Combustion Engine cars vs Electric Vehicles-Change

- Makeup of the work force
 - No need for highly trained work force skilled in transmissions or other internal combustion parts
 - Less people needed for assembly of Electric Vehicles (less parts)
 - Different skilled people to do software, sensors and battery (or hydrogen)
- New Capital Investment needed
 - Batteries, sensors and AI software technologies for non-hydrogen vehicles
 - Hydrogen pressure tanks, sensors and AI software technologies-hydrogen vehicles
- New Business Models
 - For example—Mercedes looking at Office365 type license in which car owner signs up for so many days a month use anywhere in Germany
 - Buyer of EV vehicle does not own the battery—only leases it
 - For example—Toyota gets into the hydrogen distribution business in addition to selling Hydrogen vehicles
- Sales, Service & Distribution Channels
 - Fewer models and more internet/on-line sales-smaller dealerships and less people
 - Fewer service facilities or need for third party oil change/transmission/engine shops-loss of jobs and skills