



Energy Storage section 3

Innovation models

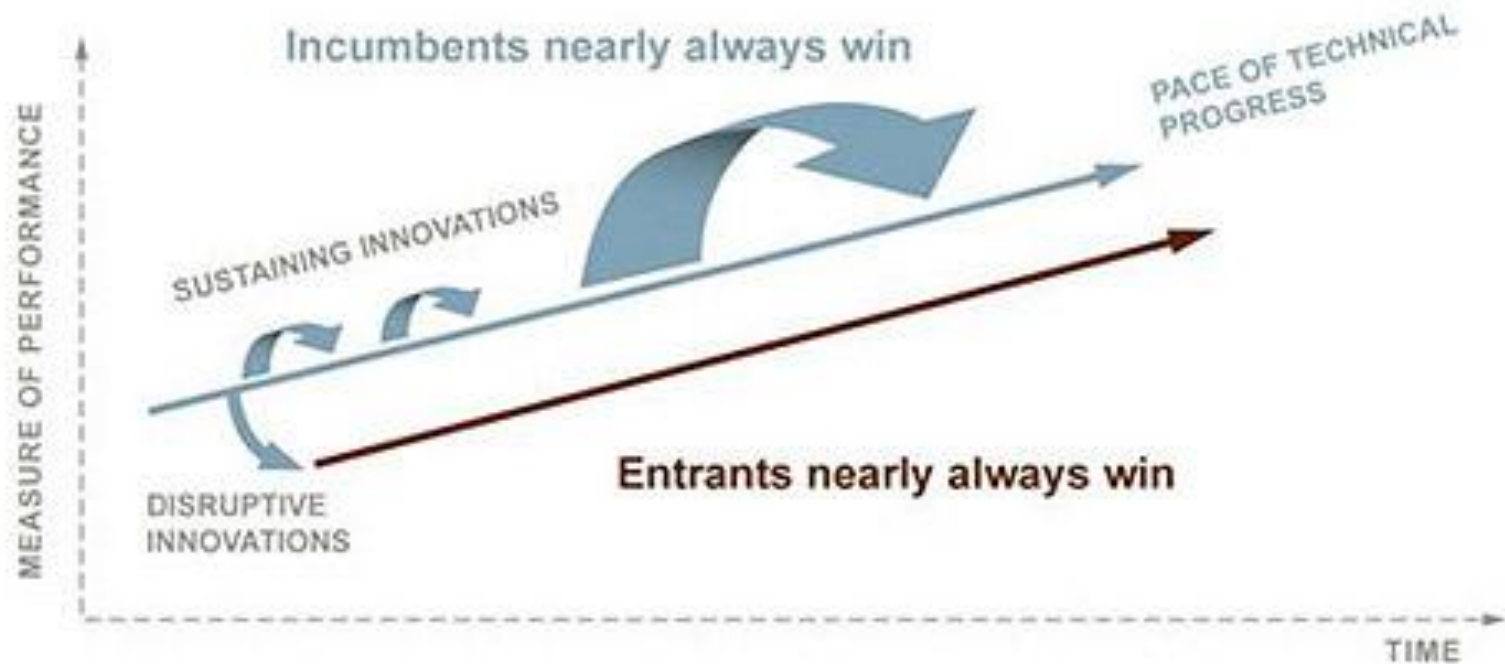
Business/technology preparation

# Examples of past disruptive innovations

<b>Disruptor</b>	<b>Disruptee</b>
<b>PERSONAL COMPUTERS</b>	<b>MAINFRAME AND MINI COMPUTERS</b>
<b>MINI MILLS</b>	<b>INTEGRATED STEEL MILLS</b>
<b>CELLULAR PHONES</b>	<b>FIXED LINE TELEPHONY</b>
<b>COMMUNITY COLLEGES</b>	<b>FOUR-YEAR COLLEGES</b>
<b>DISCOUNT RETAILERS</b>	<b>FULL-SERVICE DEPARTMENT STORES</b>



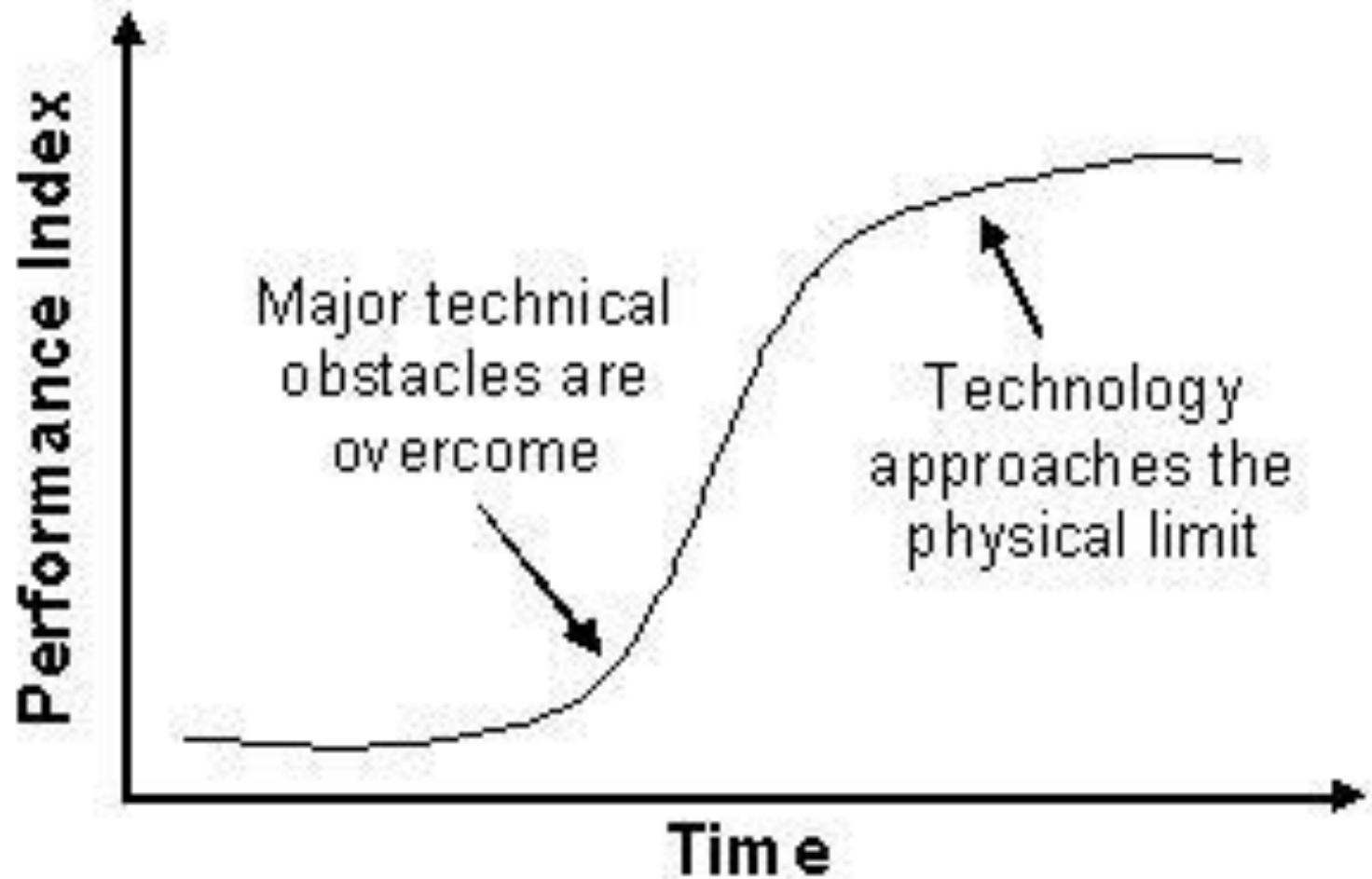
# Christensen's Disruptive Innovation



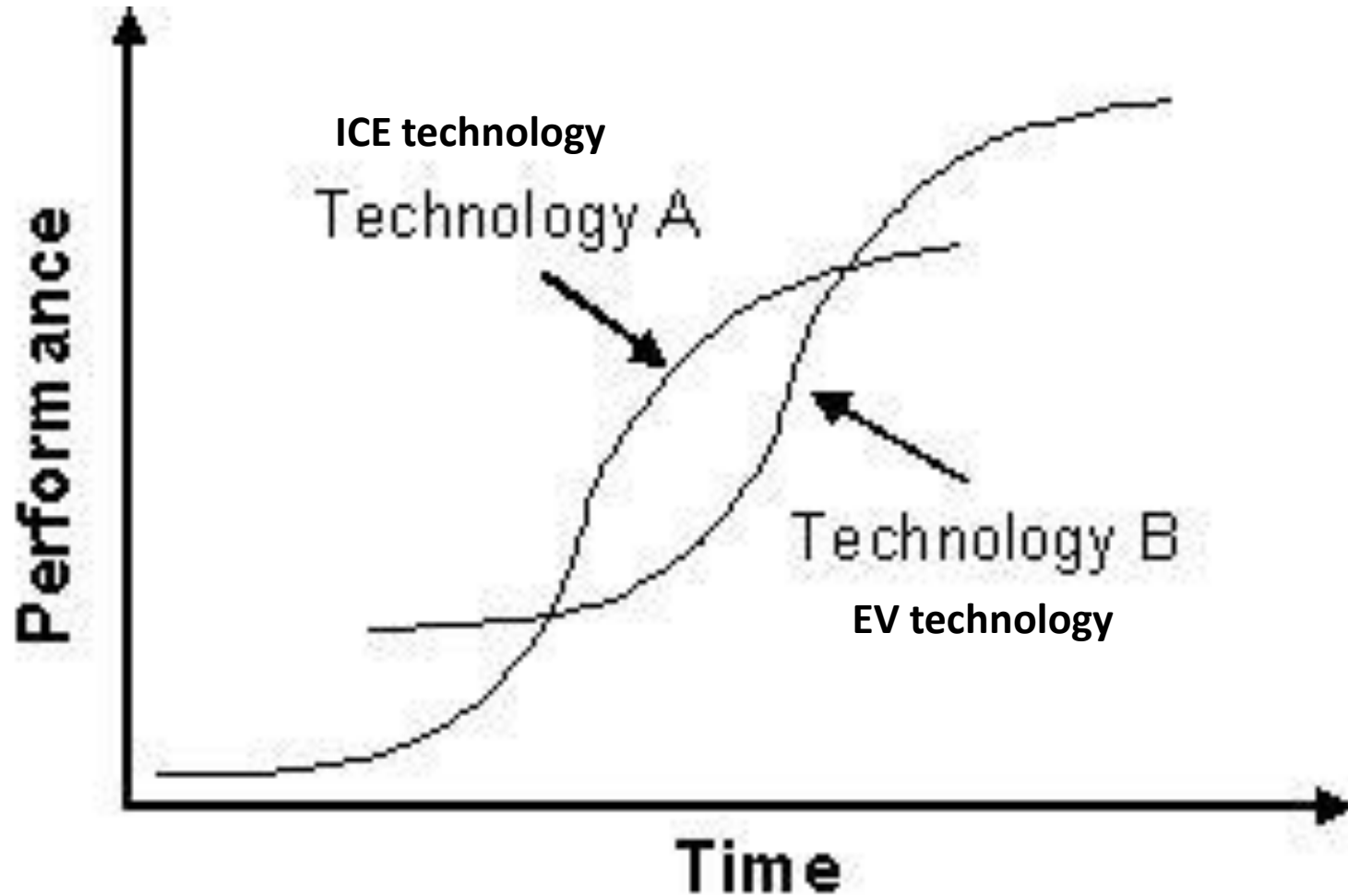
# Christensen's Model EV automobiles vs. existing ICE

- Currently EV makes up a small segment of the automobile industry (~\$20B).
- Will gradually see a shift from ICE to EV as total ownership costs shift (~\$635B market).
- Low end disruption.
- Consumers will have to see value in EV and realize the ownership savings compared to ICE.

# S-Curve



# S-Curve Cycle



# S-Curve Electric power vs. gas power

- ICE technology at the top of their efficiency and life cycle.
- Battery technologies have made a steady advancement over the past 15-20 years.
- Latest battery technologies could move energy storage up the curve to overtake ICE in the next 15-20 years.

# WiTricity disruptive model

- Incremental vs. Radical Innovation
- The technology is new (<10 years old) and a radical change from the current methods to charge batteries.
- It has the ability to render existing businesses and technologies obsolete.
- Toyota is only existing large company to invest in the development.



# Future outlook / business prep

- Existing auto assembly plants already making EV cars.
- Biggest disruption will be in the supply chain.
- New component companies will pop-up to supply the assembly plants.
- Existing supply chain will have to embrace technology or get replaced by new companies.