

Project Management Implications and Implementation Roadmap of Human Readiness Levels

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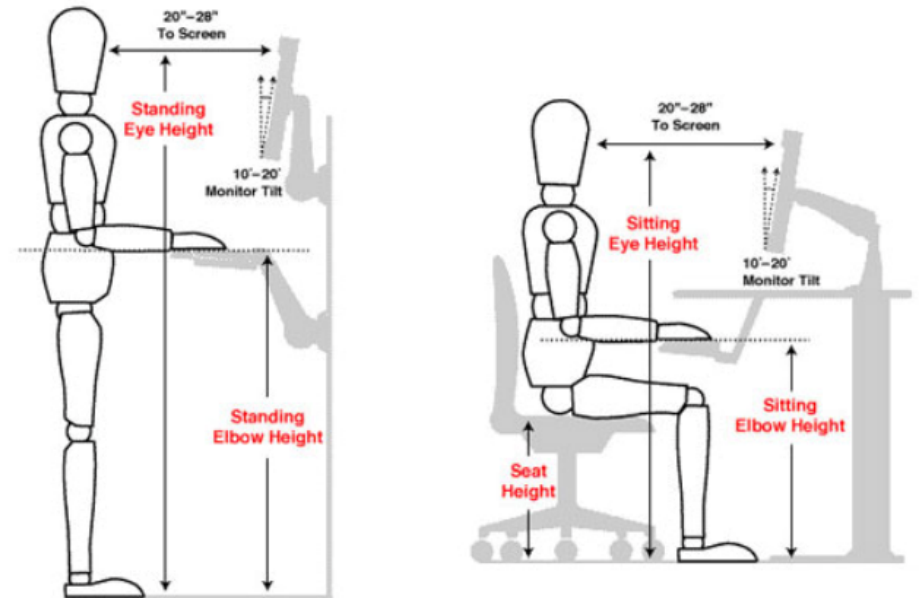
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Humans rather than technical failures now represent the greatest threat to complex and potentially hazardous systems

- James Reason

Human Factors & Ergonomics

- Human Factors and Ergonomics definition
- History of Human Factors & Ergonomics
 - Ancient Greece 5th Century BCE
 - Industrial Societies in the late 1800's
 - Early 1900's Time and Motion Studies
 - World War I
 - World War II
 - Cold War
 - Information Age (HCI)



Why Human Factors and Ergonomics?

- Assumption of inevitable human fallibility
- Design for human efficiency
- Limited Bandwidth
- Kahneman and Tversky
 - Systematic heuristics and biases
- Suboptimal decision making
- Mitigation



Human Readiness Levels (HRL)

- Developed by Phillips at the Naval Postgraduate School
- Designed to compliment Technology Readiness Levels
- Purpose of Human Readiness Levels
- Draft HRL scale in 2015 by Endsley
- Human Readiness Level as a general concept
- Human Readiness Level in the Government Sector

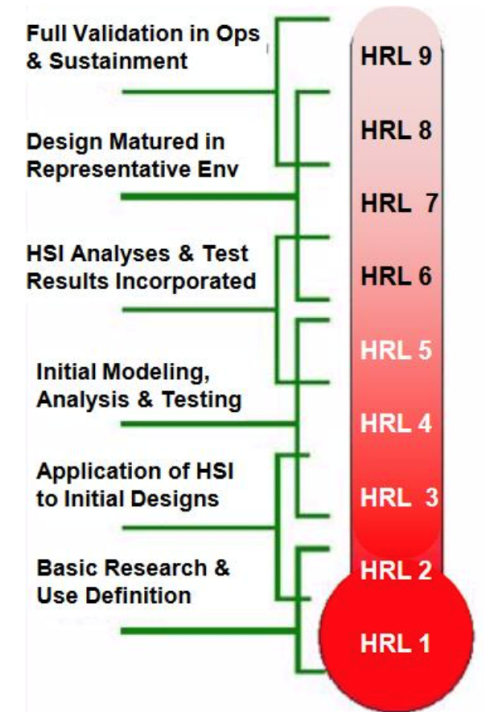


Figure 1. HRLs scale as suggested by Endsley (2015)

Research Questions

- Can we justify using human readiness levels by their economic benefits and technical needs?
- Can we create implementation strategies for human readiness levels based on the forecasted adoption roadmap?

Reactive Case Study

- Failure to incorporate the human component
- Sandia National Laboratories case
- Reactive Approach
- Project Management Implications
 - Triple Constraints
- Metrics

Metric	Percent Improvements
Lot Cost	67%
Elapsed Time	36%
Components Delivered	-98%
Yield	-100%
Cost per Component Delivered	83%
Time per Component Delivered	67%

Figure 2. The scope, cost, and schedule percent improvements from human factors interventions that were implemented on a defense project within the U.S. government.

Human Factors Utilization

- Reactive usage and breadth of human error
 - Three Mile Island Nuclear Reactor (1979)
 - King's Cross Station fire (1987)
 - Herald of the Free Enterprise (1987)
 - The Challenger Explosion (1986)
- Proactive usage to:
 - Mitigate risk
 - Maximize benefits



Investment in Human Component

- HRLs through the product lifecycle
- Increase flexibility and capability
- Competitive Advantage
- Triple Constraint Benefits
- Latent Benefits
 - Reputation
 - Panasonic Example



History of Technology Readiness Levels

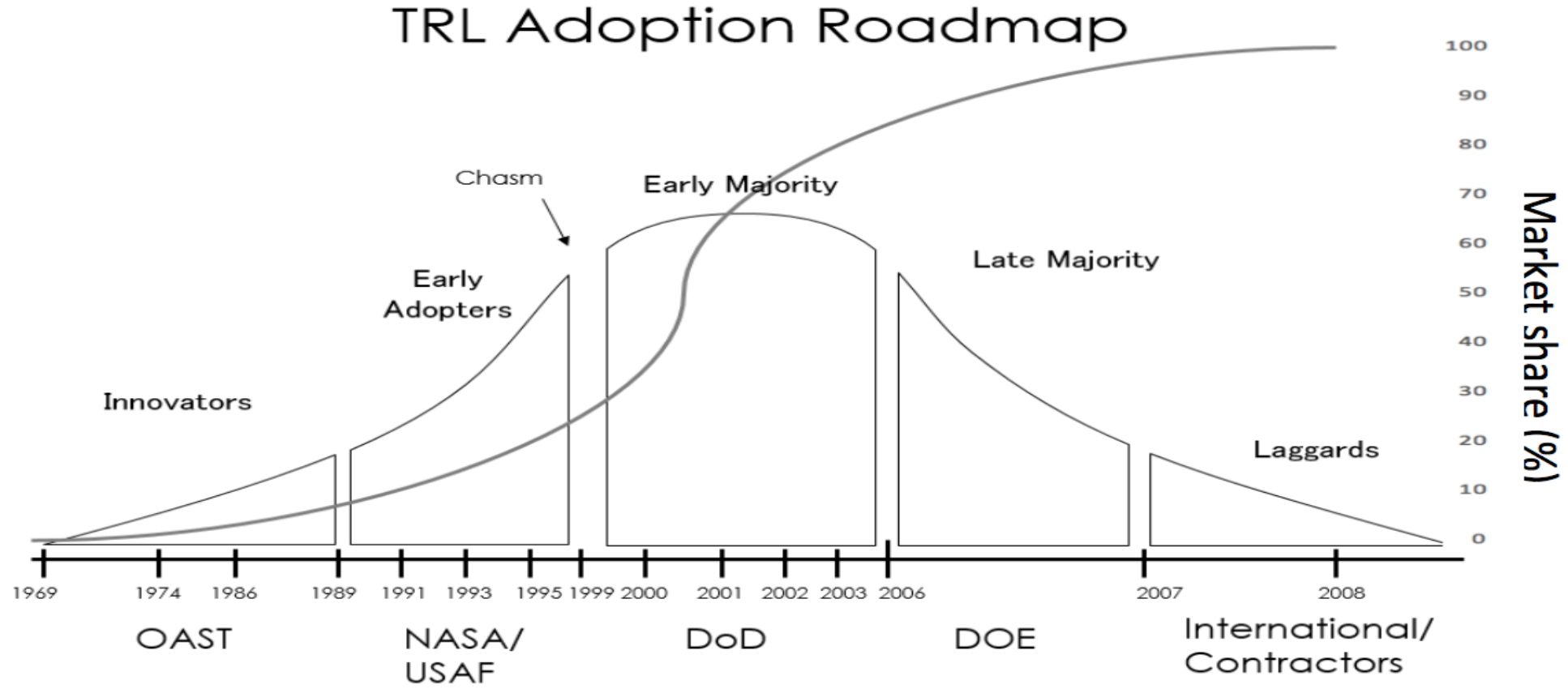


Figure 3. Model of our TRL Historical Adoption Roadmap and Market Share Percent

Human Readiness Levels Forecast

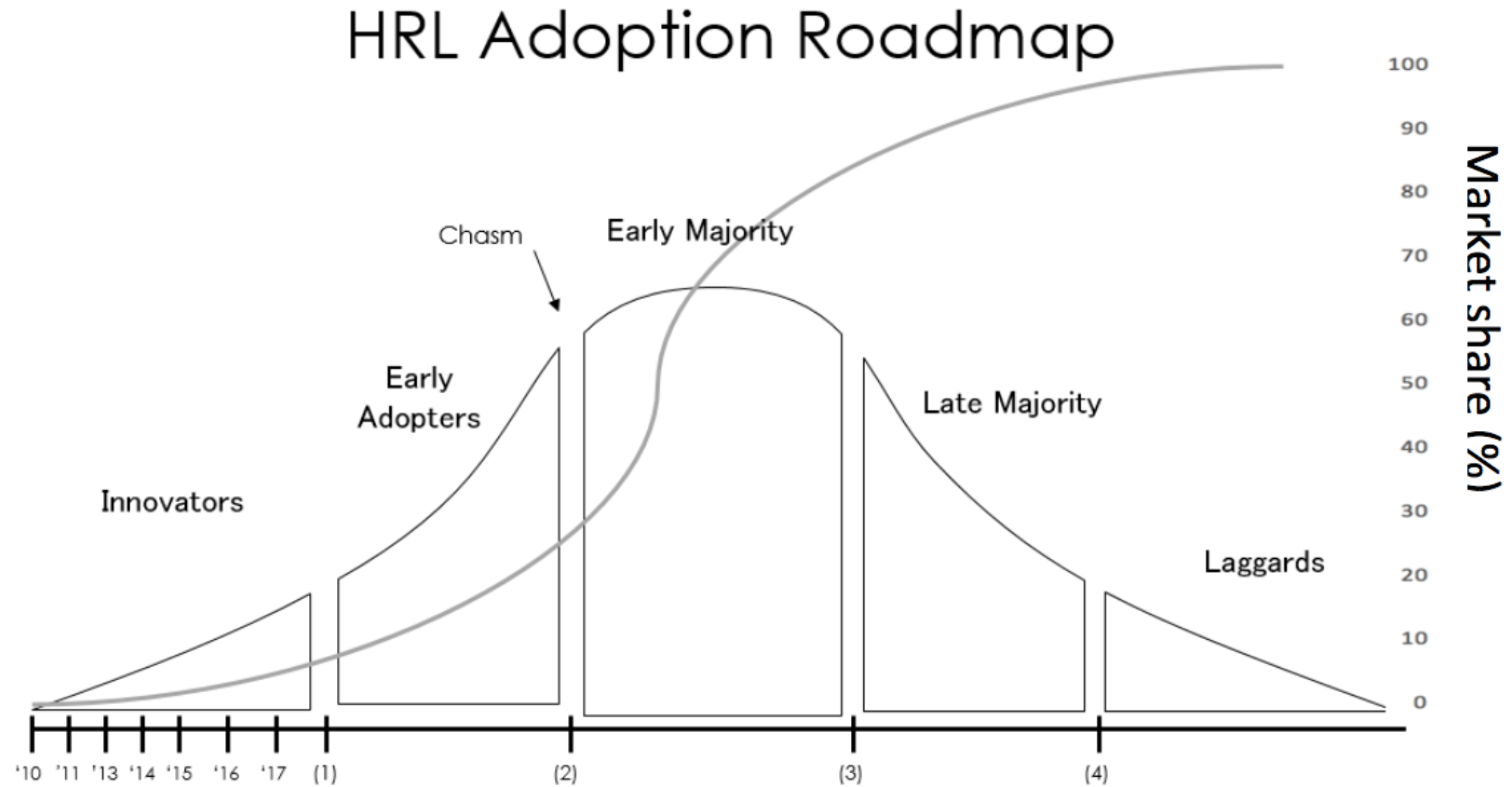


Figure 4. Forecasted HRLs Adoption Roadmap and Possible Market Share Percent

Implementation Strategies

- TRL Feasibility Study
- Picking an organization
 - Social Capital
 - Human Factors considerations
- Tactics
 - 3rd Person objective observer
 - Super User
 - Policy Requirements
- HRL Optimization and Contingency Plan



Conclusions

- Business and Economic justification for implementation
- Further Research and Next Steps
 - Latent Benefits
 - HRL Feasibility study
 - Formal guidelines
 - Foundational Procedure
 - Creating Technologies for all users
 - HRLs for future technologies



Questions?