Slide 1

THOUGHTS ON THE [SECOND] REVOLUTION

PAUL FREIBERG
TORCH CLUB OF THE FOX VALLEY

1

Slide 2

ELAINE HERZBERG

2

Slide 3

THE MACHINE THAT CHANGED THE WORLD

3

Slide 4

AUTOMATION- THE SECOND REVOLUTION

4

Slide 5

AUTOMATION TECHNOLOGY TIMELINE- CARS AND TRUCKS

1950 - 2000	2000 - 2010	2010 - 2016	2016 - 2025	2025 +
Cruise Control Seat Belts Brake lights	Electronic Stability Control Blind Spot Detection Forward Collision Warning Lane departure warning	Auto Emergency braking Pedestrian emergency braking Rear cross traffic alert Lane centering assist Rear cameras	Lane keeping assist Adaptive cruise control Traffic jam assist Self park	Fully automated safety features Highway autopilot

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Slide 6

AUTOMATION TECHNOLOGY TIMELINE- FUTURE

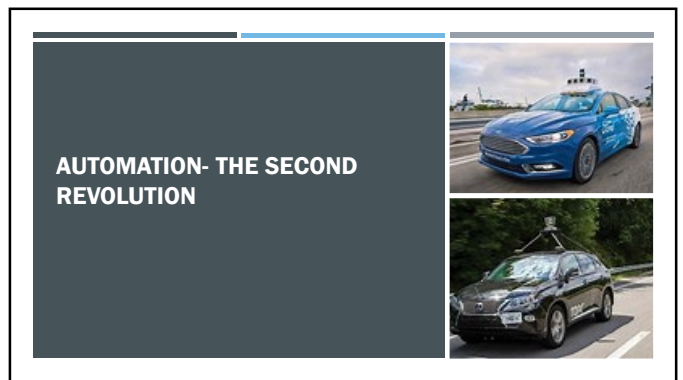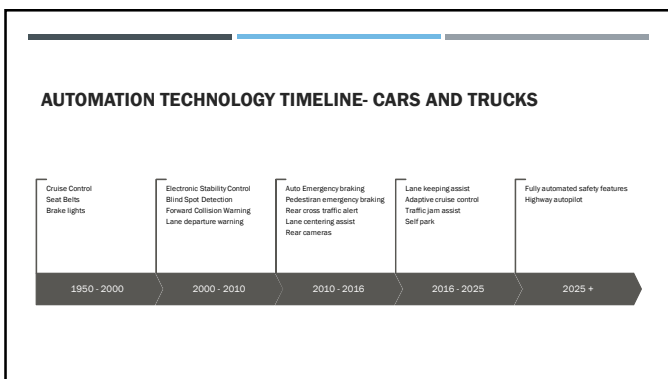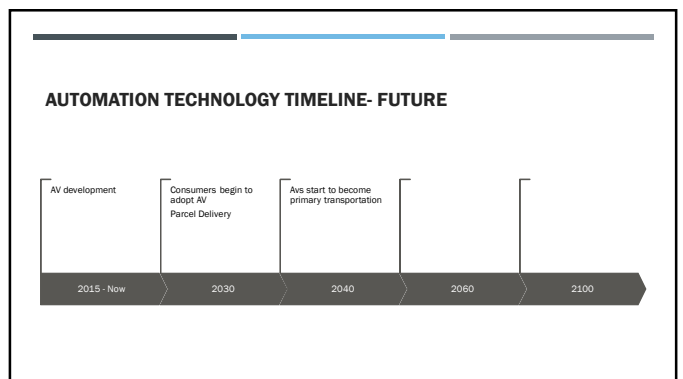| 2015 - Now	2030	2040	2060	2100
AV development	Consumers begin to adopt AV Parcel Delivery	Avs start to become primary transportation		

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SIX LEVELS OF DRIVER ASSISTANCE TECHNOLOGICAL ADVANCEMENTS

- Level 0 -No Automation
- Level 1- Driver Assistance (cruise control)
- Level 2 Partial Automation (acceleration and steering)
- Level 3 Conditional Automation – (auto-pilot in an aircraft)
- Level 4 High Automation – performs all functions
- Level 5- Full Automation

Society of Automotive Engineers

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MINNEAPOLIS AIRPORT
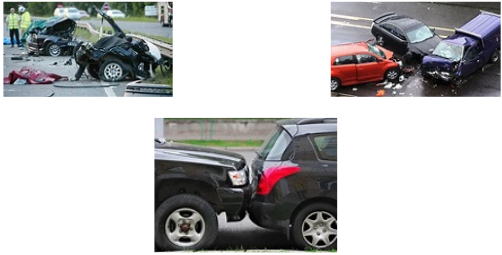

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DISNEY PEOPLE MOVER

9

PILOT ASSIST

VOLVO AND CADILLAC

10

THE CASE FOR AUTONOMOUS VEHICLES

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THE CASE FOR AUTONOMOUS VEHICLES

- 94% of serious crashes- human error
- 96% of workplace injuries attributed to unsafe behavior – DuPont
- 6.9 billion hours of traffic in 2014 – Estimate free up 50 minutes a day
- $212-Billion in Accident damages- 90% reduction
- 36560 died in 2018 in U.S.
- 595 died in 2019 in Wisconsin

NHTSA and McKinsey

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THE CASE AGAINST AUTONOMOUS VEHICLES

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EVOLUTION OR REVOLUTION?

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THE TECHNOLOGICAL FALLACY

"Society develops technology to address the changes that are taking place within it."

Mark Kulansky. Paper: Paging Through History

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THE CAMEL PAINT BRUSH STORY

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SOCIETY'S BENEFITS

- More Choices for Consumers
- Changing (Improving?) the Nature of Work
- Changing the fortunes of Companies

Womack: The Machine that Changed the World

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DULL - DANGEROUS - DIRTY

18

2/26/2021

SOCIETAL IMPACT

19

LUDDITES

20

LESS ACCIDENTS
LESS PARKING SPACES
MORE OPPORTUNITIES

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WHAT IS NEXT?

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TRUCKS WILL SOON START TO BE AUTOMATED

23

BIG CHANGES ARE COMING

24

TECHNOLOGY

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MANUFACTURERS

- Waymo (Google)
- GM Cruise (similar to Chevolet Bolt)- 180 vehicles in test mode today
- Argo AI (Ford) (similar to Ford Fusion)- $7-billion commitment through 2025 (WSJ)
- Tesla – uses ultrasonic radar and 2D
- Baider China (Search engine similar to Google)

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OTHER COMPANIES

Apple	Didi
Daimler	Aptiv
BMW	Autox
Audi	Lyft
VW	Uber
Nuro	Zoox

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ARIZONA 2018   **U.K. 1896**

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Luddites Never Win - Kurlansky
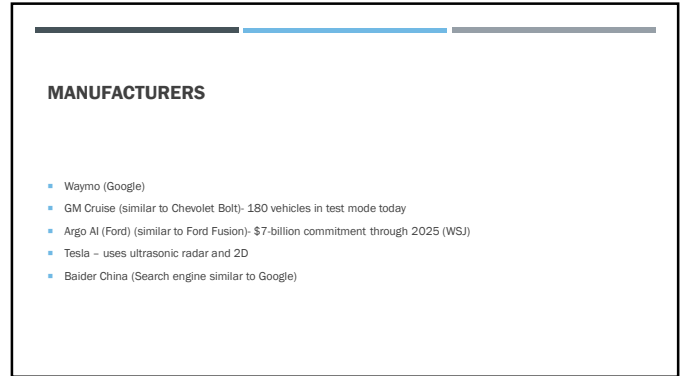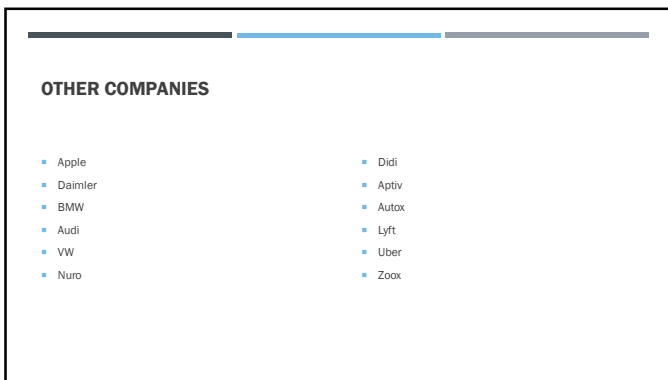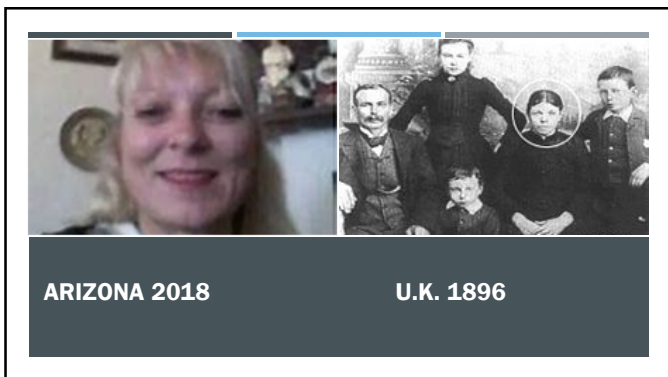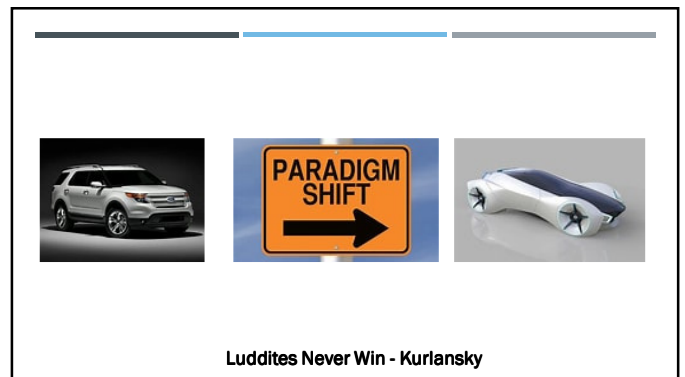
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RAFAELA VASQUEZ

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