

Business Value of Evolutionary Design

USING LEAN & AGILE ROADMAPS, UX MAPS, & DESIGN
CYCLES TO CREATE INNOVATIVE PRODUCTS & SERVICES

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Website: <http://davidfrico.com> • LinkedIn: <http://linkedin.com/in/davidfrico> • Twitter: @dr_david_f_rico

Agile Cost of Quality: <http://www.davidfrico.com/agile-vs-trad-coq.pdf>

DevOps Return on Investment (ROI): <http://davidfrico.com/rico-devops-roi.pdf>

Dave's NEW Business Agility Video: <http://www.youtube.com/watch?v=hTvtsAkL8xU>

Dave's NEWER Scaled Agile Framework SAFe 4.5 Video: <http://youtu.be/1TAuCRq5a34>

Dave's NEWEST Development Operations Security Video: <http://youtu.be/qrWRoXSS9bs>

Dave's BRAND-NEW ROI of Lean Thinking Principles Video: <http://youtu.be/wkMfaPAxO6E>

DoD Fighter Jets versus Amazon Web Services: <http://davidfrico.com/dod-agile-principles.pdf>

Principles of Collaborative Contracting: <http://davidfrico.com/collaborative-contract-principles.pdf>

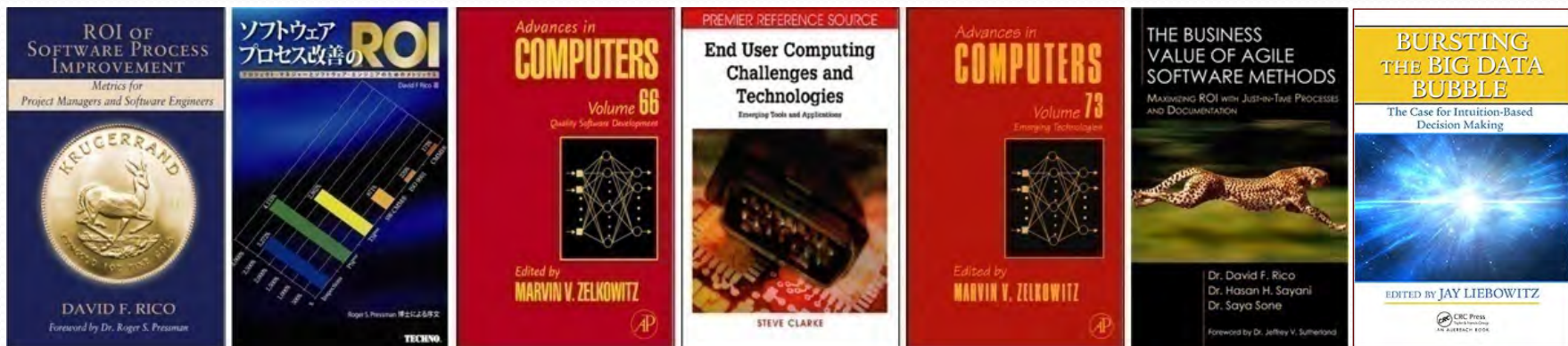
Principles of Lean Organizational Leadership: <http://davidfrico.com/lean-leadership-principles.pdf>

Principles of Evolutionary Architecture: <http://davidfrico.com/evolutionary-architecture-principles.pdf>

Principles of CI, CD, & DevOps - Development Operations: <http://davidfrico.com/devops-principles.pdf>

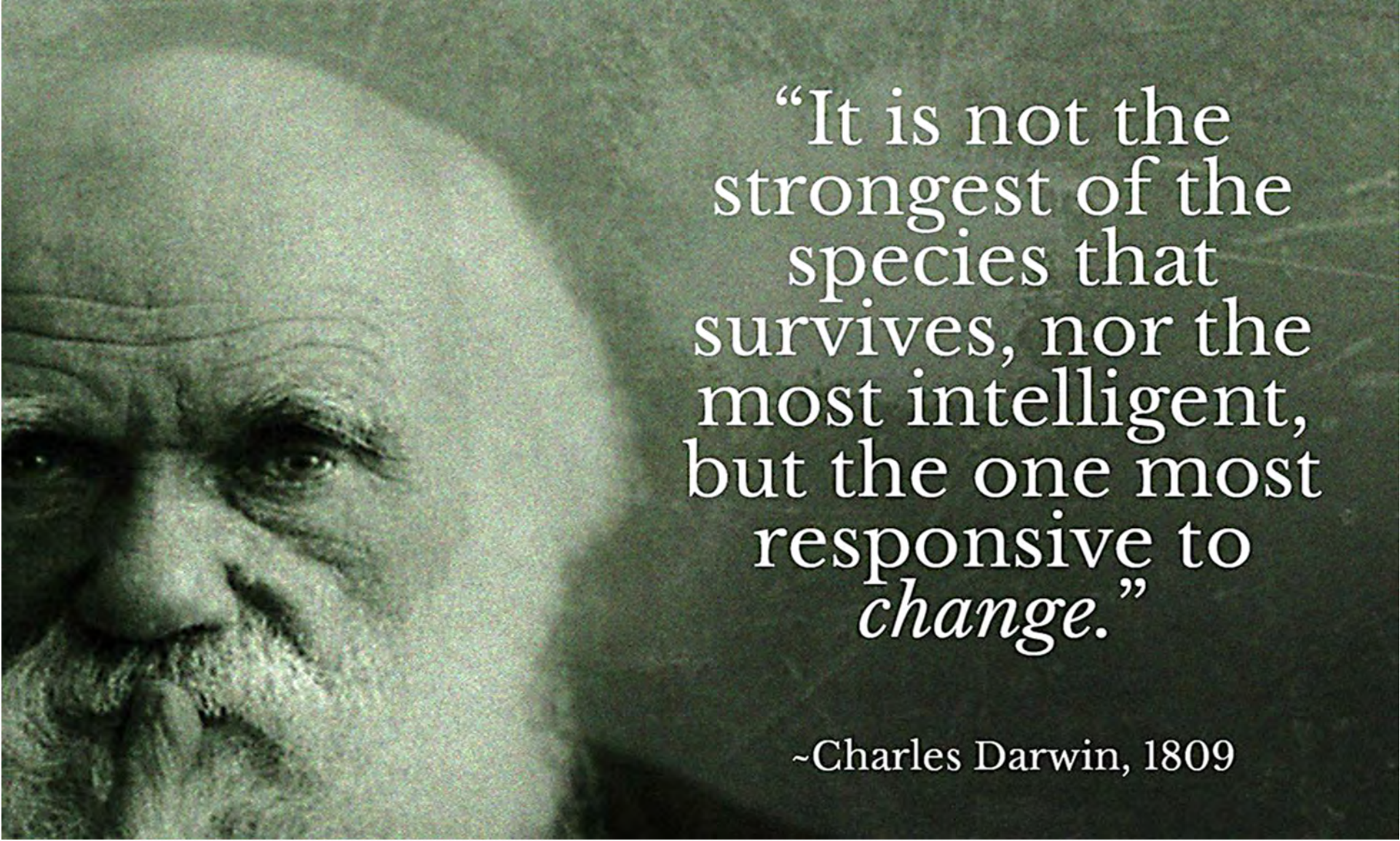
Author Background

- Gov't contractor with 37+ years of IT experience
- B.S. Comp. Sci., M.S. Soft. Eng., & D.M. Info. Sys.
- ☞ □ Large gov't projects in U.S., Far/Mid-East, & Europe



- Career systems & software engineering methodologist
- Lean-Agile, Six Sigma, CMMI, ISO 9001, DoD 5000
- NASA, USAF, Navy, Army, DISA, & DARPA projects
- Published seven books & numerous journal articles
- Intn'l keynote speaker, 270 talks to 120,000 people
- Specializes in metrics, models, & cost engineering
- Cloud Computing, SOA, Web Services, FOSS, etc.
- Professor at 7 Washington, DC-area universities

Evolutionary Design—C. Darwin

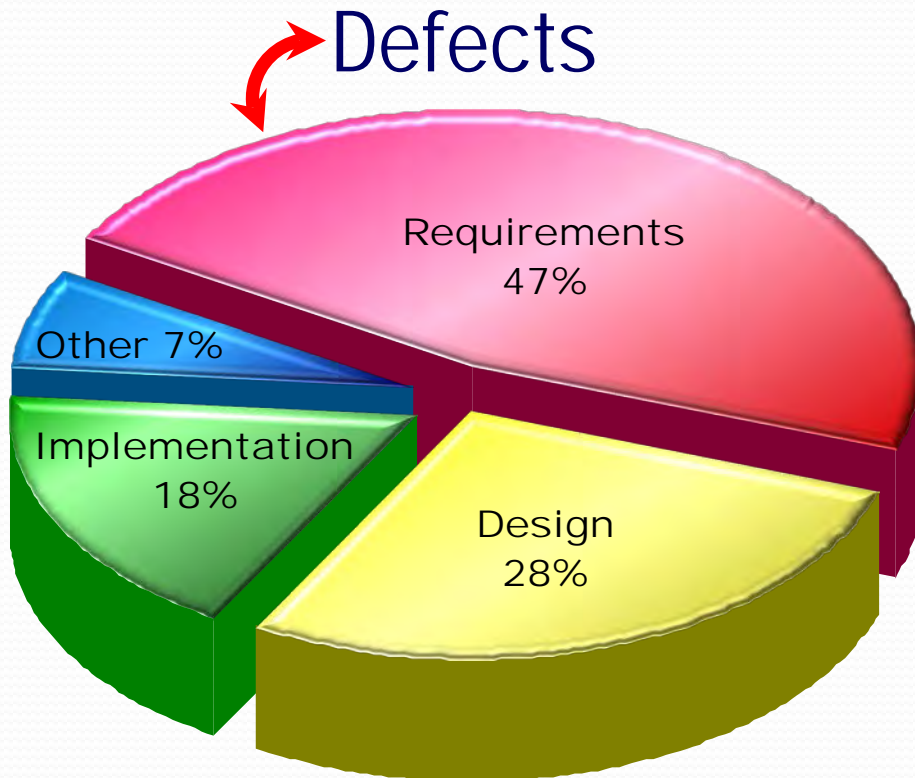


“It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to *change.*”

~Charles Darwin, 1809

Traditional Design—Defects-Waste

- Requirements defects are #1 reason projects fail
- Traditional projects specify **too many requirements**
- More than 65% of requirements are never used at all

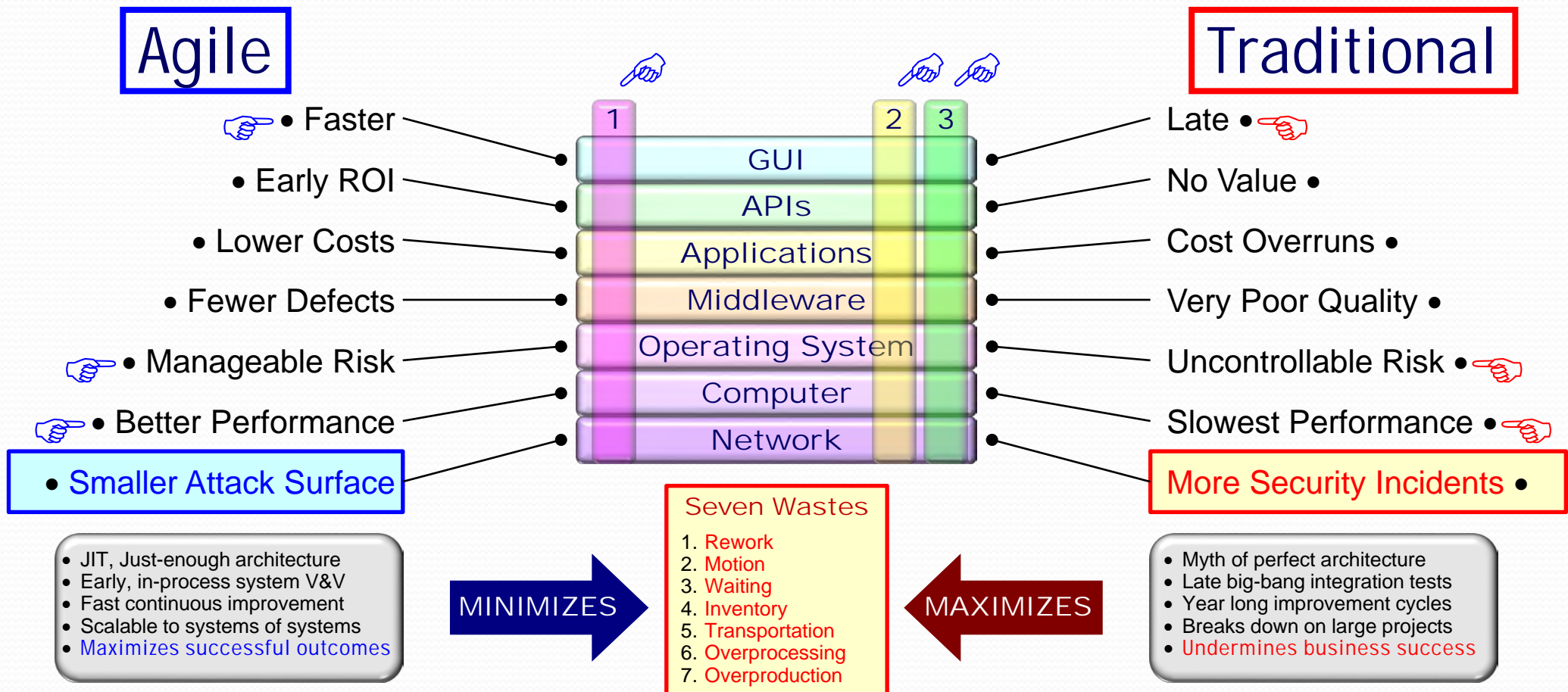


Evolutionary Design—What is it?

- E·volve (ĭ-vŏlv') **Grow, unfold, & expand** in a gradual fashion over time; To iteratively & incrementally adapt
 - *An architecture and design approach based on principles of lean-agile thinking and product development flow*
 - *Highly just-enough, just-in-time, and emergent form of new product & service development, test, and operation*
 - *Supports agile values such as collaboration, teamwork, working products/services, and responding to change*
 - *Sense and response framework with an intense focus on design thinking and rapid business experimentation*
 - *Maximizes **BUSINESS VALUE** of organizations, portfolios, and projects by utterly delighting customers & end-users*

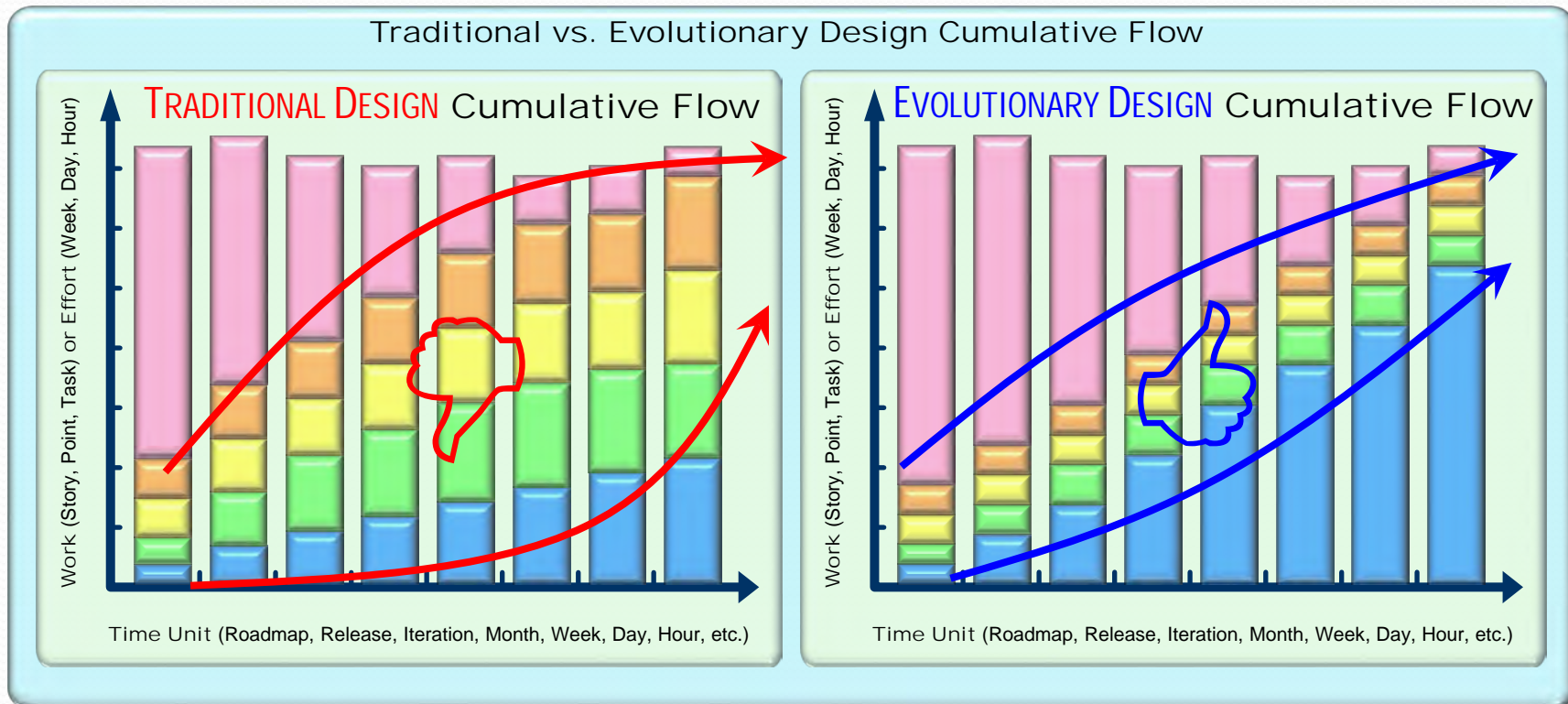
Evolutionary Design—How it works?

- ❑ New requirements implemented in slices vs. layers
- ❑ User needs with higher business value are done first
- ❑ Reduces cost & risk while increasing business success



Evolutionary Design—Results

- ❑ Late big design up front increases WIP backlog
- ❑ Evolutionary design principles reduce WIP backlog
- ❑ Improves **workflow** and **reduces WIP** and **lead times**



Anderson, D. J. (2004). *Agile management for software engineering*. Upper Saddle River, NJ: Pearson Education.

Anderson, D. J. (2010). *Kanban: Successful evolutionary change for your technology business*. Sequim, WA: Blue Hole Press.

Evolutionary Design—Techniques

- Methods to reduce new product & service “scope”
- “Key” is smallest possible scope with greatest value
- Reduces size, cost, risk, time, failure, & obsolescence

MINIMUM
MARKETABLE FEATURE
- MMF -

- ✓ Advantage
- ✓ Difference
- ✓ Revenue
- ✓ Profit
- ✓ Savings
- ✓ Brand
- ✓ Loyalty

MINIMUM
VIABLE PRODUCT
- MVP -

- ✓ Goal
- ✓ Process
- ✓ Features
- ✓ Priorities
- ✓ Story Map
- ✓ Timelines
- ✓ Architecture

STORY MAP
OR IMPACT MAP
- SM or IM -

- ✓ Goal
- ✓ Actors
- ✓ Impacts
- ✓ Deliverables
- ✓ Measures
- ✓ Milestones
- ✓ Timelines

VISION
STATEMENT
- VS -

- ✓ For <customer>
- ✓ Who <needs it>
- ✓ The <product>
- ✓ Is a <benefit>
- ✓ That <customer>
- ✓ Unlike <other>
- ✓ Ours <different>

MICRO-
SERVICE
- MS -

- ✓ Purpose
- ✓ Automated
- ✓ Unique
- ✓ Independent
- ✓ Resilient
- ✓ Ecosystem
- ✓ Consumer

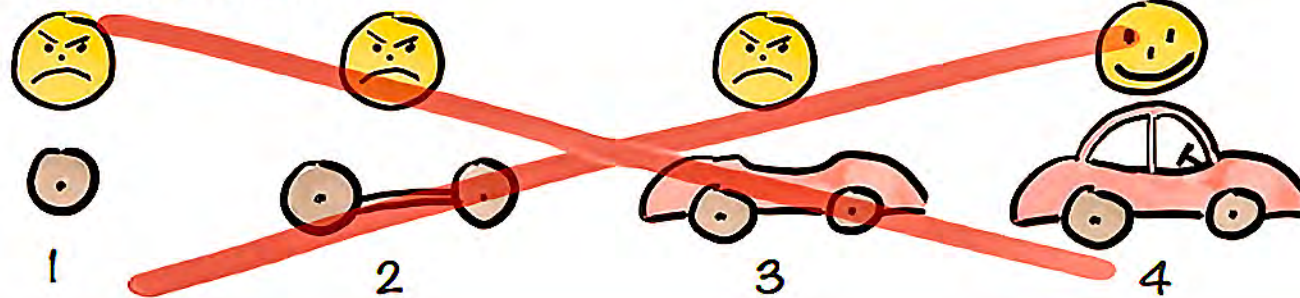
INCREASES TESTABILITY, QUALITY, RELIABILITY, SECURITY, MORALE, MAINTAINABILITY, & SUCCESS

Denne, M., & Cleland-Huang, J. (2004). *Software by numbers: Low-risk, high-return development*. Santa Clara, CA: Sun Microsystems.
Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation*. New York, NY: Crown Publishing.
Patton, J. (2014). *User story mapping: Discover the whole story, build the right product*. Sebastopol, CA: O'Reilly Media.
Layton, M. C., & Maurer, R. (2011). *Agile project management for dummies*. Hoboken, NJ: Wiley Publishing.
Krause, L. (2014). *Microservices: Patterns and applications*. Paris, France: Lucas Krause.

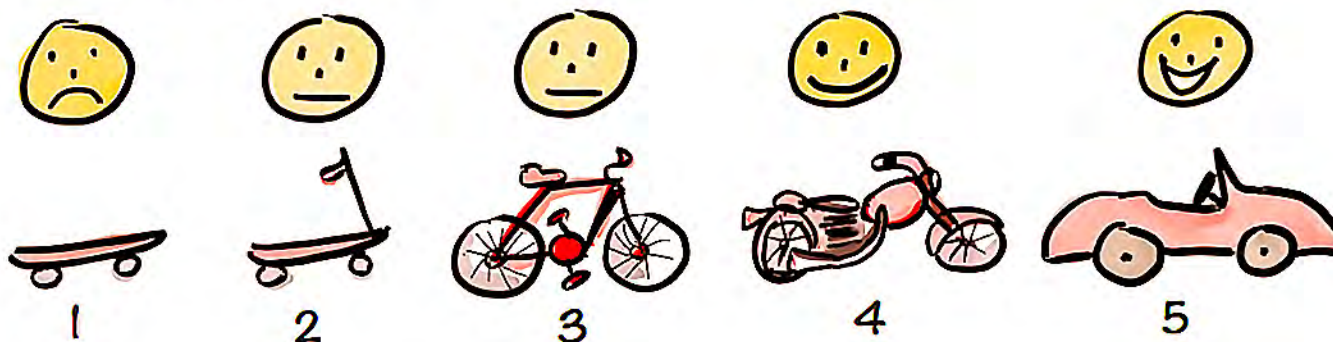
Minimum Viable Product—MVP

- Term coined by Eric Ries in “Lean Startup” (2011)
- Absolutely smallest possible new product or service
- Rapidly collect and measure greatest possible feedback

Not like this....



Like this!



Ambler, S. (2018). *Defining mvp, mmf, mmp, and mmr*. Retrieved March 2, 2020, from <https://bit.ly/3ajUaCb>

Blank, S. (2013). *Why the lean startup changes everything*. Retrieved March 2, 2020, from <https://bit.ly/2uSEwic>

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. New York, NY: Crown Books.

Kniberg, H. (2016). *Making sense of minimum viable product (MVP): Why I prefer earliest testable, usable, and lovable*. Retrieved March 2, 2020 from <https://bit.ly/3akYGjS>

Evolutionary Design—Roadmaps

- Numerous models of roadmapping techniques
- Based on lean-agile thinking principles & methods
- ☞ □ Capture scope, goals, features, timelines, value, etc.



Curedale, R. (2016). *Service blueprints: The tool for service innovation*. Topanga, CA: Design Community College.

Angrave, J. (2020). *The journey mapping playbook: A practical guide to preparing, facilitating, and sharing the value of customer journey mapping*. Boston, MA: de Gruyter.

Szabo, P. W. (2017). *User experience mapping: Enhance UX with user story map, journey map, and diagrams*. Birmingham, UK: Packt Publishing

Patton, J., & Economy, P. (2014). *User story mapping: Discover the whole story, build the right product*. Sebastopol, CA: O'Reilly Media, Inc.

Young, I. (2008). *Mental models: Aligning design strategy with human behavior*. Brooklyn, NY: Rosenfeld Media.

Adzick, G. (2012). *Impact mapping: Making a big impact with software products and projects*. Woking, Surrey, UK: Provoking Thoughts Ltd.

Parrish, R., Manning, H., Stearns, C., & Murphy, M. (2015). *How to map your customer experience ecosystem*. Cambridge, MA: Forrester Research.

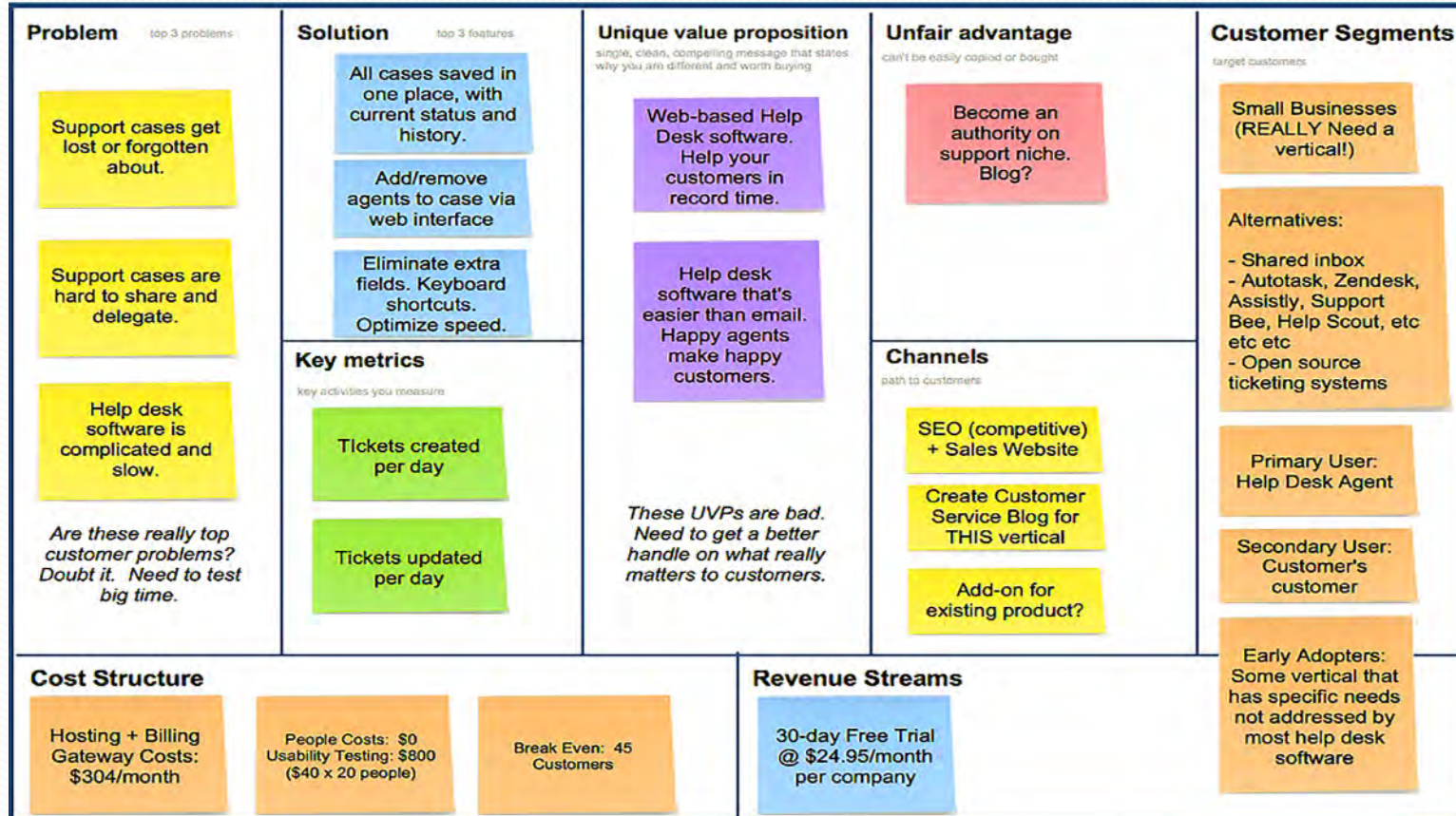
Business Model Canvas

- ❑ Created by Alexander Osterwalder circa 2004
- ❑ Strategic planning model based on 9 building blocks
- ❑ Outlines roadmap for business, portfolio, and product



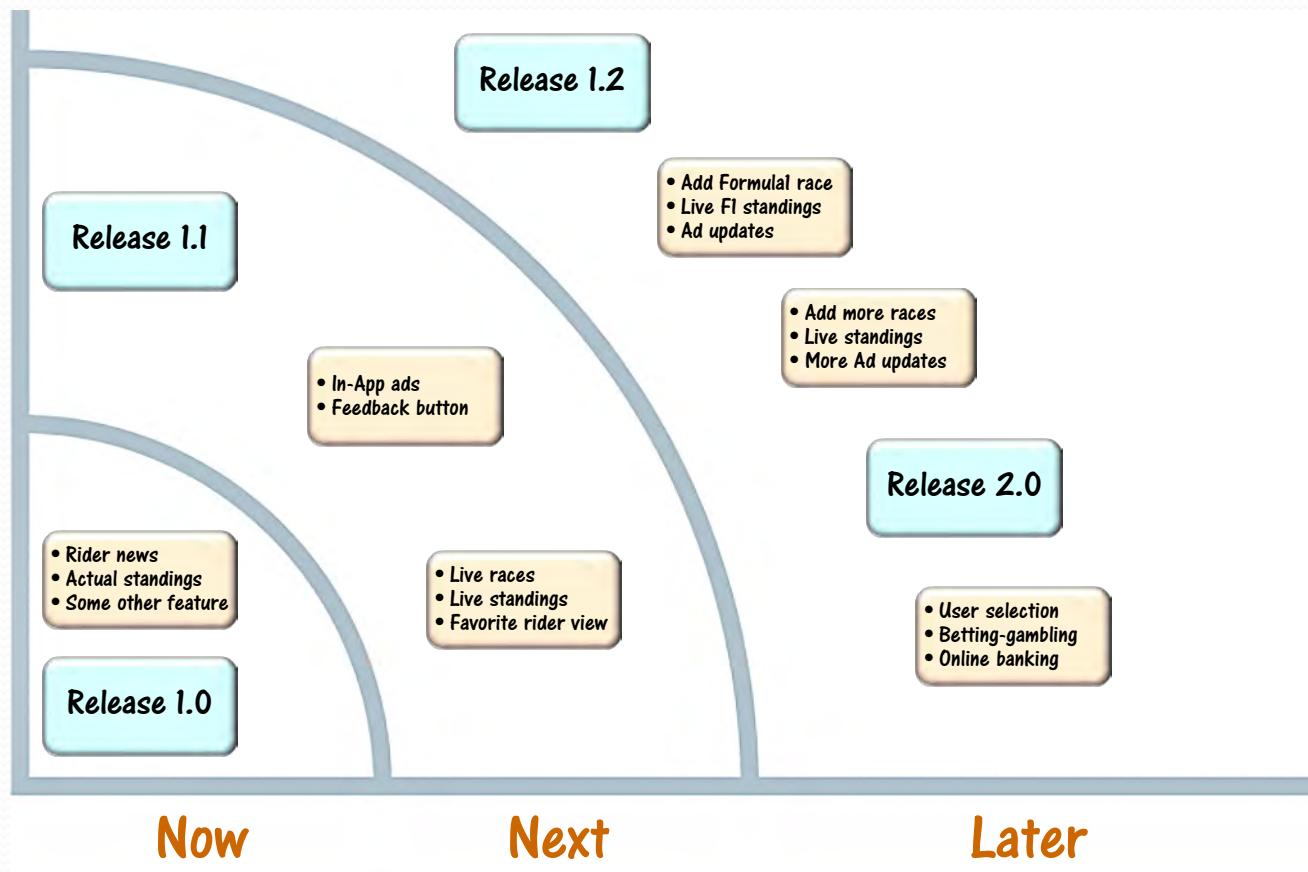
Lean Canvas

- ❑ Created by Ash Maurya for lean startups in 2010
- ❑ Highly simplified version of business model canvas
- ❑ Focuses on market, solution, & measurable outcomes



Now Next Later Roadmap

- Created by Simon Cast & Janna Bastow (2010)
- Establishes direction while allowing for flexibility
- Simple 1-page product roadmap without milestones



Goal Oriented Roadmap

- Attributed to Roman Pichler circa 2013
- Basic idea is to establish business goals first
- 1-page roadmap with goals, features, and outcomes

Date	January 1st	April 1st	July 1st	October 1st
Name	Release 1.0	Release 1.1	Release 1.2	Release 2.0
Goal	MotoGP App Idea validation in a small market segment	Expanding the user bases for the current version of the App	Retention of current users of the MotoGP App	Entering new market segments by adding Formula1
Features	<ul style="list-style-type: none"> • Rider news • Actual standings • Some other feature 	<ul style="list-style-type: none"> • In-App ads • Feedback button 	<ul style="list-style-type: none"> • Live races • Live standings • Favorite rider view 	<ul style="list-style-type: none"> • Add Formula1 race • Live F1 standings • Ad updates
Metrics	<ul style="list-style-type: none"> • 50 new users • DAU >= 20 • DAM => 2 min 	<ul style="list-style-type: none"> • 100 new users • DAU >= 50 • DAM => 2 min 	<ul style="list-style-type: none"> • 100 new users • DAU >= 100 • DAM => 10 min 	<ul style="list-style-type: none"> • 200 new users • DAU >= 200 • DAM => 20 min

Fuzzy Time Roadmap

- Variation of now-next-later roadmap by Roadmunk
- Pseudo-Kanban without WIP limits or pull-backlogs
- ☞ □ Shows current, next, future, and completed capabilities

	IN PROGRESS	SOON	FUTURE	COMPLETED
NEW FEATURES	<ul style="list-style-type: none"> Undo Function Feature B Scope Search 	<ul style="list-style-type: none"> Integrated Prototype MVP Requirements 	<ul style="list-style-type: none"> Archiving Front-End Prototype 	<ul style="list-style-type: none"> Feature A Scope Feature Requirements
STICKINESS	<ul style="list-style-type: none"> Gamification Desktop Delighter (TBD) 	<ul style="list-style-type: none"> Mobile Delighter (TBD) 	<ul style="list-style-type: none"> Reward (Progress Bar) Onboarding Flow 	<ul style="list-style-type: none"> Status Updates
INTEGRATIONS	<ul style="list-style-type: none"> Zendesk Marketo 	<ul style="list-style-type: none"> Trello HubSpot 	<ul style="list-style-type: none"> JIRA HipChat 	<ul style="list-style-type: none"> Slack Salesforce
INFRA-STRUCTURE	<ul style="list-style-type: none"> Metrics Design Process 	<ul style="list-style-type: none"> Automated Tests 	<ul style="list-style-type: none"> Regression Back-End Analytics 	<ul style="list-style-type: none"> Demo Staging

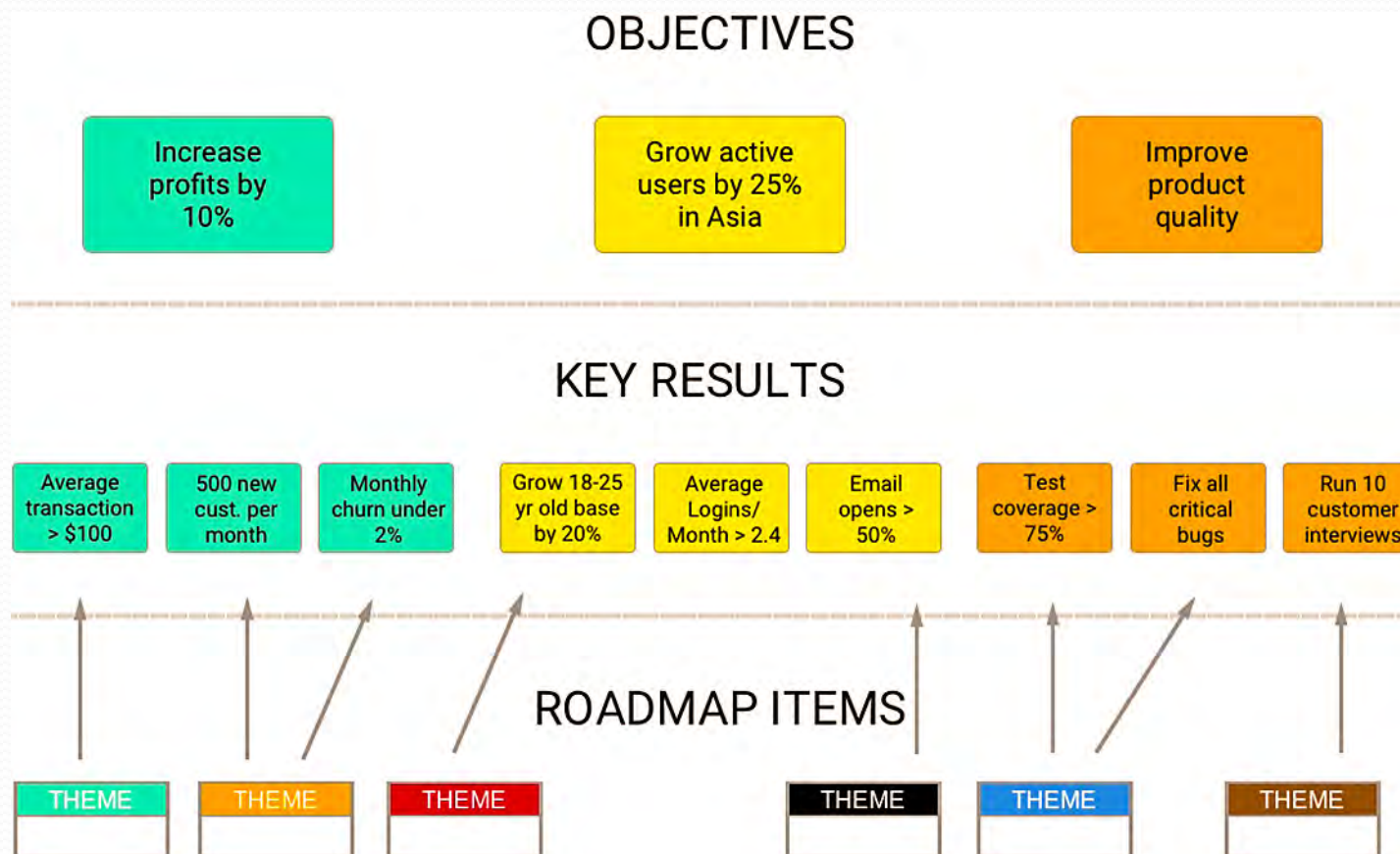
Product Roadmap

- ❑ Modern roadmaps created by Lombardo (2018)
- ❑ Combine OKRs, canvases, themes, now-next-later
- ❑ Theme and feature-based roadmap to achieve OKRs

Who	Timeframe	1st Half	2nd Half	Next Year	Future Yrs.
Engineers	Theme	Indestructible Hose	Flower Management	Green Evenness	Extensibility
	Features	<ul style="list-style-type: none"> • 20-40' Lengths • No-lead connections • No-kink armor 	<ul style="list-style-type: none"> • Super flexibility • EZPlace stakes • Low-pressure mode 	<ul style="list-style-type: none"> • Microfine sprinkler • Dispersion mgt • Rain sensor 	<ul style="list-style-type: none"> • Industrial/Farming components
	Business Objectives	<ul style="list-style-type: none"> • Increase unit sales • Decrease returns • Decrease defects 	<ul style="list-style-type: none"> • Double selling price 	<ul style="list-style-type: none"> • Increase brand value 	<ul style="list-style-type: none"> • Expand marketshare
	Development Stage	<ul style="list-style-type: none"> • Preproduction 	<ul style="list-style-type: none"> • Prototype 	<ul style="list-style-type: none"> • Discovery 	<ul style="list-style-type: none"> • Concept
	Infrastructure	<ul style="list-style-type: none"> • Santa Fe Plant 	<ul style="list-style-type: none"> • New Mesa Plant 	<ul style="list-style-type: none"> • Cincinnati Plant 	<ul style="list-style-type: none"> • Future Plant
	Dependencies/Risks	<ul style="list-style-type: none"> • Key personnel 	<ul style="list-style-type: none"> • Untested material 	<ul style="list-style-type: none"> • 2nd plant required 	<ul style="list-style-type: none"> • Global competition
Market	Product Volume	<ul style="list-style-type: none"> • 100K Units 	<ul style="list-style-type: none"> • 1M Units 	<ul style="list-style-type: none"> • 4M Units 	<ul style="list-style-type: none"> • 10M Units
	Markets	<ul style="list-style-type: none"> • Santa Fe & Phoenix 	<ul style="list-style-type: none"> • Southwest & NE 	<ul style="list-style-type: none"> • U.S. & Canada 	<ul style="list-style-type: none"> • Pro Market
	Sales Events	<ul style="list-style-type: none"> • Partner Showcases 	<ul style="list-style-type: none"> • Lawn & Garden Show 	<ul style="list-style-type: none"> • Hardware Show 	<ul style="list-style-type: none"> • Manufacturing Event
Execs	Confidence Levels	<ul style="list-style-type: none"> • 90% 	<ul style="list-style-type: none"> • 75% 	<ul style="list-style-type: none"> • 50% 	<ul style="list-style-type: none"> • 25%
	Market Sizes	<ul style="list-style-type: none"> • \$200 million 	<ul style="list-style-type: none"> • \$2 billion 	<ul style="list-style-type: none"> • \$4 billion 	<ul style="list-style-type: none"> • \$7 billion
	Revenues/Profits	<ul style="list-style-type: none"> • \$5 million/\$0.7 mil. 	<ul style="list-style-type: none"> • \$50 million/\$2 mil. 	<ul style="list-style-type: none"> • \$200 million/\$15 mil. 	<ul style="list-style-type: none"> • \$500 million/\$50 mil.

OKR Roadmap

- Simple OKR roadmap created by Tim O'Malley (2019)
- Can be based on a hierarchy of corporate-level OKRs
- ☞ □ Combines critical OKRs into simple prioritized timeline



O'Malley, P. (2019). *Roadmap element 4: Objectives*. Retrieved March 3, 2020, from <https://bit.ly/3aojRS3>

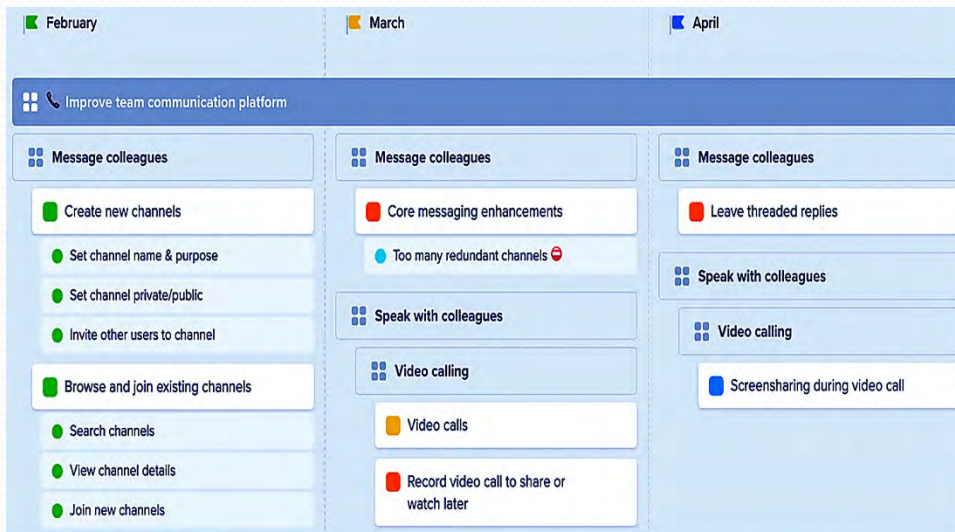
Doerr, J. (2018). *Measure what matters: How google, bono, and the gates foundation rock the world with okrs*. New York, NY: Portfolio/Penguin.

Niven, P. R., & Lamore, B. (2016). *Objectives and key results: Driving focus, alignment, and engagement with okrs*. Hoboken, NJ: John Wiley & Sons.

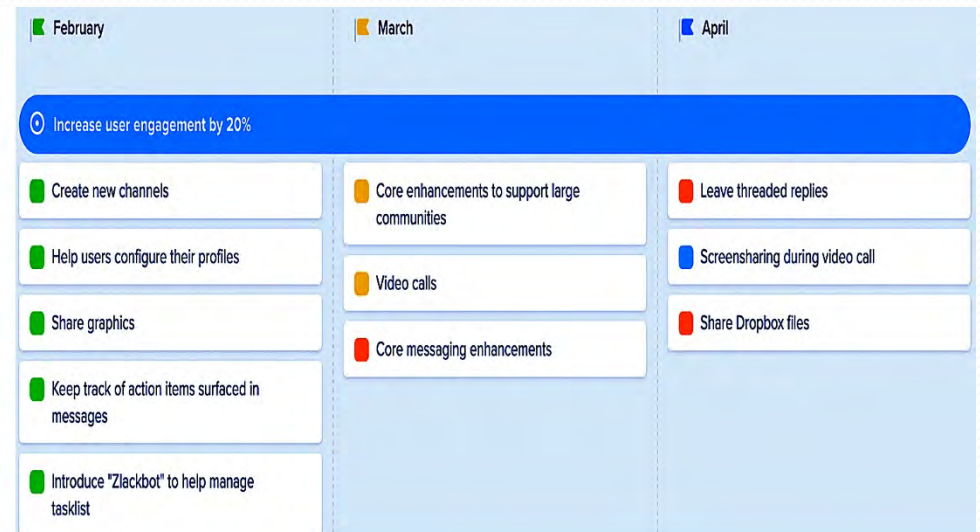
Gray, D. (2019). *Objectives + key results (OKR) leadership: How to apply silicon valley's secret sauce to your career, team, or organization*. Butte, CO: Action Learning.

Miscellaneous Roadmaps I

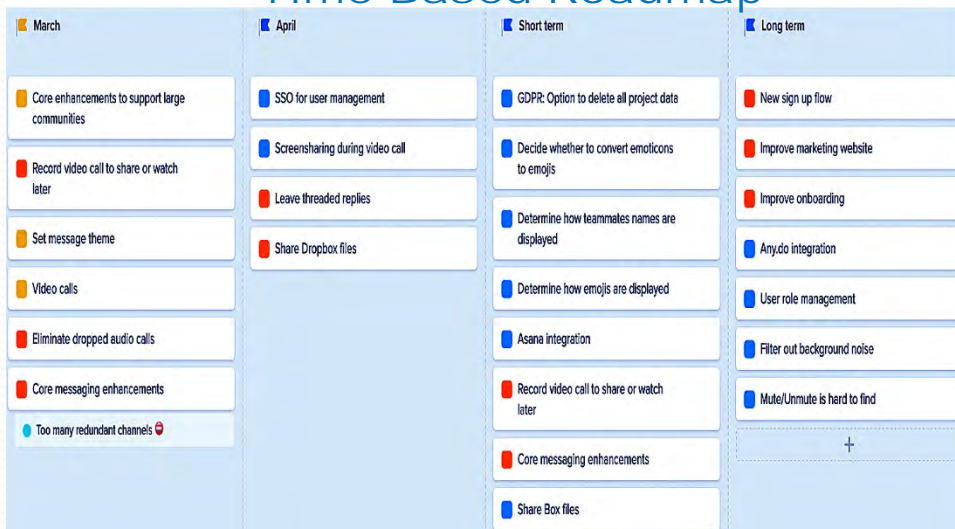
Feature-Driven Roadmap



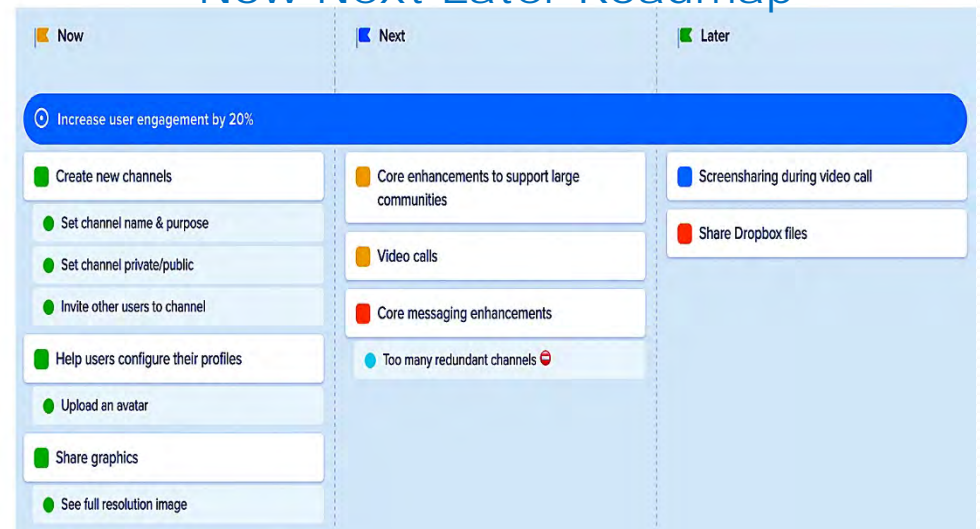
Objective-Driven Roadmap



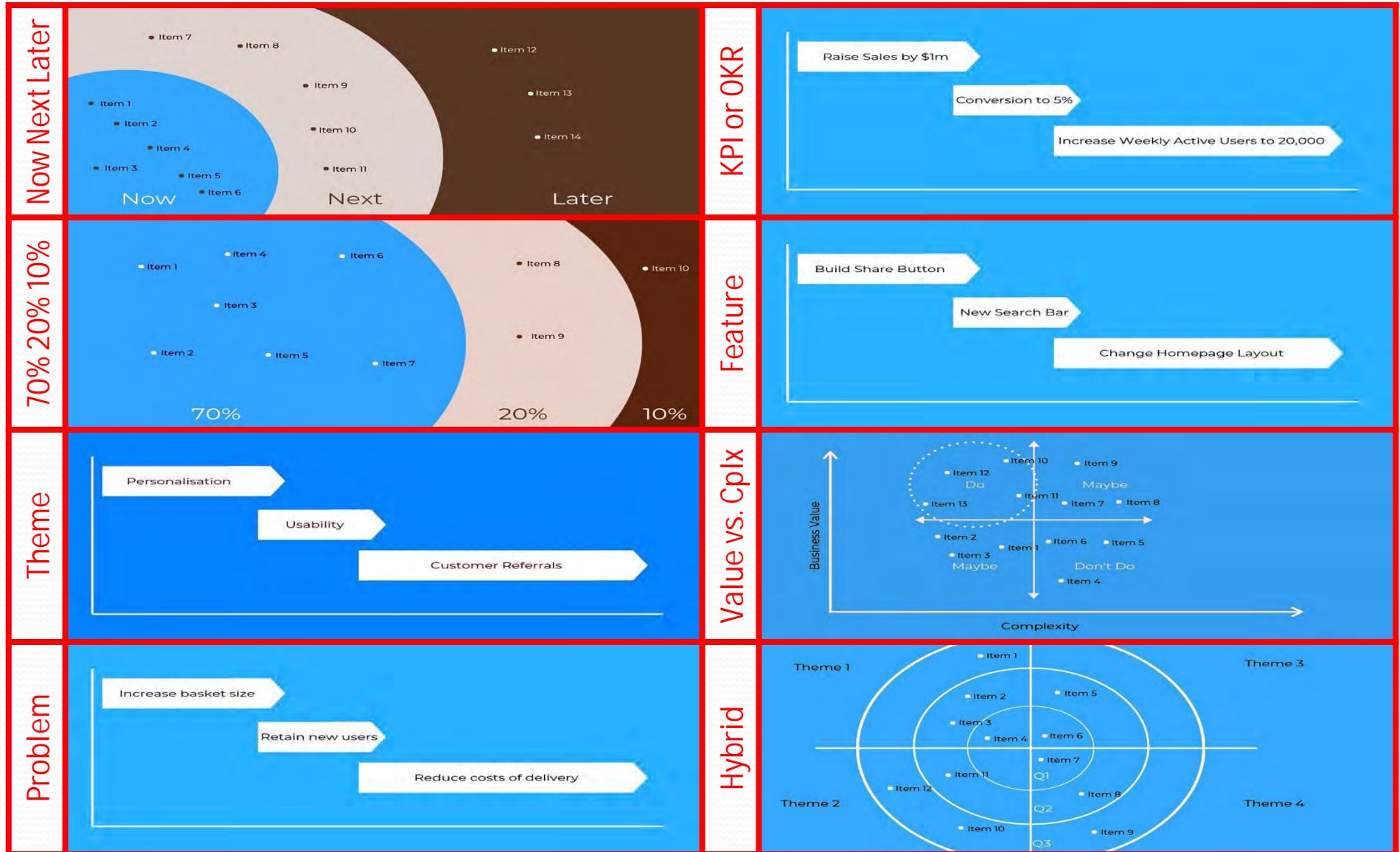
Time-Based Roadmap



Now-Next-Later Roadmap



Miscellaneous Roadmaps II



Evolutionary Design—UX Maps

- Numerous models of UX mapping techniques
- Based on lean-agile thinking principles & methods
- ☞ □ Capture lifecycles, problems, pain points, features, etc.

SERVICE

- 1984 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Near Term
- Simplified View
- End-to-End
- Less Popular

JOURNEY

- 1992 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Long Term
- Simplified View
- Pain Points
- Popular

EXPERIENCE

- 1998 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Near Term
- Simplified View
- Pain Points
- Popular

STORY

- 2005 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Near Term
- Simplified View
- End-to-End
- Popular

MENTAL

- 2008 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Near Term
- Simplified View
- End-to-End
- Popular

IMPACT

- 2012 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Near Term
- Simplified View
- Value Point
- Popular

ECOSYSTEM

- 2013 -

- User Perspective
- Multi-Layered
- Lifecycle Stages
- Long Term
- Simplified View
- End-to-End
- Popular

Curedale, R. (2016). *Service blueprints: The tool for service innovation*. Topanga, CA: Design Community College.

Angrave, J. (2020). *The journey mapping playbook: A practical guide to preparing, facilitating, and sharing the value of customer journey mapping*. Boston, MA: de Gruyter.

Szabo, P. W. (2017). *User experience mapping: Enhance UX with user story map, journey map, and diagrams*. Birmingham, UK: Packt Publishing

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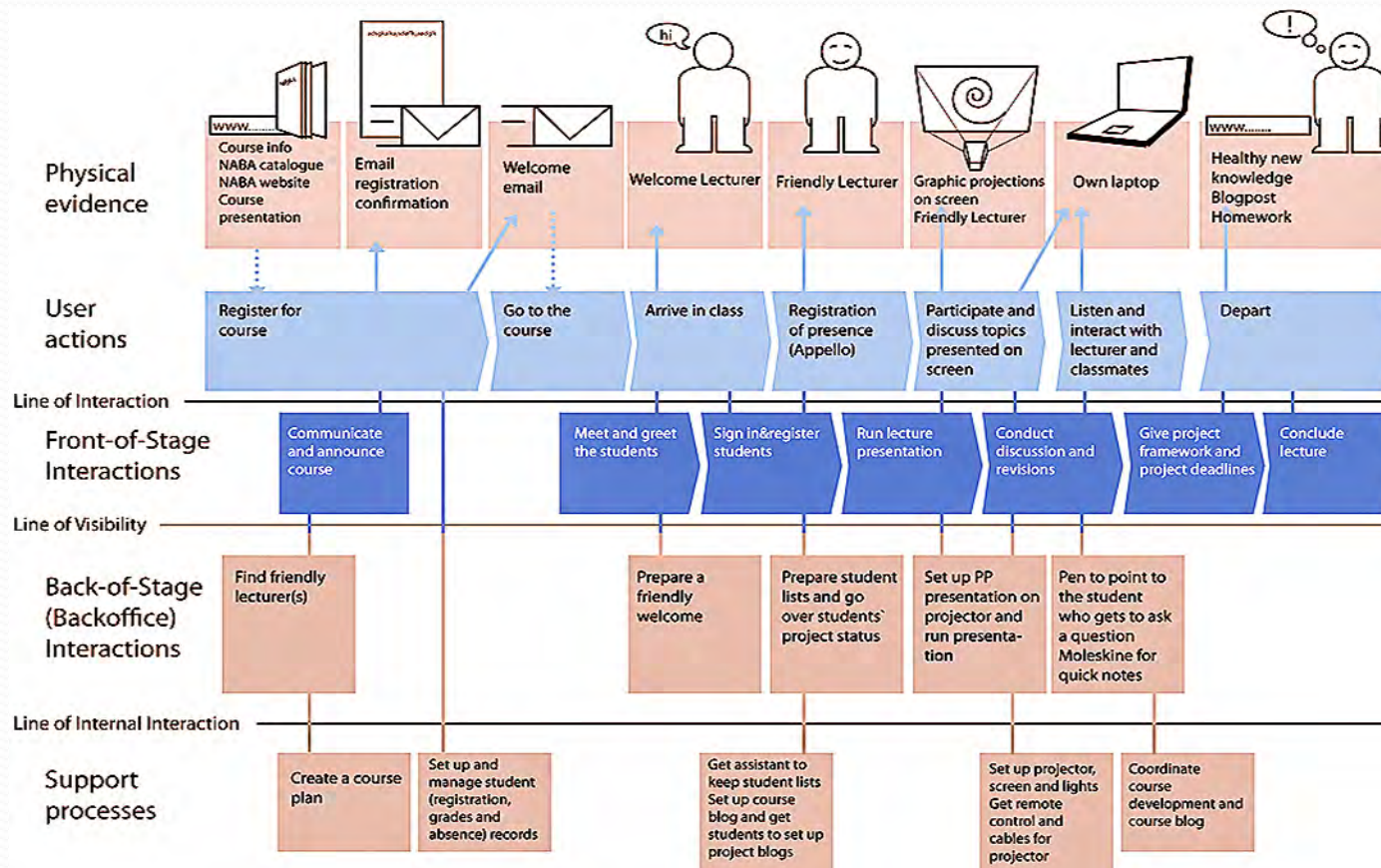
Young, I. (2008). *Mental models: Aligning design strategy with human behavior*. Brooklyn, NY: Rosenfeld Media.

Adzick, G. (2012). *Impact mapping: Making a big impact with software products and projects*. Woking, Surrey, UK: Provoking Thoughts Ltd.

Parrish, R., Manning, H., Stearns, C., & Murphy, M. (2015). *How to map your customer experience ecosystem*. Cambridge, MA: Forrester Research.

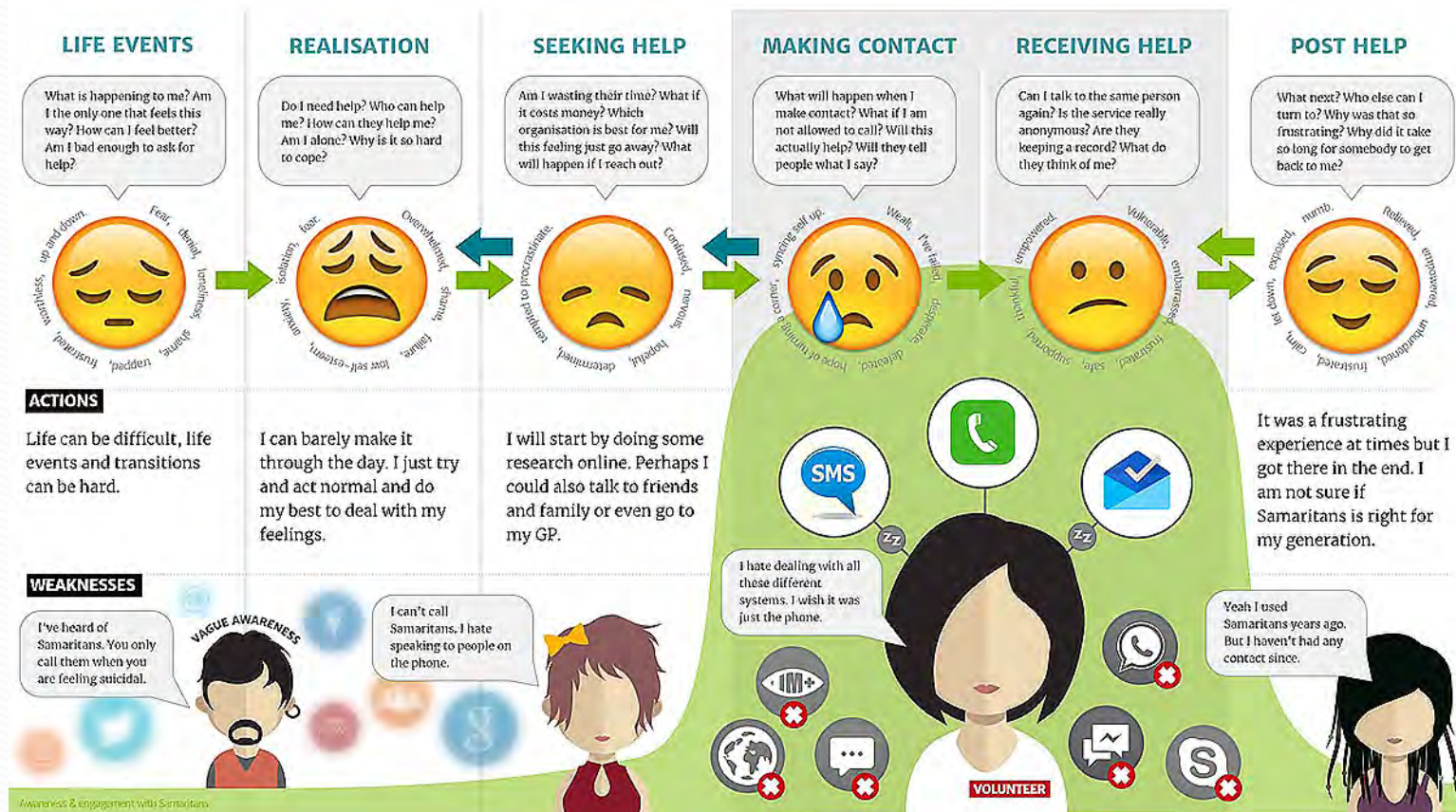
Service Blueprint

- ❑ Created by Lynn Shostack of Bankers Trust (1984)
- ❑ Simple input-output charts for service product design
- ❑ Illustrates key customer transactions and service layers



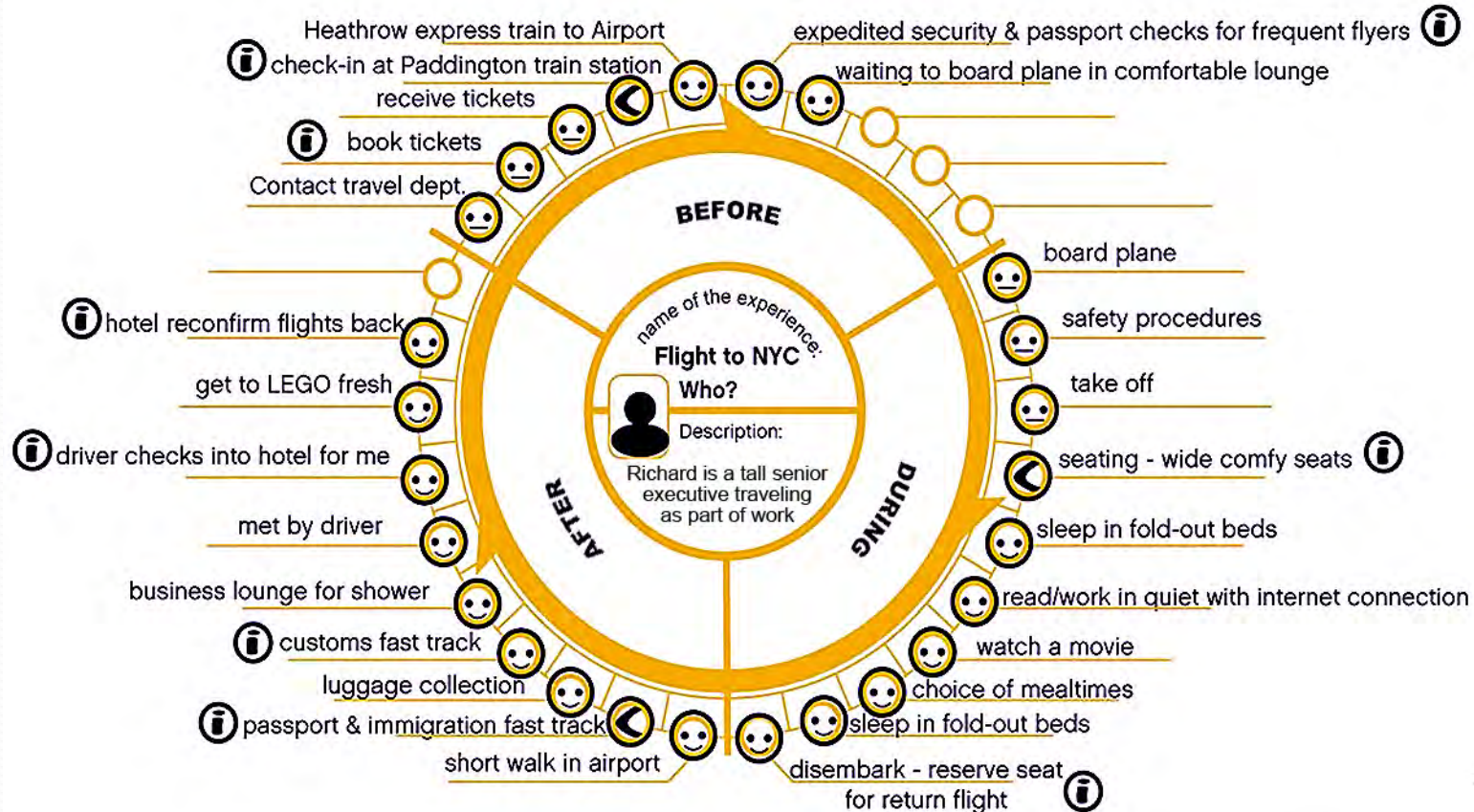
Journey Map

- Created by Chip Bell and Ron Zemke in 1992
- High-level lifecycle of major customer experiences
- Depicts major pain points encountered along the way



Experience Map

- Created by Oxford Corporate Consultants in 1998
- Map of customer experience with product or service
- Depicts major unknowns and areas for improvements



Temkin, B. (2009). *Lego's building block for good experiences*. Retrieved February 19, 2020, from <https://bit.ly/2V48me3>

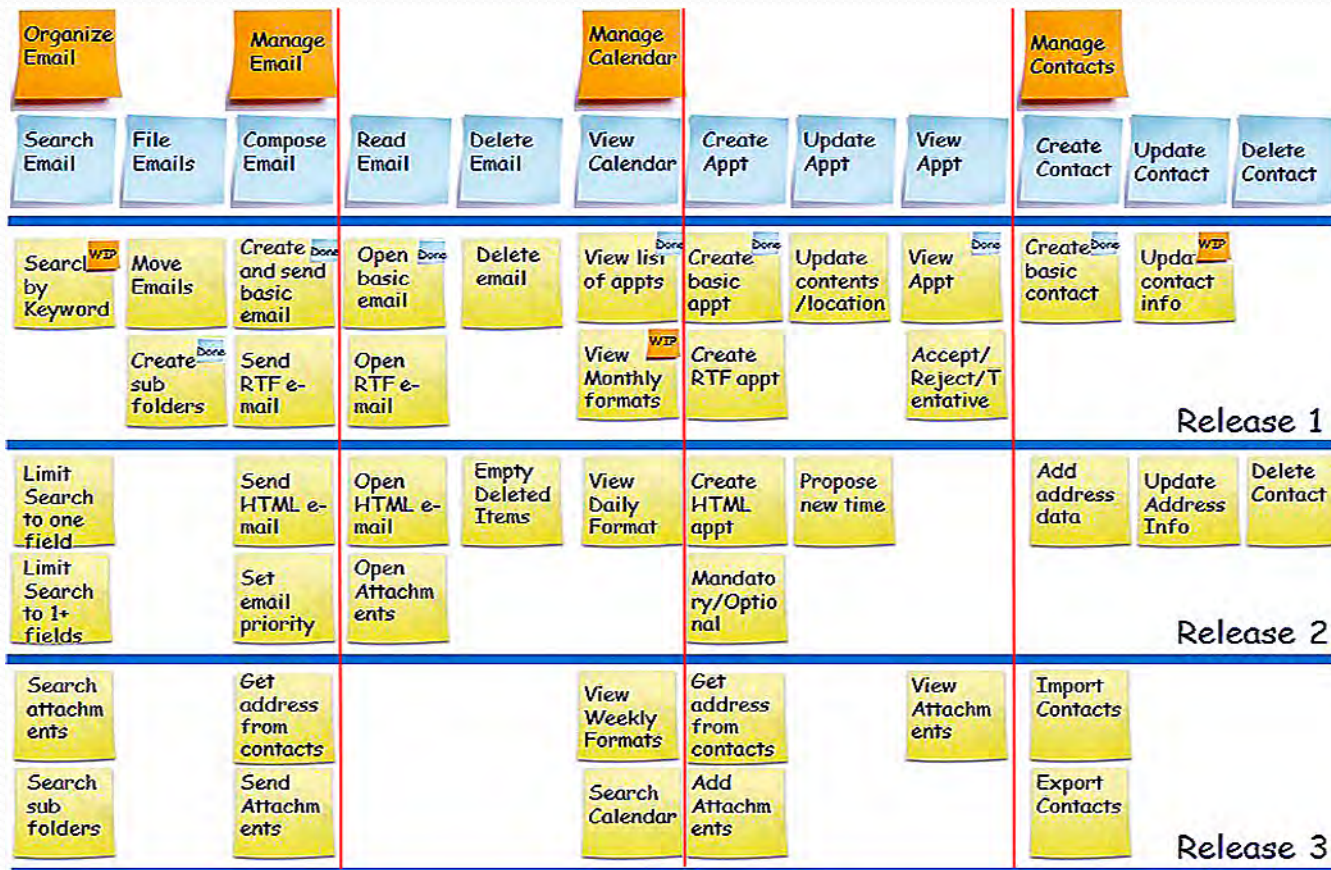
Szabo, P. W. (2017). *User experience mapping: Enhance UX with user story map, journey map, and diagrams*. Birmingham, UK: Packt Publishing

Kalbach, J. (2016). *Mapping experiences: A complete guide to creating value through journeys, blueprints, and diagrams*. Sebastopol, CA: O'Reilly Media, Inc.

Curedale, R. (2018). *Mapping methods 2: Guide to experience maps, journey maps, service blueprints, affinity diagrams, empathy maps, and business model canvas*. Topanga, CA: DCG.

Story Map

- ❑ Created by Jeff Patton of Thoughtworks in 2005
- ❑ Simple mapping of major features and user stories
- ❑ Visual functional depiction of user's application needs



Patton, J. (2005). It's all in how you slice it. *Better Software Magazine*, 2(1), 16-22.

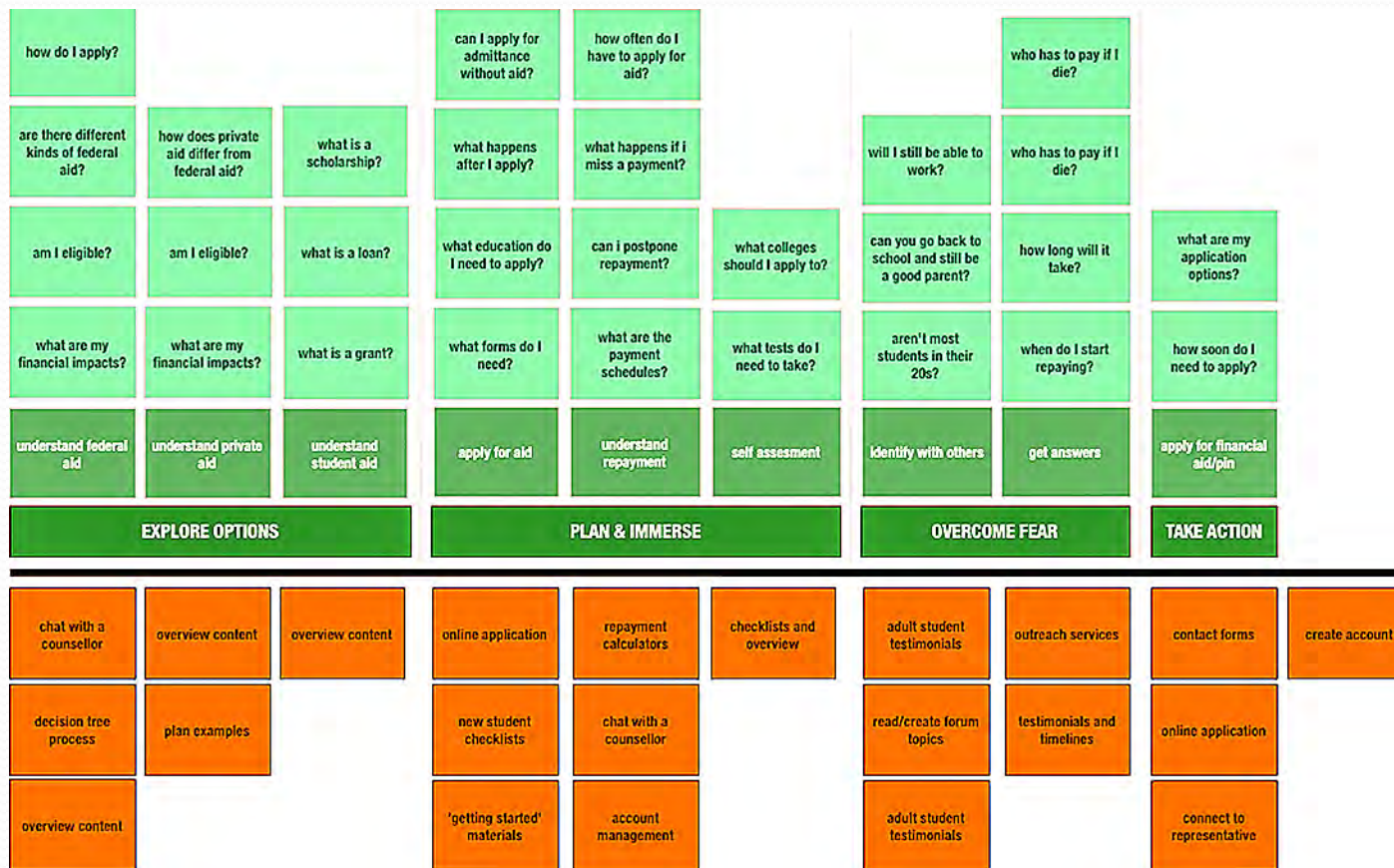
Patton, J., & Economy, P. (2014). *User story mapping: Discover the whole story, build the right product*. Sebastopol, CA: O'Reilly Media, Inc.

Overeem, B. (2015). *The user story mapping game*. Retrieved February 19, 2020, from <http://www.barryovereem.com/the-user-story-mapping-game>

Patton, J. (2020). *User story mapping: Story mapping is a better way to work with agile user stories*. Retrieved February 19, 2020, from <https://bit.ly/2wz5b49>

Mental Map

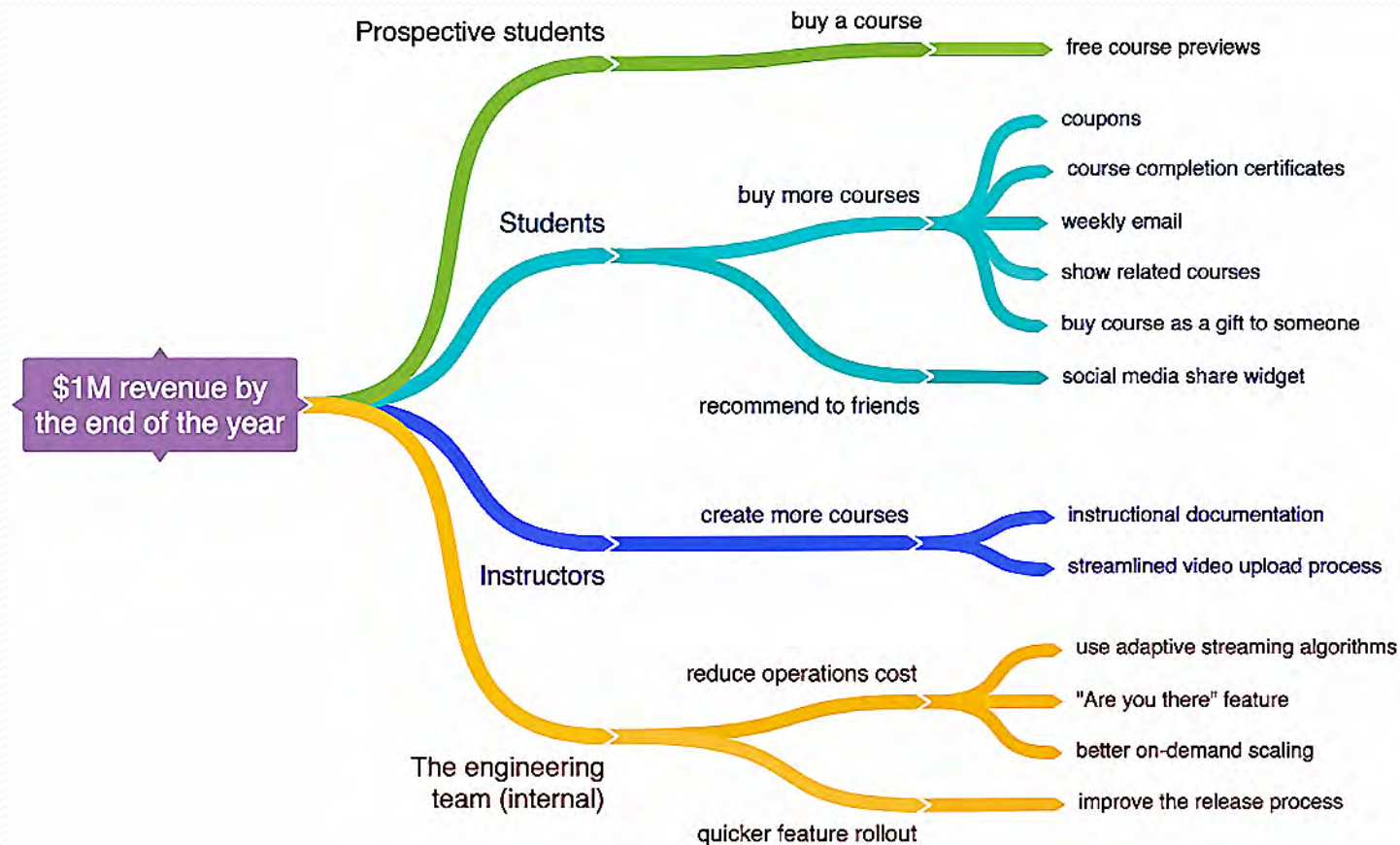
- ❑ Created by Indi Young in current form in 2008
- ❑ Simple end-user model of how a system works
- ❑ Mapping of end-user needs to system functions



Eizans, D. (2012). *Evolving mental models*. Retrieved February 19, 2020, from <https://bit.ly/2HETF9q>
 McClellan, K. (2019). *A primer on mental models*. Retrieved February 19, 2020, from <https://bit.ly/2SGTn8f>
 Davis, B. (2017). *What is a customer mental model?* Retrieved February 19, 2020, from <https://bit.ly/2SI4y0M>
 Young, I. (2008). *Mental models: Aligning design strategy with human behavior*. Brooklyn, NY: Rosenfeld Media.

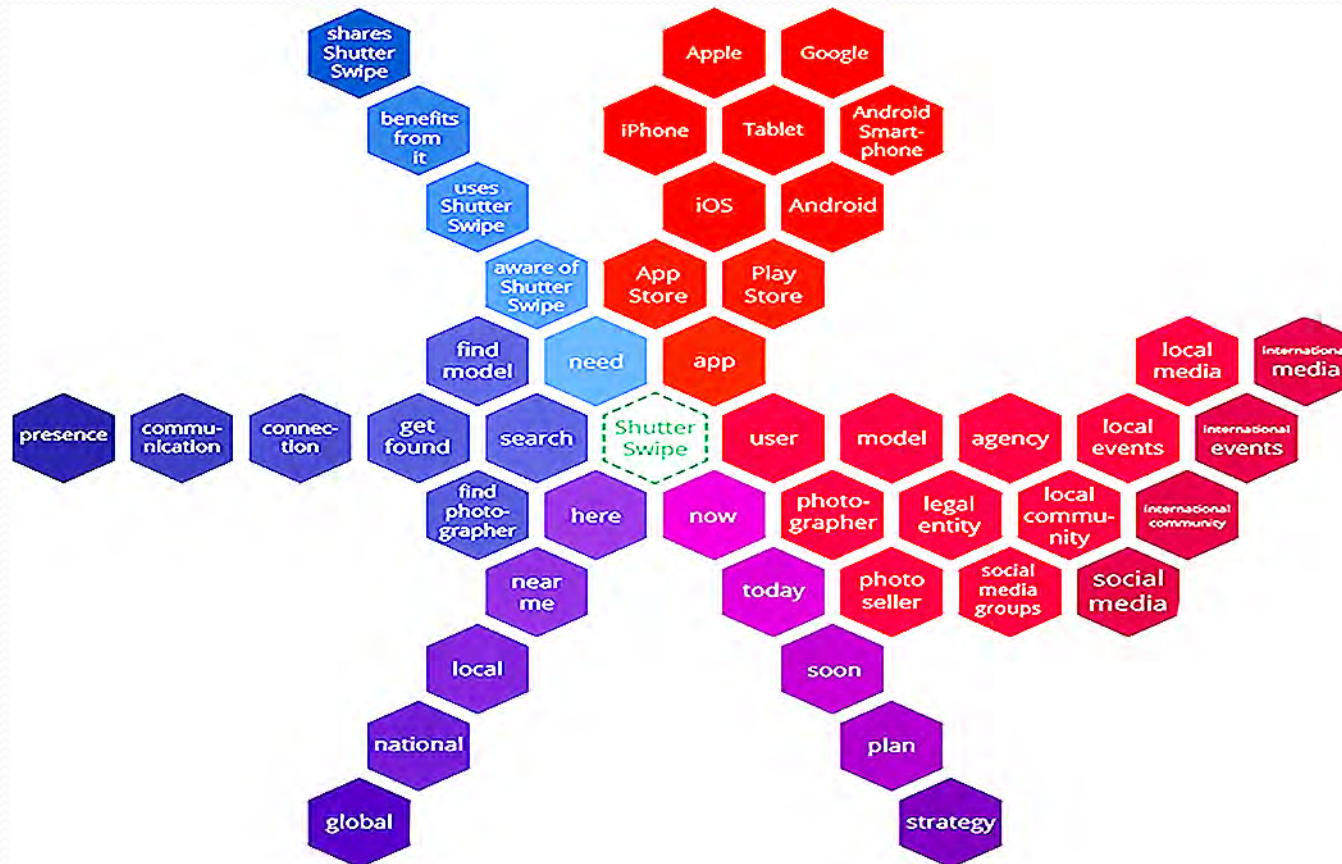
Impact Map

- ❑ Created by Gojko Adzic of United Kingdom in 2012
- ❑ Simple goal-oriented model of product or service
- ❑ Maps goals, roles, impacts, and deliverables

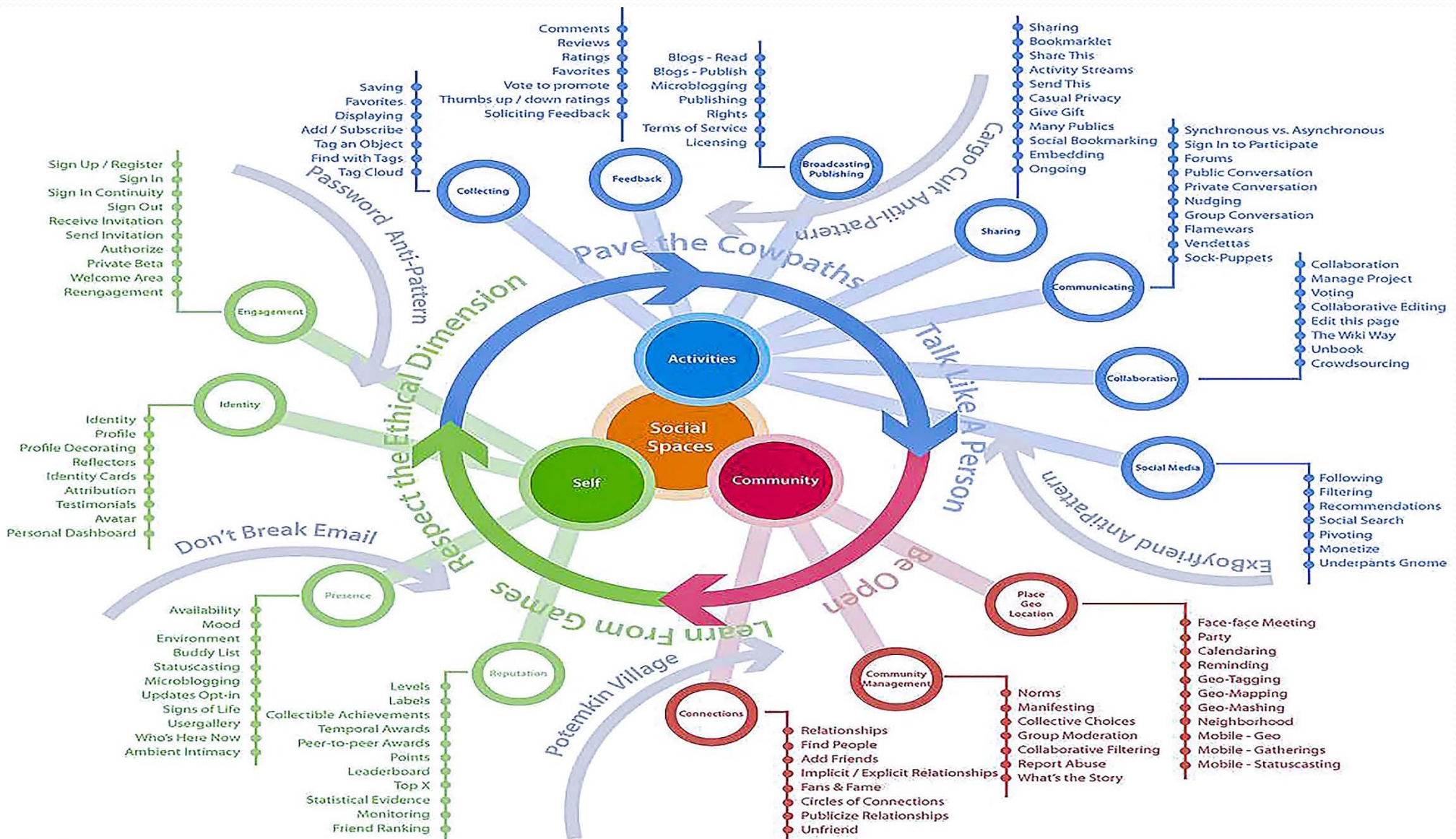


Ecosystem Map

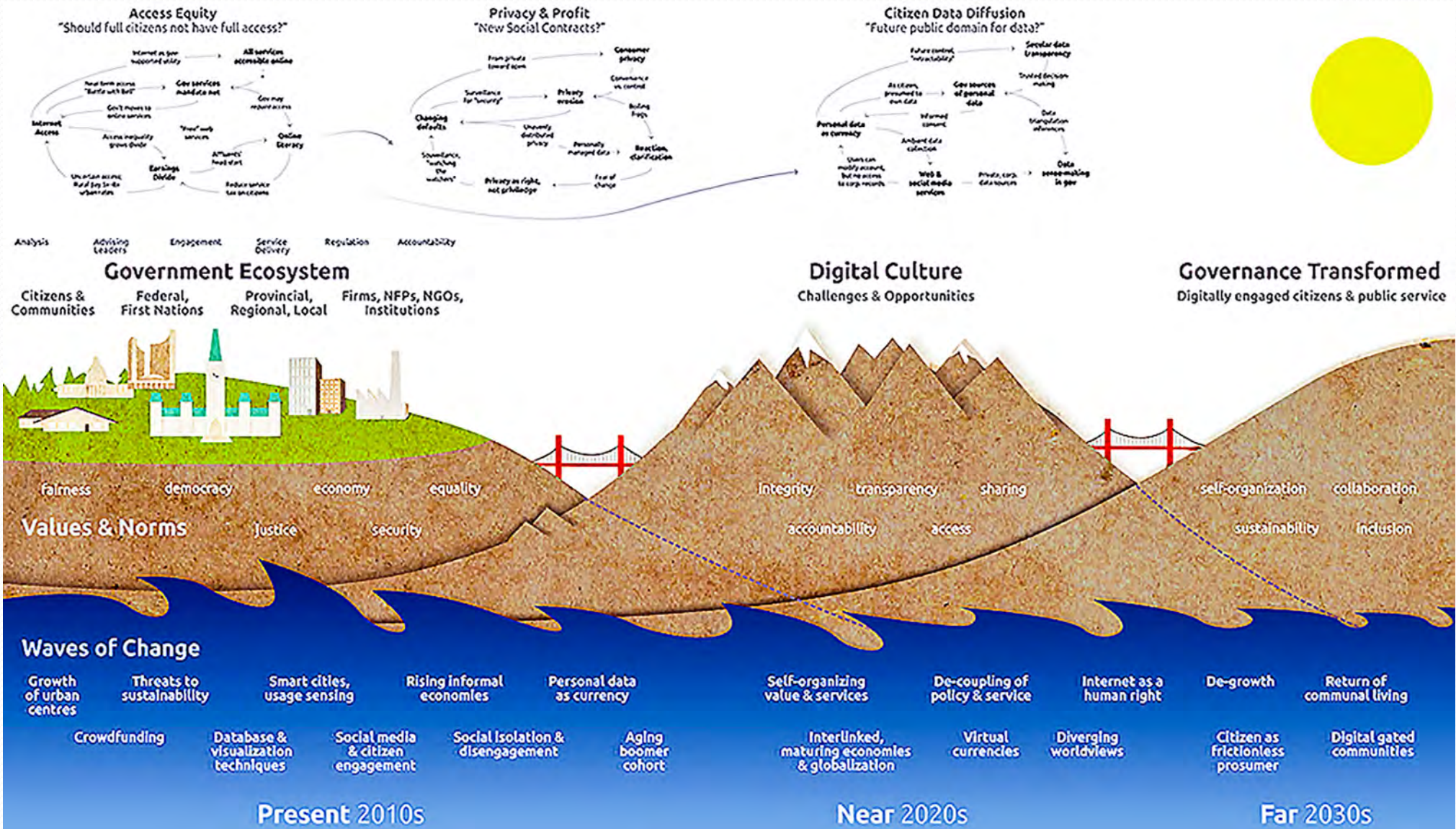
- ❑ Created by designer Andy Polaine circa 2013
- ❑ Synthetic model of Product and its environment
- ❑ Defines all of the entities, flows, and relationships



Ecosystem Map II



Ecosystem Map III



Evolutionary Design—Design Cycles

- Numerous models of design cycle techniques
- Based on lean-agile thinking principles & methods
- ☞ □ Capture roles, needs, problems, solutions, scale, etc.

REFACTORING - 1990 -

- User story
- Test driven design
- Just enough code
- Refactor software
- One unit at a time
- Onepiece workflow
- Emergent design

SCRUM - 1993 -

- Market features
- Product backlog
- Daily standups
- 14-30 day sprints
- Product demos
- Retrospective
- Shippable product

FDD - 1997 -

- Object-oriented
- Feature list
- Incremental plan
- Feature slices
- Code features
- Code inspections
- Iterate over design

DESIGN THINKING - 2008 -

- User Perspective
- Empathy
- Define problem
- Ideate solutions
- Prototype solutions
- Market testing
- Rinse-n-repeat

LEAN STARTUP - 2013 -

- Lean canvas
- Lean objectives
- Rapid development
- Measure results
- Pivot and adapt
- Identify solution
- Scale up and grow

5X5 X-TEAMS - 2014 -

- Form small team
- Develop hypothesis
- Small experiments
- Inexpensive model
- Measure results
- Learning focus
- Five-day cycles

DESIGN SPRINTS - 2016 -

- Perspective
- Identify problem
- Create designs
- Select solutions
- Build prototypes
- Measure results
- Build new product

Fowler, M. (1999). *Refactoring: Improving the design of existing code*. Boston, MA: Addison-Wesley.

Schwaber, K., & Beedle, M. (2001). *Agile software development with scrum*. Upper Saddle River, NJ: Prentice-Hall.

Palmer, S. R., & Felsing, J. M. (2002). *A practical guide to feature driven development*. Upper Saddle River, NJ: Prentice-Hall.

Pressman, A. (2019). *Design thinking: A guide to creative problem solving for everyone*. New York, NY: Routledge.

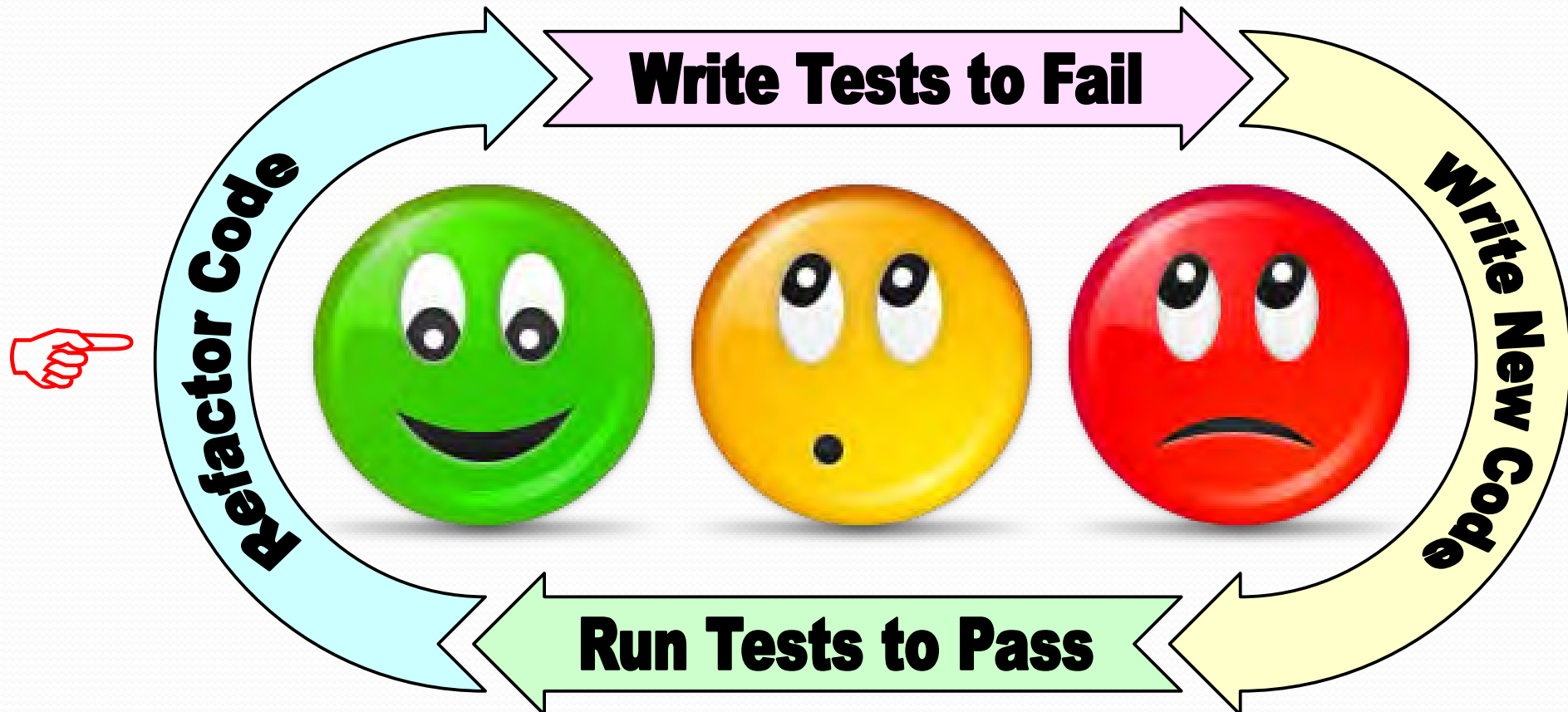
Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. New York, NY: Crown Books.

Schrage, M. (2014). *The innovator's hypothesis: How cheap experiments are worth more than good ideas*. Boston, MA: MIT Press.

Knapp, J. (2016). *Sprint: Solve big problems and test new ideas in just five days*. New York, NY: Simon & Schuster.

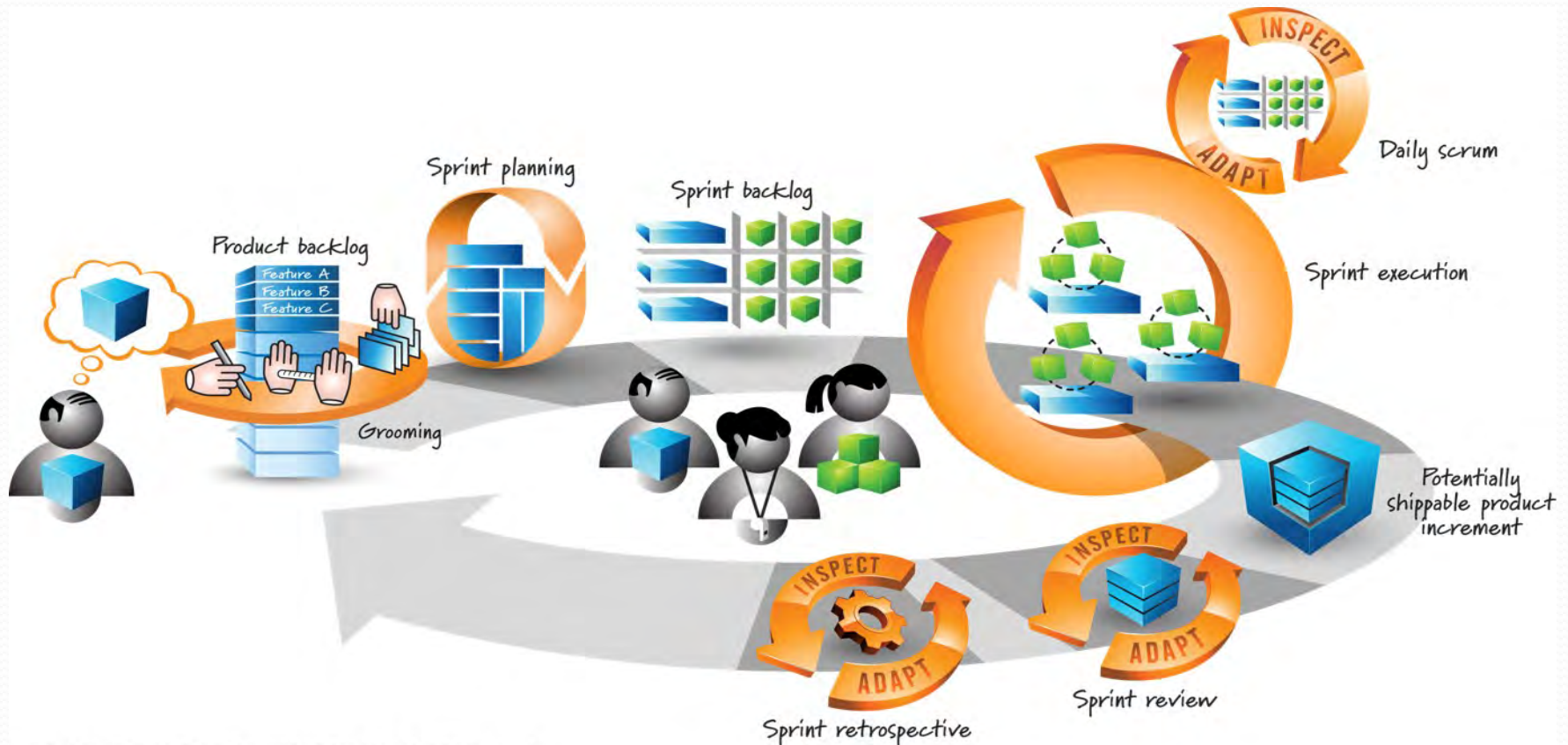
Refactoring

- Term coined by William Opdyke in 1990
- Process of coding and testing one story at time
- ☞ □ Evolve architecture and design in one-piece-workflow



Scrum

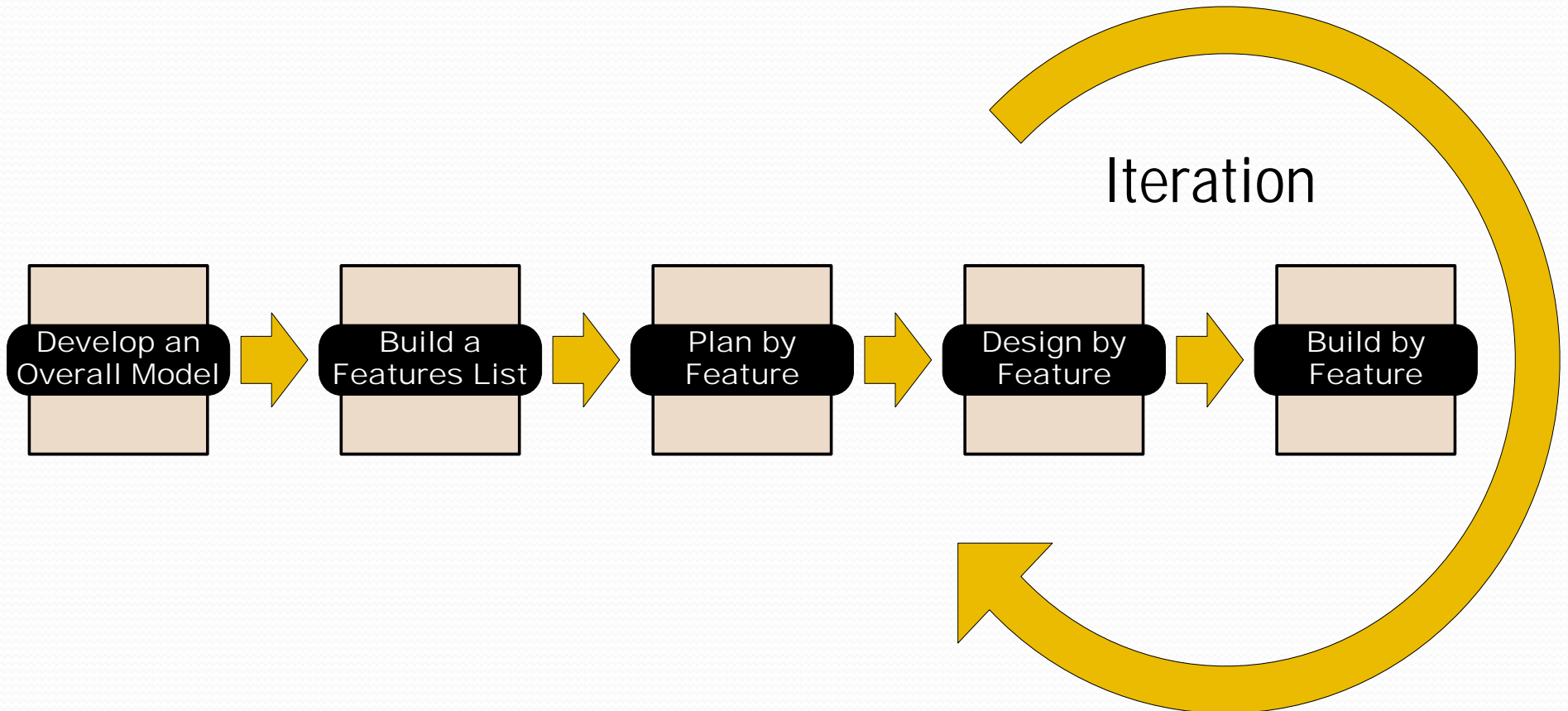
- Created by Jeff Sutherland at Easel in 1993
- Product backlog comprised of prioritized features
- Iterative sprint-to-sprint, adaptive, & emergent model



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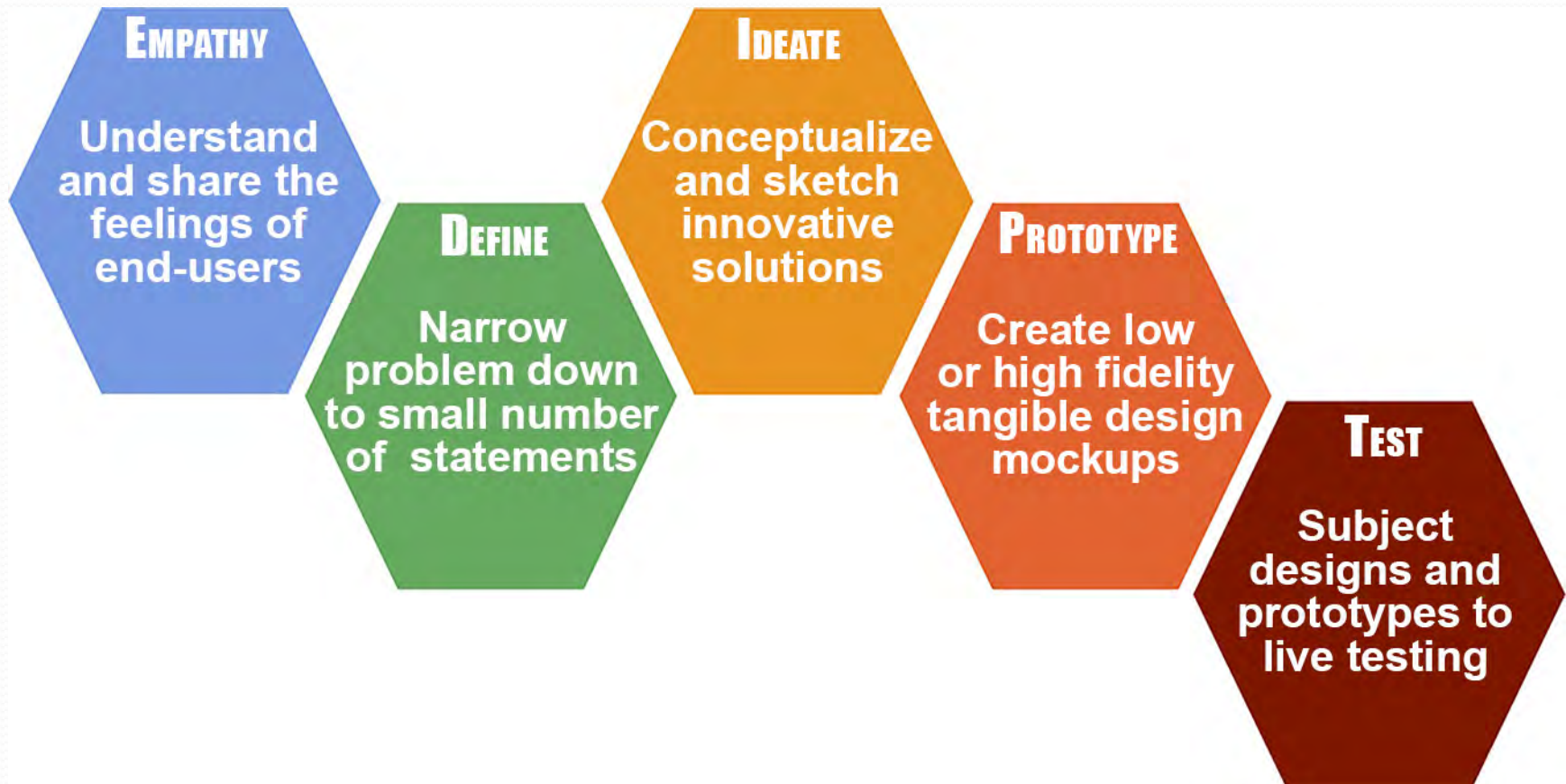
Feature Driven Development—FDD

- Created by Jeff De Luca at Nebulon in 1997
- Begins with an object-oriented design model
- ☞ □ Create plan for incrementally building design



Design Thinking

- Popularized by Tim Brown of IDEO in 2008
- Customer or end-user focused design process
- Design model that begins with customer pain points



Meredith, C. (2019). *The five stages of design thinking*. Retrieved March 2, 2020, from <https://bit.ly/3crqN2A>

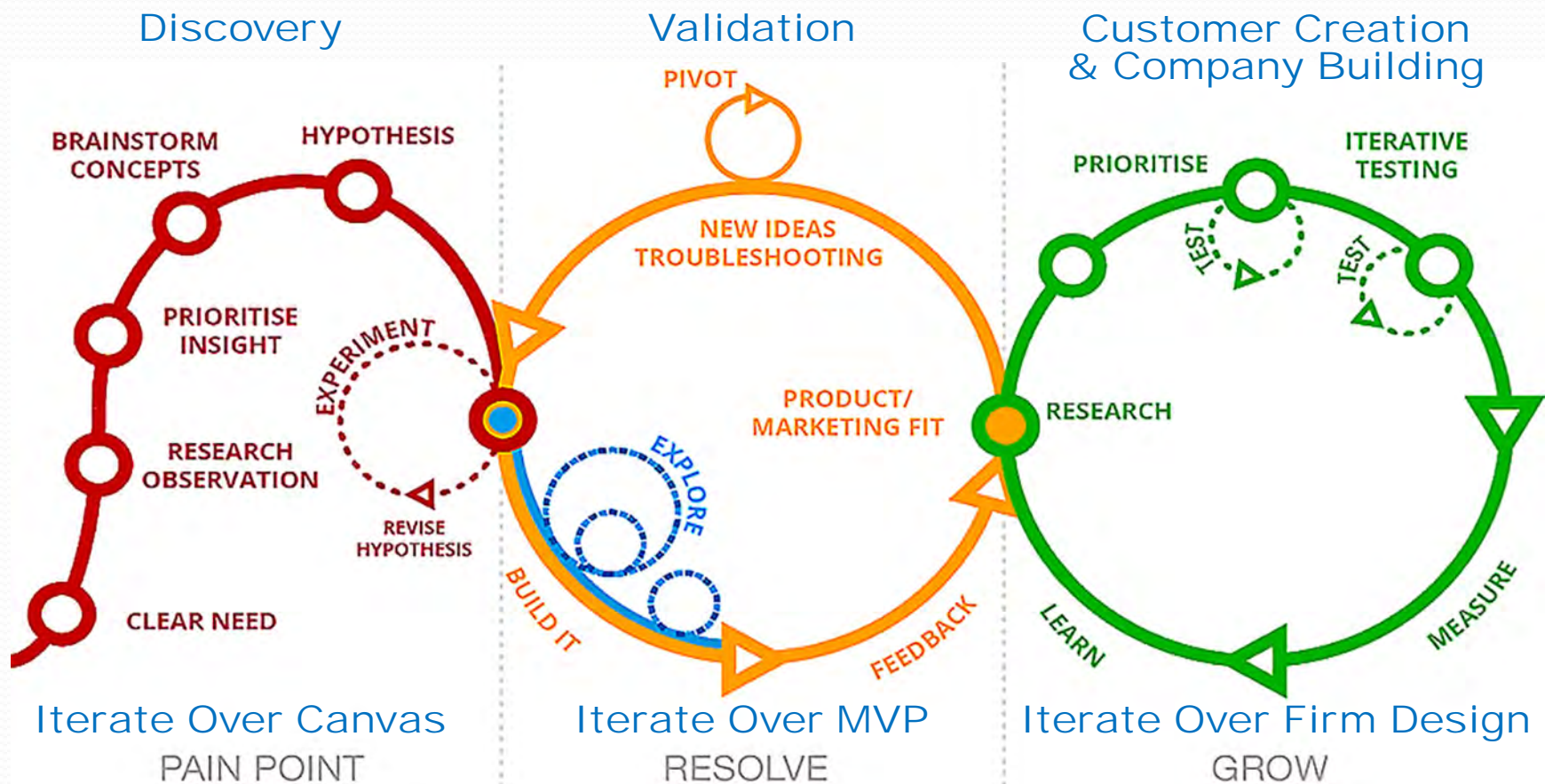
Pressman, A. (2019). *Design thinking: A guide to creative problem solving for everyone*. New York, NY: Routledge.

Lewrick, M., Link, P., & Leifer, L. (2018). *The design thinking playbook: Mindful digital transformation of teams, products, services, businesses, and ecosystems*. Hoboken, NJ: John Wiley & Sons.

Kelly, T., & Littman, J. (2005). *The ten faces of innovation: IDEO's strategies for beating the devil's advocate and driving creativity throughout your organization*. New York, NY: Currency Books.

Lean Startup

- ❑ Created by Eric Ries of Catalyst circa 2013
- ❑ Customer requirements exist as tacit knowledge
- ❑ Iterate over canvas, MVP, customers, and company



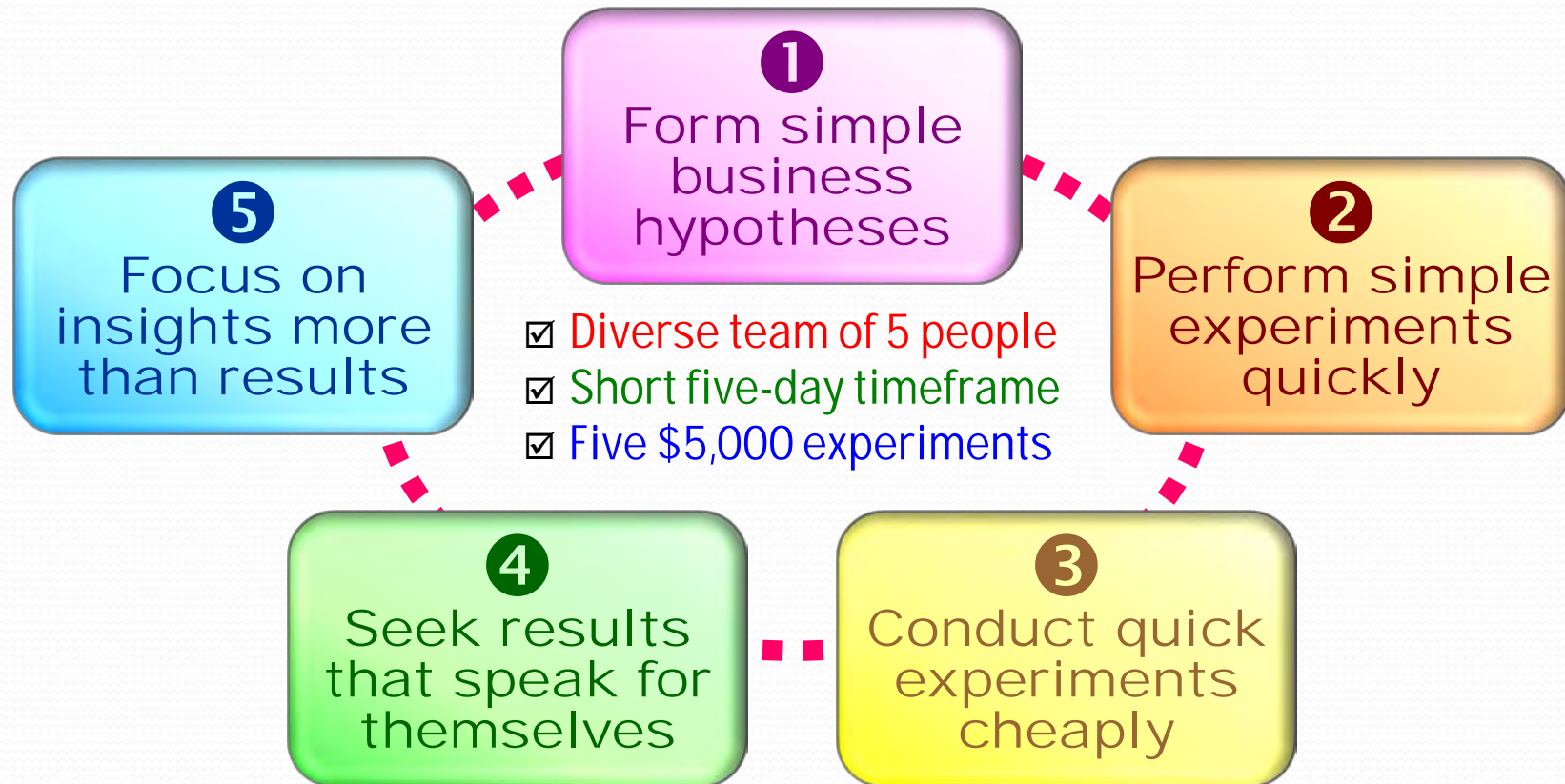
Blank, S. (2013). *Why the lean startup changes everything*. Harvard Business Review, 91(5): 63-72.

Gardner, O. (2015). *Awesome lean optimization diagram*. Retrieved March 2, 2020, from <https://bit.ly/38kQBdn>

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. New York, NY: Crown Books.

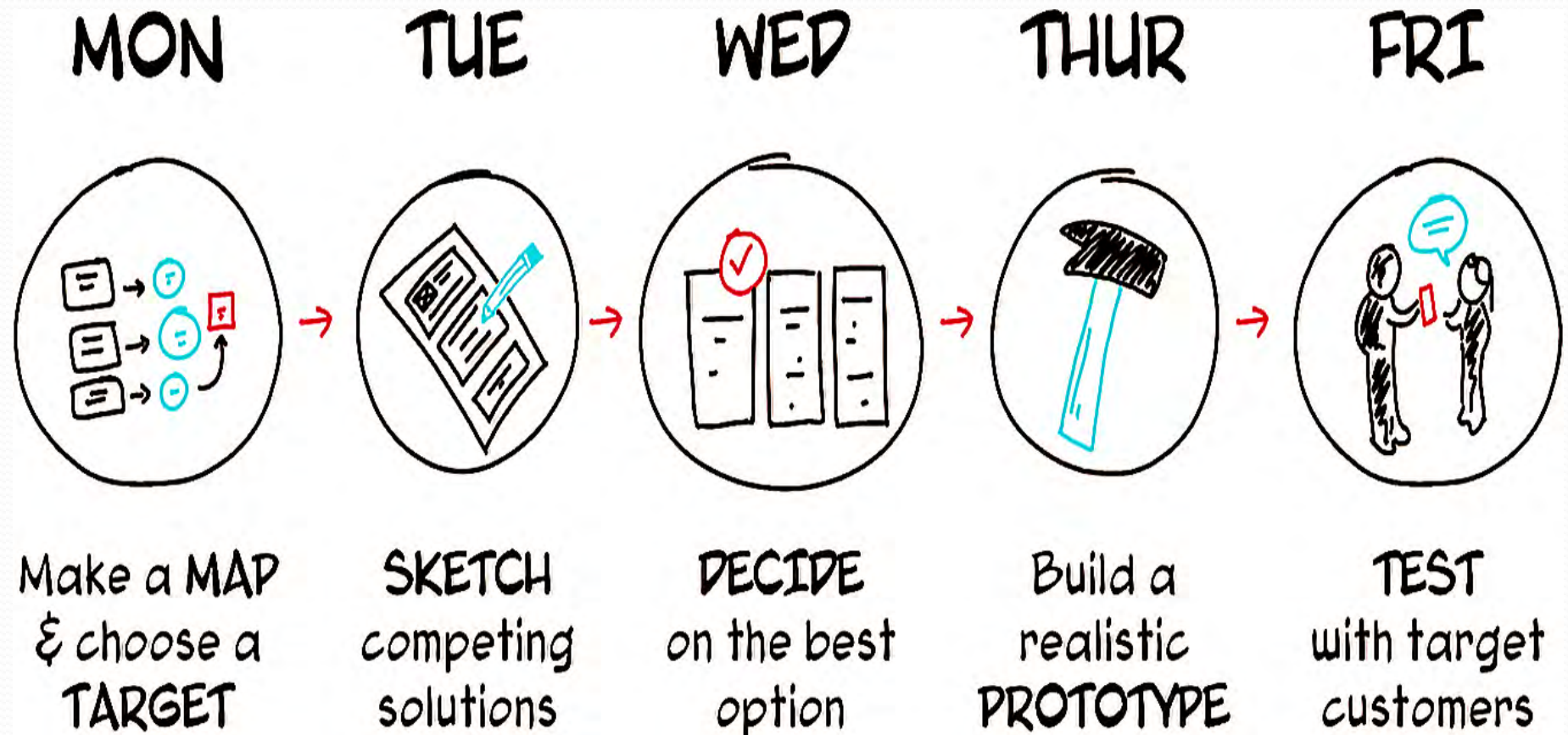
5x5 X-Teams

- ❑ Created by Michael Schrage of MIT in 2014
- ❑ All design requirements exist as tacit knowledge
- ❑ Uncover design knowledge with small experiments



Design Sprint

- Created by Jake Knapp of Google in 2016
- Top-down executive entrepreneur-driven model
- ☞ □ One-week process to design new product or service



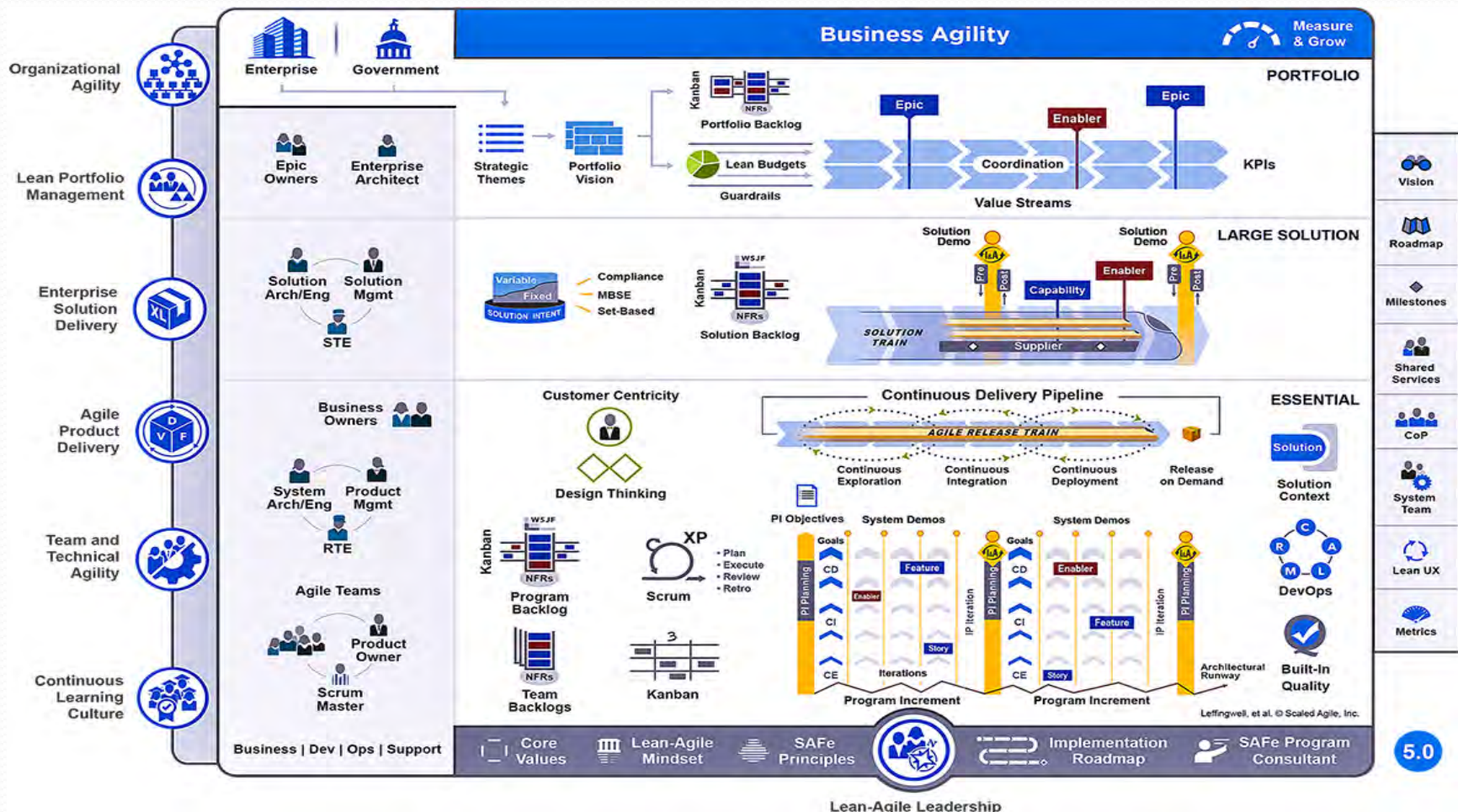
Knapp, J. (2016). *Sprint: Solve big problems and test new ideas in just five days*. New York, NY: Simon & Schuster.

Chin, D. (2018). *Make meaningful progress via remote design sprints: Webinar recap*. Retrieved March 2, 2020, from <https://bit.ly/2vx0VSo>

Banfield, R., Lombardo, C. T., & Wax, T. (2016). *Design sprint: A practical guidebook for building great digital products*. Sebastopol, CA: O'Reilly Media, Inc.

Scaled Agile Framework—SAFe 5.0

- Framework by Dean Leffingwell of Rally in 2007
- Newest version leaner, meaner, lighter, and simpler
- ☞ □ Lightweight enterprise framework for evolutionary design



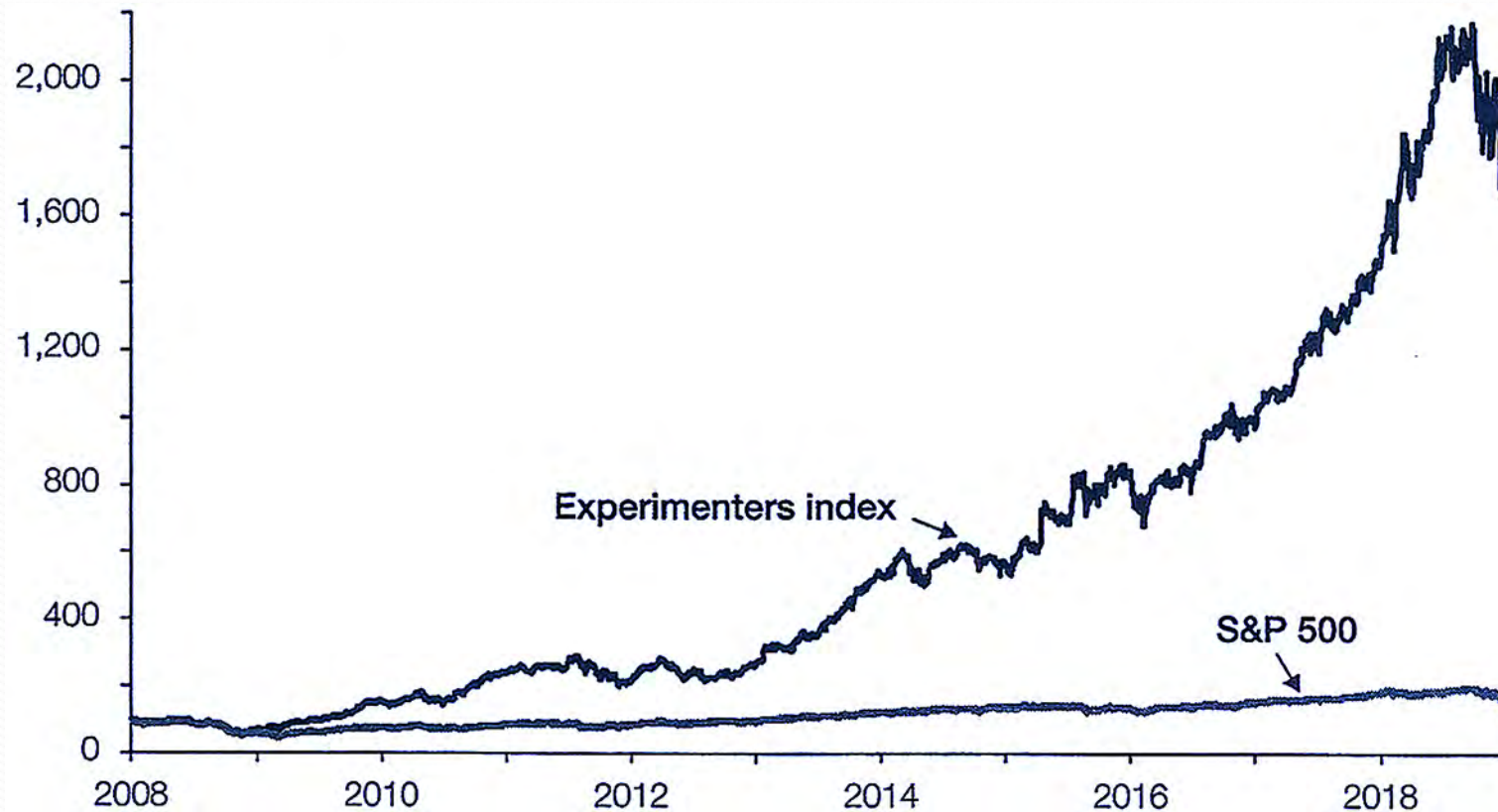
Evolutionary Design—Business Value

- Evolutionary design economics are emerging
- ROI ranges from \$17M to \$195M *with minor costs*
- ☞ □ Benefits from cost savings, revenue, and availability

Org	Low Perf	Med Perf	High Perf
Small - 250 -	\$23M Benefits	\$29M Benefits	\$17M Benefits
	\$0.2M Costs	\$0.2M Costs	\$0.2M Costs
	13,589% ROI	17,799% ROI	9,932% ROI
	<i>3 Day Payback</i>	<i>2 Day Payback</i>	<i>4 Day Payback</i>
Medium - 2,000 -	\$42M Benefits	\$66M Benefits	\$36M Benefits
	\$1.3M Costs	\$1.3M Costs	\$1.3M Costs
	3,101% ROI	4,901% ROI	2,663% ROI
	<i>11 Day Payback</i>	<i>7 Day Payback</i>	<i>13 Day Payback</i>
Large - 8,500 -	\$114M Benefits	\$195M Benefits	\$76M Benefits
	\$5.6M Costs	\$5.6M Costs	\$5.6M Costs
	1,942% ROI	3,375% ROI	1,254% ROI
	<i>18 Day Payback</i>	<i>11 Day Payback</i>	<i>27 Day Payback</i>

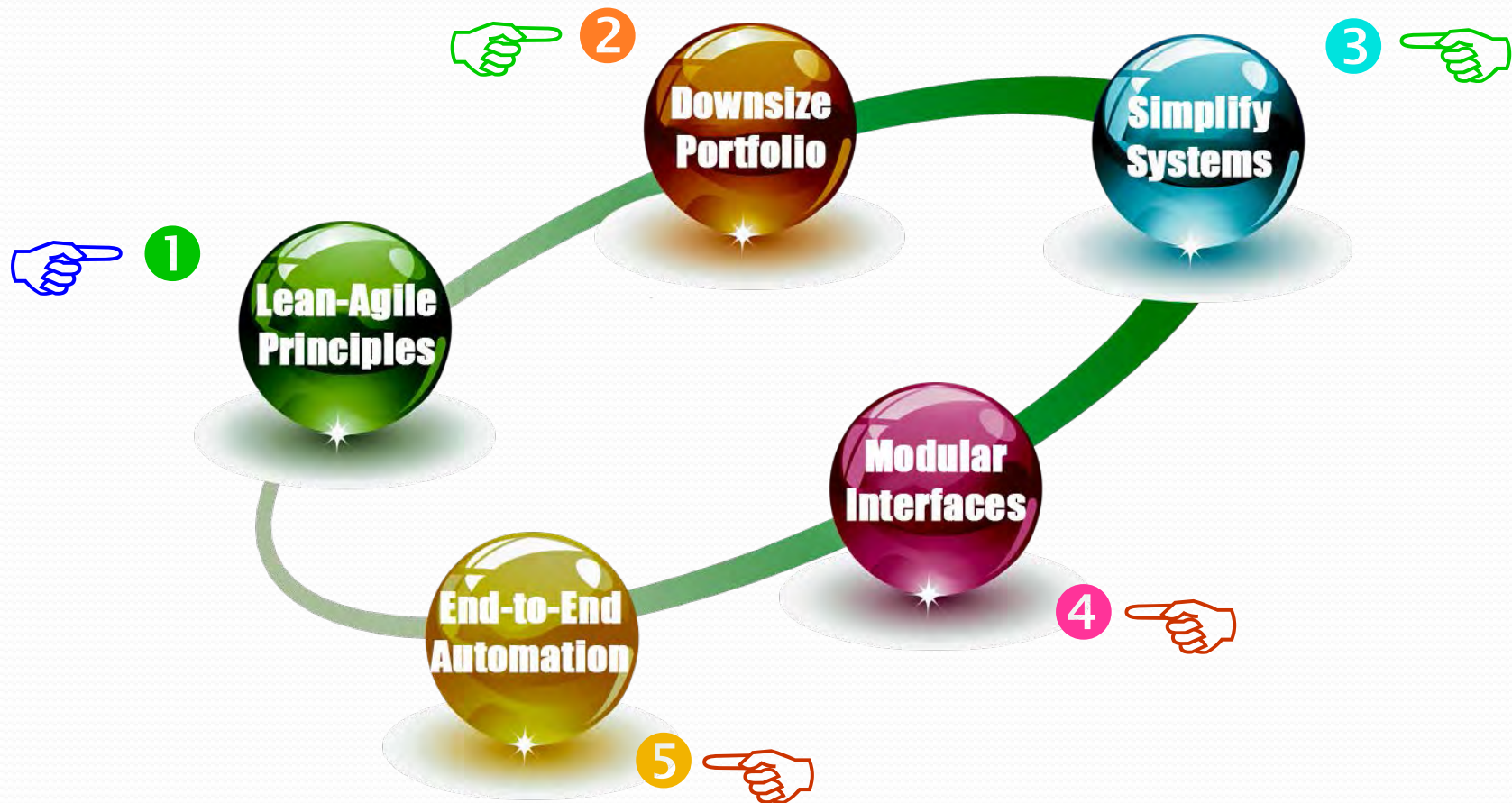
Evolutionary Design—Business Value

- Recent study of evolutionary design economics
- Results from firms like Amazon, Google, Apple, etc.
- ☞ □ Firms applying evolutionary design outperform others



Five Keys to Evolutionary Design

- Everything begins with lean thinking principles
- Next step is smaller portfolios & simpler designs
- Final step is modular interfaces & E2E automation



Evolutionary Design Summary

- Lean **DOES NOT** mean deliver it now and fixing it later
- Lightweight, yet disciplined approach to development
- Reduced cost, risk, & waste while improving quality

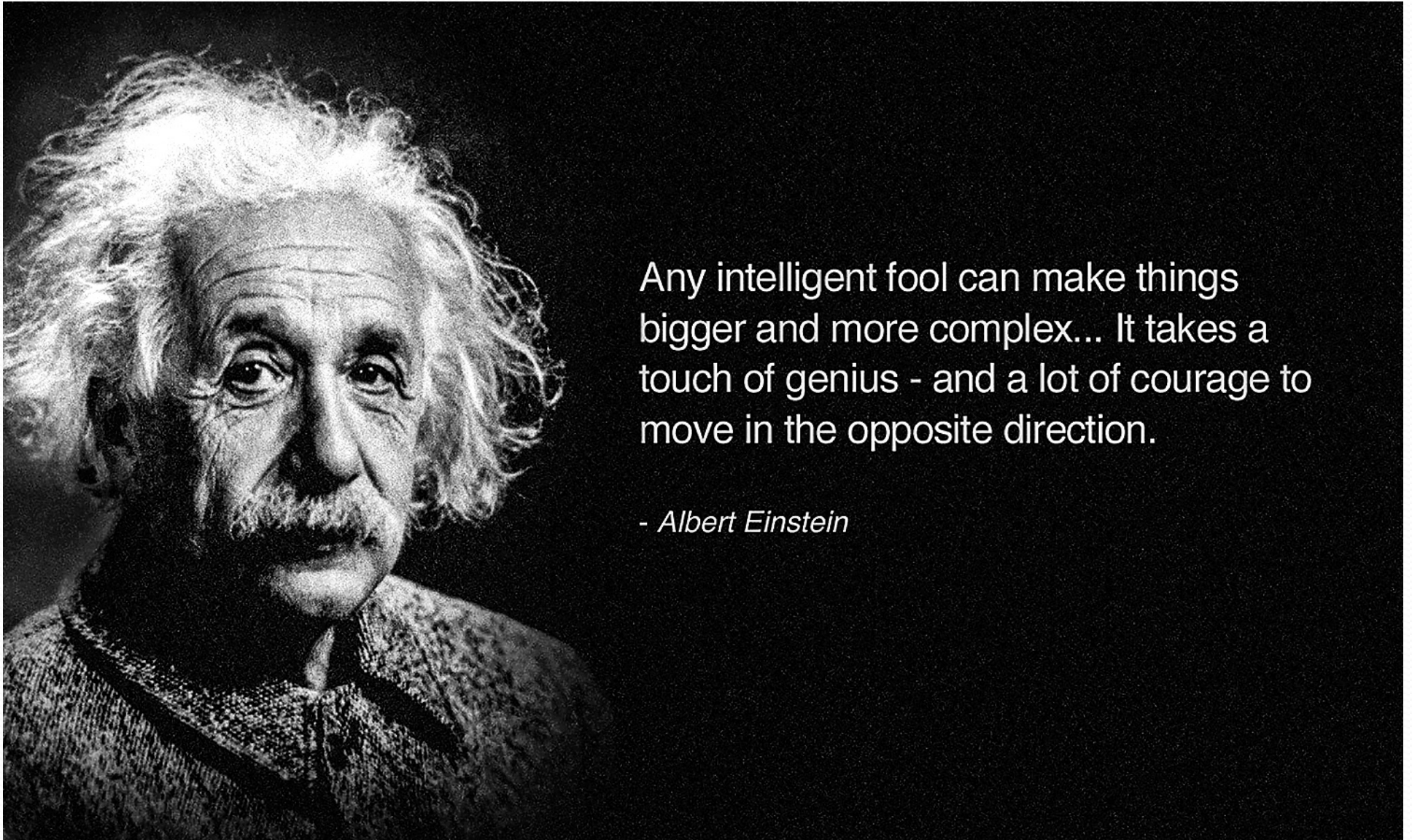
What	How	Result
Flexibility	Use lightweight, yet disciplined processes and artifacts	Low work-in-process
Customer	Involve customers early and often throughout development	Early feedback
Prioritize	Identify highest-priority, value-adding business needs	Focus resources
Descope	Descope complex programs by an order of magnitude	Simplify problem
Decompose	Divide the remaining scope into smaller batches	Manageable pieces
Iterate	Implement pieces one at a time over long periods of time	Diffuse risk
Leanness	Architect and design the system one iteration at a time	JIT waste-free design
Swarm	Implement each component in small cross-functional teams	Knowledge transfer
Collaborate	Use frequent informal communications as often as possible	Efficient data transfer
Test Early	Incrementally test each component as it is developed	Early verification
Test Often	Perform system-level regression testing every few minutes	Early validation
Adapt	Frequently identify optimal process and product solutions	Improve performance

Rico, D. F. (2012). *What's really happening in agile methods: Its principles revisited?* Retrieved June 6, 2012, from <http://davidfrico.com/agile-principles.pdf>

Rico, D. F. (2012). *The promises and pitfalls of agile methods.* Retrieved February 6, 2013 from, <http://davidfrico.com/agile-pros-cons.pdf>

Rico, D. F. (2012). *How do lean & agile intersect?* Retrieved February 6, 2013, from <http://davidfrico.com/agile-concept-model-3.pdf>

Evolutionary Design—A. Einstein

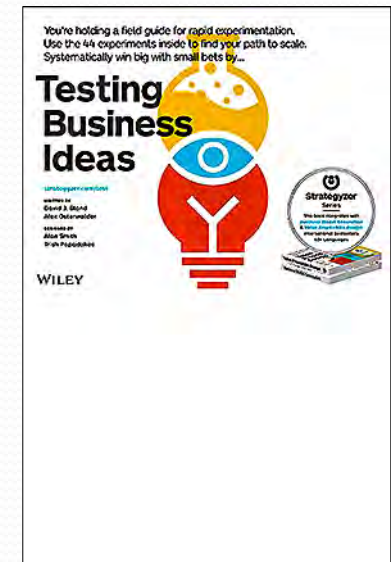
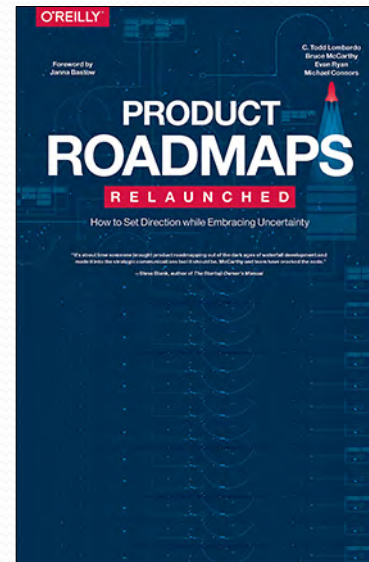
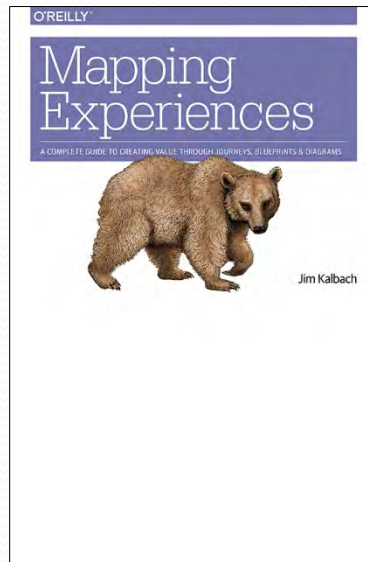
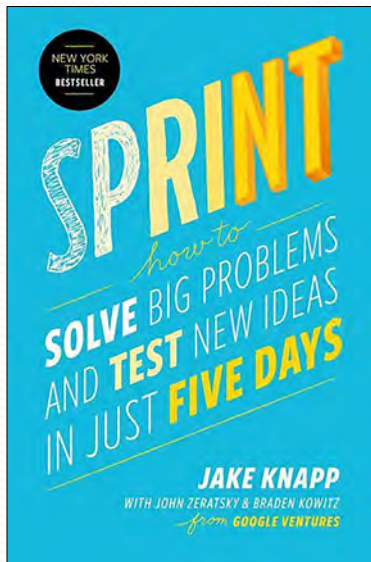


Any intelligent fool can make things bigger and more complex... It takes a touch of genius - and a lot of courage to move in the opposite direction.

- *Albert Einstein*

Evolutionary Design Resources

- Guides to lean-agile evolutionary design principles
- Illustrate key principles of just-in-time architectures
- ☞ □ Keys to apply lean-thinking to product development



EVOLUTIONARY DESIGN VIDEOS

- <http://davidfrico.com/lean-startup.htm>
- <http://davidfrico.com/design-sprints.htm>
- <http://davidfrico.com/evolutionary-architecture-resources.htm>

Knapp, J. (2016). *Sprint: Solve big problems and test new ideas in just five days*. New York, NY: Simon & Schuster.

Kalbach, J. (2016). *Mapping experiences: A complete guide to creating value through journeys, blueprints, and diagrams*. Sebastopol, CA: O'Reilly Media, Inc.

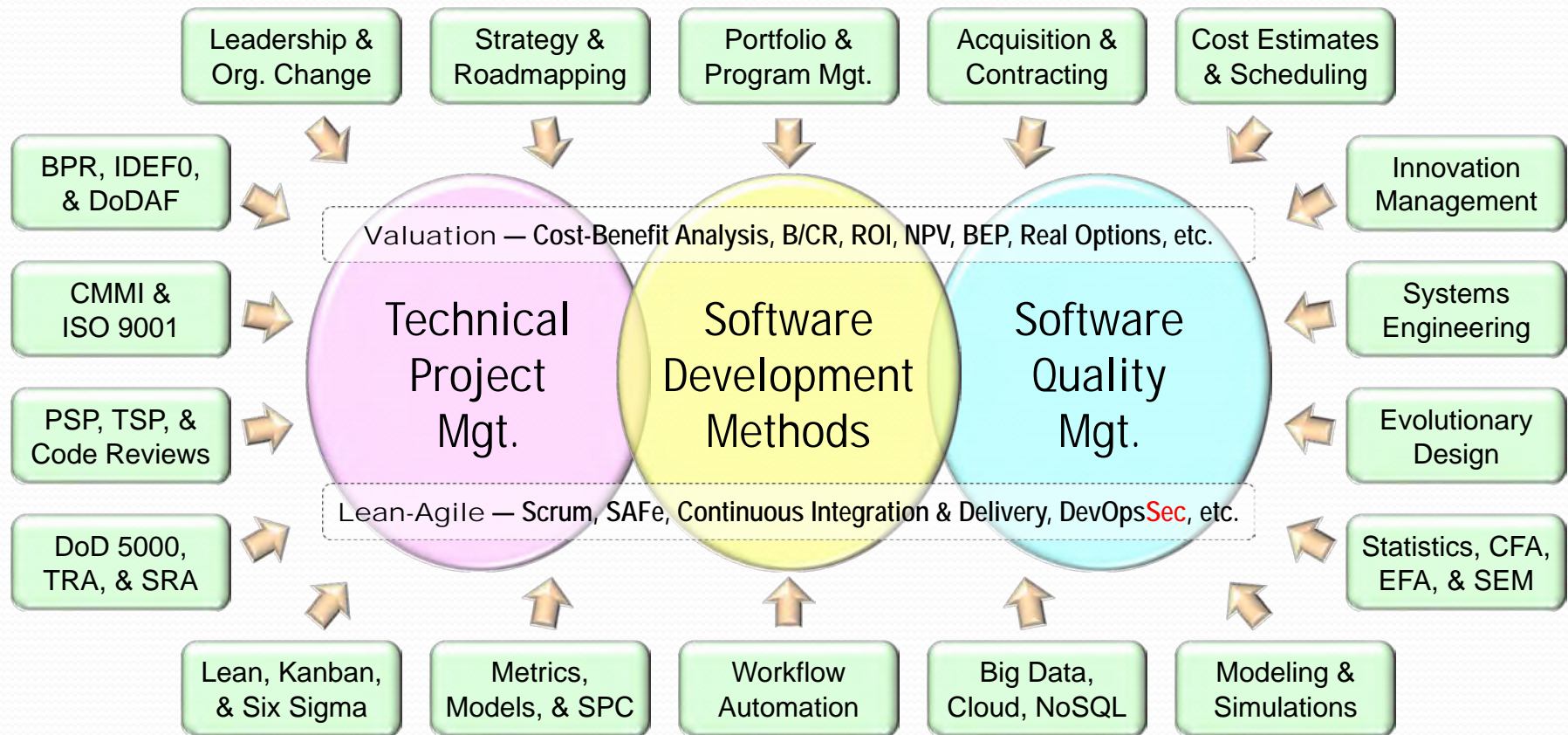
Lewrick, M., Link, P., & Leifer, L. (2018). *The design thinking playbook: Mindful digital transformation of teams, products, services, businesses, and ecosystems*. Hoboken, NJ: John Wiley & Sons.

Lombardo, C. T., McCarthy, B., Ryan, E., & Connors, M. (2018). *Product roadmaps relaunched: How to set direction while embracing uncertainty*. Sebastopol, CA: O'Reilly Media, Inc.

Bland, D. J., & Osterwalder, A. (2020). *Testing business ideas: Field guide for rapid experimentation using 44 experiments to find your path to scale*. Hoboken, NJ: John Wiley & Sons.

Rico, D. F. (2019). *Evolutionary architecture: 24 principles of emergent, organic, and highly-adaptive design*. Retrieved September 3, 2019, from <http://davidfrico.com/evolutionary-architecture-principles.pdf>

Dave's PROFESSIONAL CAPABILITIES



STRENGTHS – Lean & Agile Thinking • 360 Leadership Assessments • Executive & Agile Coaching • Enterprise Business Agility • Agile Acquisition Contracts • Scaled Agile Framework (SAFe) • DevOps + Security (DevOpsSec) • Cloud Computing/Amazon Web Svcs. • Portfolio, Program, & Project Mgt. • 5x5x5 Innovation & Marketing Sprints • Strategic Planning & Technology Roadmaps • Program Increment & Big Room Planning • Emergent & Evolutionary Microservices • Exploratory MVP, MVA, & MMF Experiments • Lean Startup Product-Focused Value Streams • Performance Metrics, Measures & Dashboards



- **Data mining.** Metrics, benchmarks, & performance.
- **Simplification.** Refactoring, refinement, & streamlining.
- **Assessments.** Audits, reviews, appraisals, & risk analysis.
- **Coaching.** Diagnosing, debugging, & restarting stalled projects.
- **Business cases.** Cost, benefit, & return-on-investment (ROI) analysis.
- **Communications.** Executive summaries, white papers, & lightning talks.
- **Strategy & tactics.** Program, project, task, & activity scoping, charters, & plans.

