SUSTAINABLE IMPLEMENTATION OF NEW TECHNOLOGIES:

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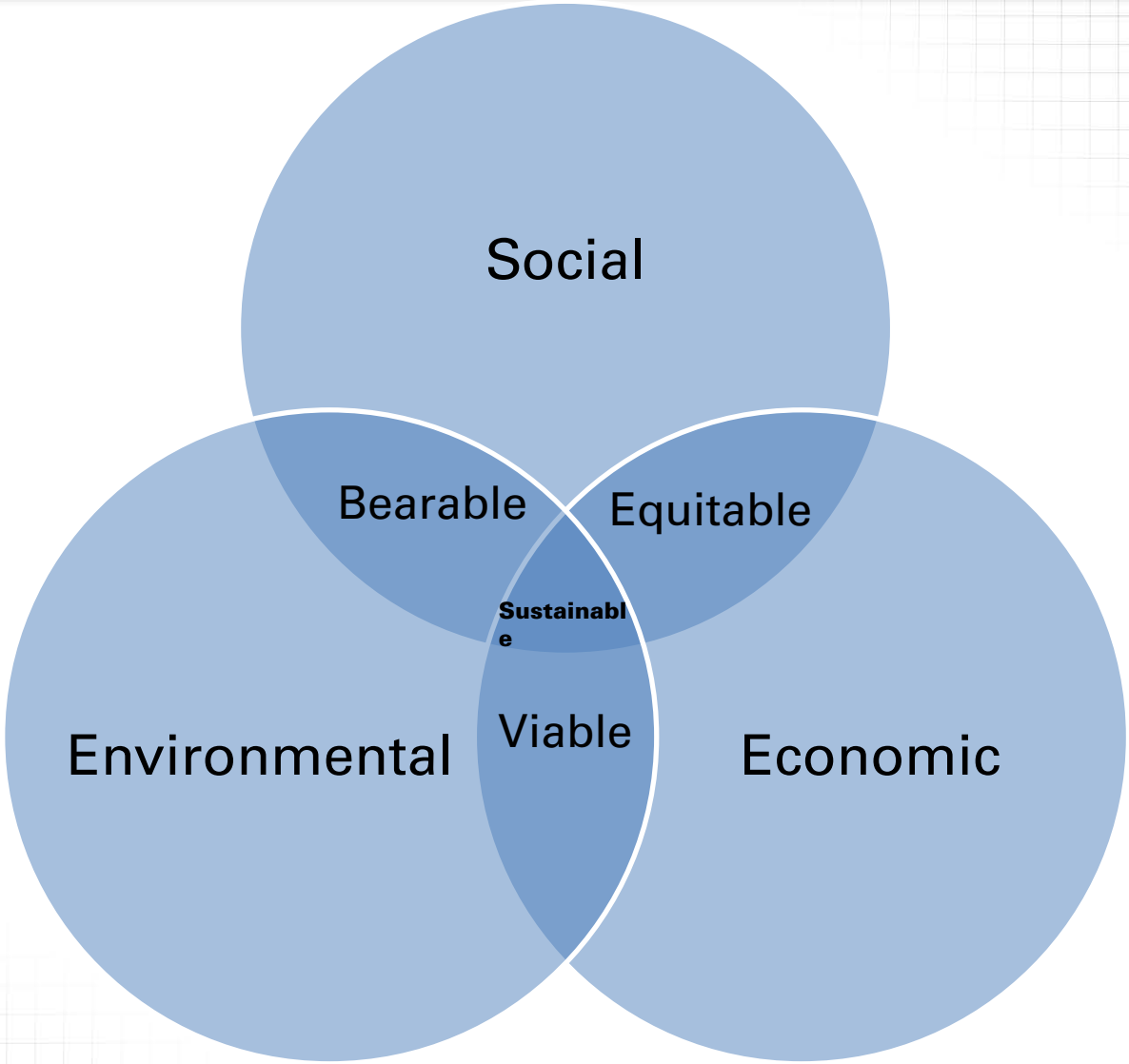
WHAT IS SUSTAINABILITY?

Definition

- Sustain
  - to provide what is needed for (something or someone) to exist, continue, etc.
- United States Environmental Protection Agency
  - To create and maintain conditions in which both humans and nature can exist harmoniously
- Corporate sustainability
  - 3BL
    - social, environmental and financial.

www.merriam-webster.com
https://www.epa.gov/

Definition



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WHY IS IT HARD TO ACHIEVE?

Sustainability is valued subjectively

VERSUS

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ASSIMILATE THE VALUE OF SUSTAINABILITY?

SV represented in USD future value

- Over the course of 50 years, a single tree can generate
  - $31,250 of oxygen
  - provide $62,000 worth of air pollution control
  - recycle $37,500 worth of water

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www.re-treewny.org/

SV represented in USD Present Value

- Trees can reduce energy bills by up to 40 percent.
- Residential Homes landscaped with trees are worth 4-15 percent more than homes without

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www.americanforests.org

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MANAGING FOR SUSTAINABILITY

Law of unintended consequences

- Unforeseen Outcome
  - Unexpected benefit
    - Giving Blood
      - The American Journal of Epidemiology found blood donors are 88% less likely to suffer from a heart attack.
  - Unexpected drawback
    - Prohibition in the 1920s
      - Increase in large-scale organized crime
  - Perverse result
    - Passenger-side airbags
      - increase in child fatalities in the mid-1990s

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aje.oxfordjournals.org

Law of unintended consequences

- Cause of unforeseen outcomes
  - The world is inherently complex
  - Human recklessness
  - The cobra effect
    - attempted solution makes the problem worse
      - Corruption, perverse incentive
  - The butterfly effect

Law of unintended consequences

- Unforeseen outcome = Risk
  - the possibility that something unpleasant or unwelcome will happen
- Risk management:
  - mitigate the effects of human recklessness
  - anticipate world complexities
  - avoid unexpected drawbacks
    - CFCs used as refrigerants, and propellants in aerosol applications
      - Drawback ozone depletion

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PROJECT RISK MANAGEMENT

Risk

- Can happen during a project, and after project close
- First time quality mitigates the costs of continuous control/improvement
- Project/Corporate/Supply Chain transparency is critical for optimal solutions

Six Process Groups

- Planning risk management
- Risk identification
- Performing qualitative risk analysis
- Performing quantitative risk analysis
- Planning risk responses
- Monitoring and controlling risks

Risk Matrix

Likelihood	Impact				
	Very Low	Low	Medium	High	Very High
Very High	5	10	15	20	25
High	4	8	12	16	20
Medium	3	6	9	12	15
Low	2	4	6	8	10
Very Low	1	2	3	4	5

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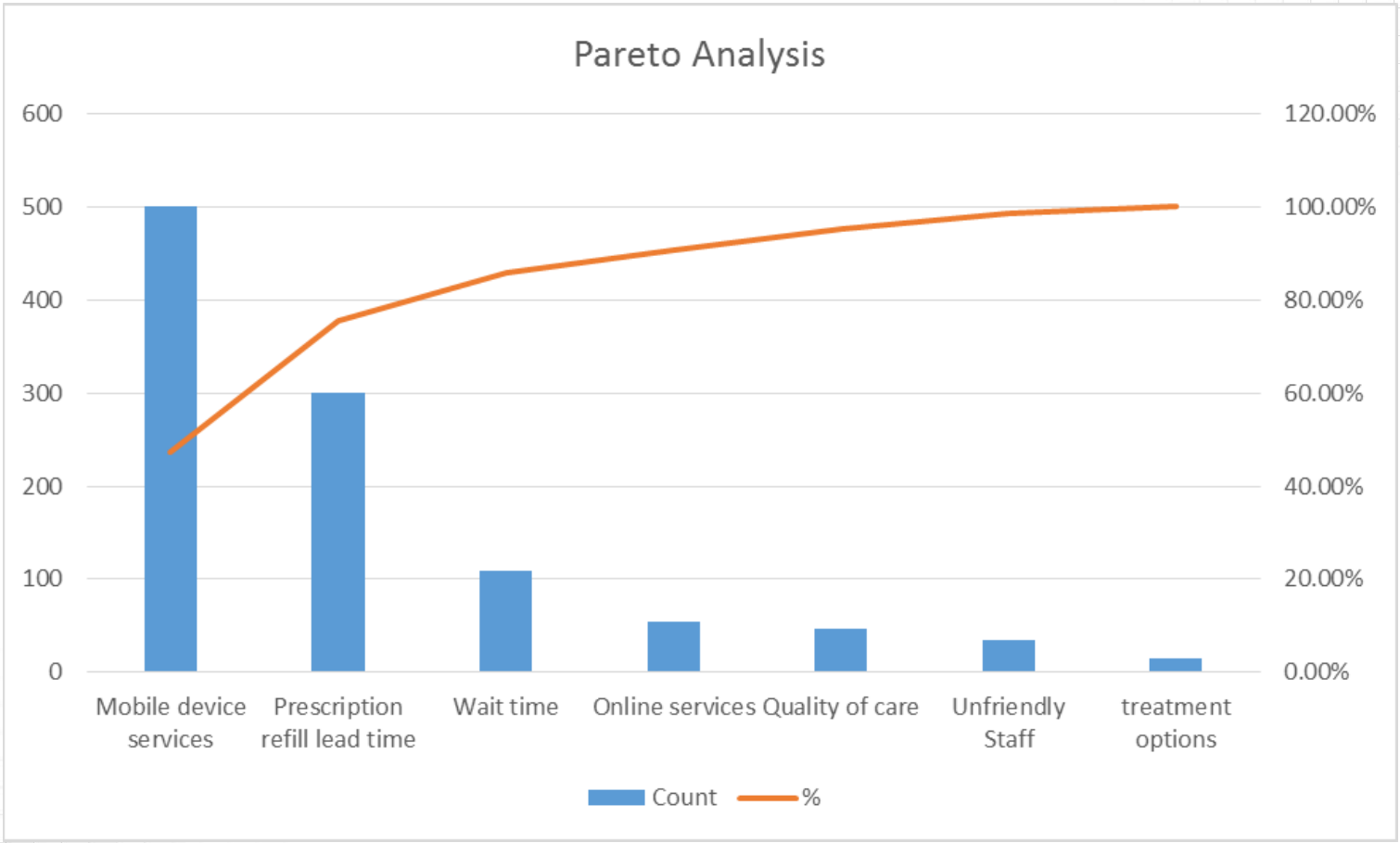
80-20 Rule



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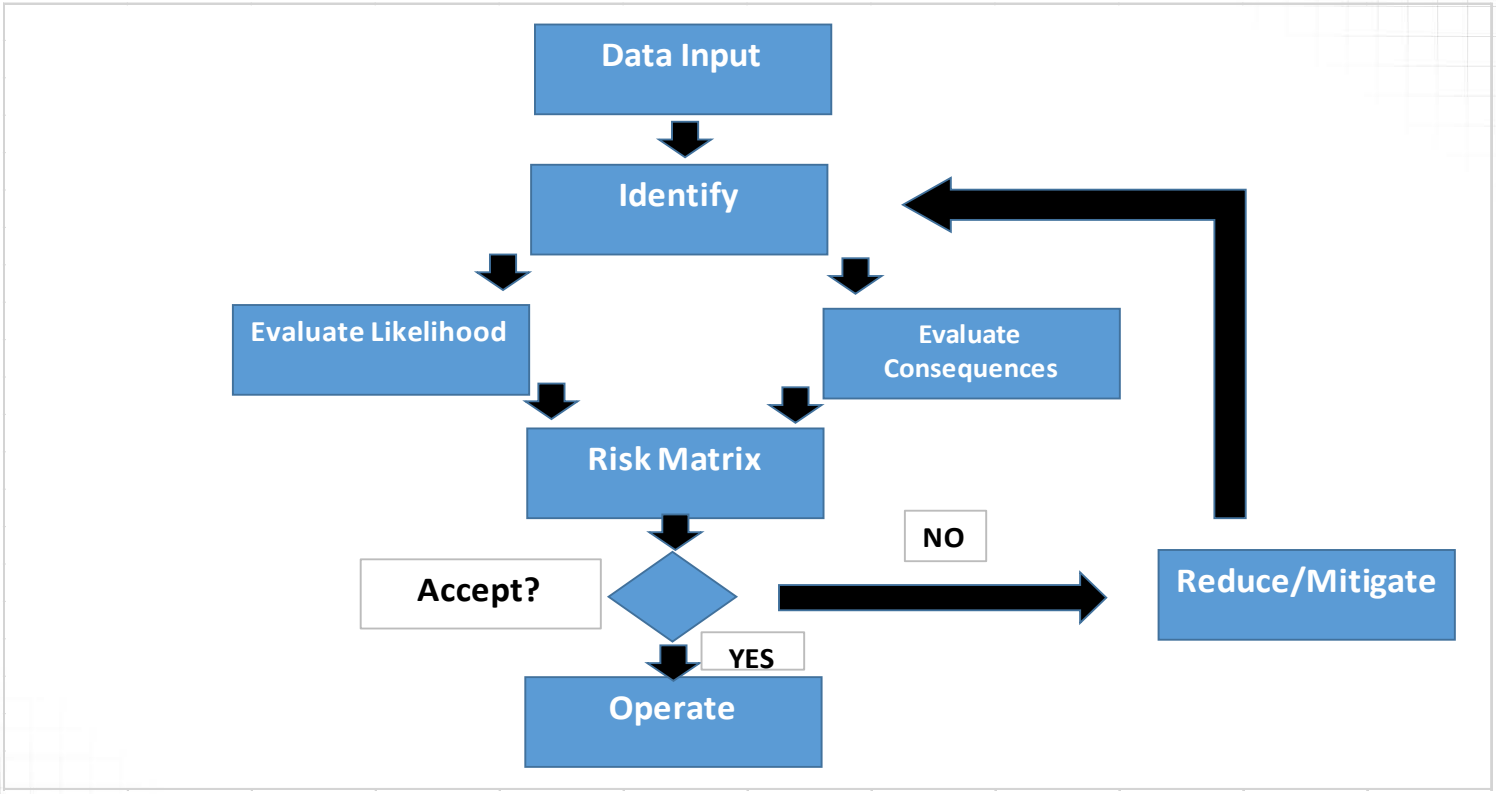
Risk Process Map



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QUALITY MANAGEMENT

Quality in Healthcare Tech.

- Malcolm Baldrige National Quality Award (MBNQA)
  - Past 10 years, increasing number of applicants & recipients among non-profits, schools, and hospitals
- Third Working Draft of ISO/IEC 42030
  - Systems and Software Engineering Architecture Evaluation
  - Focus on sustainability in software engineering

Six Sigma as Quality Metric

- A measure of variation
  - Sigma represents standard deviation
    - A measure of variability
- Reduction in variability/defects = reduction in waste

Six Sigma as a metric for Yield			
Yield	DPM	COQ	Sigma
99.99%	3.4	<10%	6
99.97%	233	10-15%	5
99.40%	6210	15-20%	4
93%	66807	20-30%	3
65%	308537	30-40%	2
50%	500000	>40%	1

Lean Waste / New Technology

- Defects: Does the solution match the need?
- Overproduction: Would the solution be under utilized?
- Waiting: Does the solution rely on supplements?
- Non-Utilized Talent: Current tech capabilities?
- Transportation: redundancies across supply chain?
- Inventory: software/database scaling?
- Motion: Is the solution accessible without changing current processes?
- Extra Processing: redundancy in the process?

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SUSTAINABLE TECH CRITERIA

Criteria for technology implementation

- HIPPA & FDA regulations
  - Federal/State policy
- Cybersecurity
  - Malware, malicious cyber attacks
- Adaptability
  - Useful life of the technology to be implemented
- Market & Economic volatility
- Cost effectiveness / EVA / SROI

Criteria for technology implementation

- Does this provide a needed service to the community, patients, caregivers, doctors, etc.?
  - ROI, does the benefit outweigh the initial cost and ongoing total cost of ownership?
- Sustainable sourcing practices?
  - GPOs (group purchasing organization) and their OEMs (original equipment manufacture) maintain sustainable operations? 1st 2nd tier suppliers.

CONCLUSIONS

Conclusions

- Sustainable projects, processes, and operations are critical to the continued success of a Supply chain network and SC players
- In order to mitigate the negative effects from unintended consequences, sustainability should be managed as a risk
  - KPIs include focus on quality and lean waste reduction
- Criteria effecting the health care industry include elements that are social, environmental, and financial (3BL)
- Further Research would be necessary to critique these claims

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QUESTIONS