

PROJECT TO  
PRODUCT  
MIK KERSTEN

*HOW TO  
SURVIVE AND  
THRIVE IN THE  
AGE OF DIGITAL  
DISRUPTION  
WITH THE FLOW  
FRAMEWORK*

FOREWORD BY  
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PROJECT TO PRODUCT

# CONTENTS

## FIGURES

### INTRODUCTION

- 0.1 Technological Revolutions and the Age of Software 7

### CHAPTER 1

- 1.1 The BMW Group Leipzig Plant Central Building 8
- 1.2 Software as Approximate Proportion of Car Cost 9
- 1.3 From Installation Period to Deployment Period 10

### CHAPTER 2

- 2.1 The BMW Group Leipzig Plant 12
- 2.2 The Three Ways of DevOps 13
- 2.3 Zone Management (Moore) 14
- 2.4 Functional Optimization vs. Business Outcomes 16
- 2.5 Bringing the People to the Work vs. Work to the People 17

### CHAPTER 3

- 3.1 Manufacturing Value Stream Map 18
- 3.2 The Flow Framework 19

### CHAPTER 4

- 4.1 Flow Metrics 22
- 4.2 Dashboard Showing Flow Distribution 23
- 4.3 Flow Distribution Timeline 24
- 4.4 Sample Flow Velocity Dashboard 25
- 4.5 Comparison of Lead Time, Flow Time, and Cycle Time 27
- 4.6 Flow Efficiency 28

### CHAPTER 5

- 5.1 Connecting Flow Metrics to Business Results 29
- 5.2 Sample Value Stream Dashboard 31

### CHAPTER 6

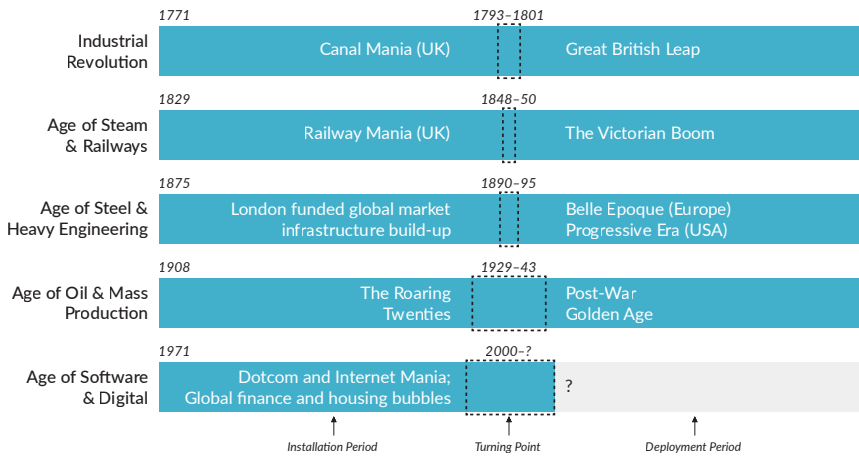
- 6.1 Recalls of Electronic Car Components in the United States 32
- 6.2 The Rise and Fall of Nokia 33

<b>CHAPTER 8</b>	
8.1 Agile and DevOps Tool Roles and Specialization	35
8.2 Fragmented Value Streams	37
8.3 Examples of Value Stream Integration Diagrams	38
<b>CHAPTER 9</b>	
9.1 More Like an Airline Network	40
9.2 Value Stream Network	41
9.3 The Tool Network	42
9.4 Integration Model Field Mapping	43
9.5 Integration Model Artifact Mapping	44
9.6 Sample Artifacts and Workflow States Corresponding to Activity Model	45
9.7 The Product Model	46
<b>TABLES</b>	
<b>CHAPTER 1</b>	
1.1 Technological Revolutions	11
<b>CHAPTER 2</b>	
2.1 Project-Oriented Management vs. Product-Oriented Management	15
<b>CHAPTER 3</b>	
3.1 Flow Items	20
<b>CHAPTER 4</b>	
4.1 Flow Metrics	25
<b>CHAPTER 5</b>	
5.1 Business Results Metrics	30
<b>CHAPTER 8</b>	
8.1 Dimensions of Scale	36
8.2 Types of Tools Used	39



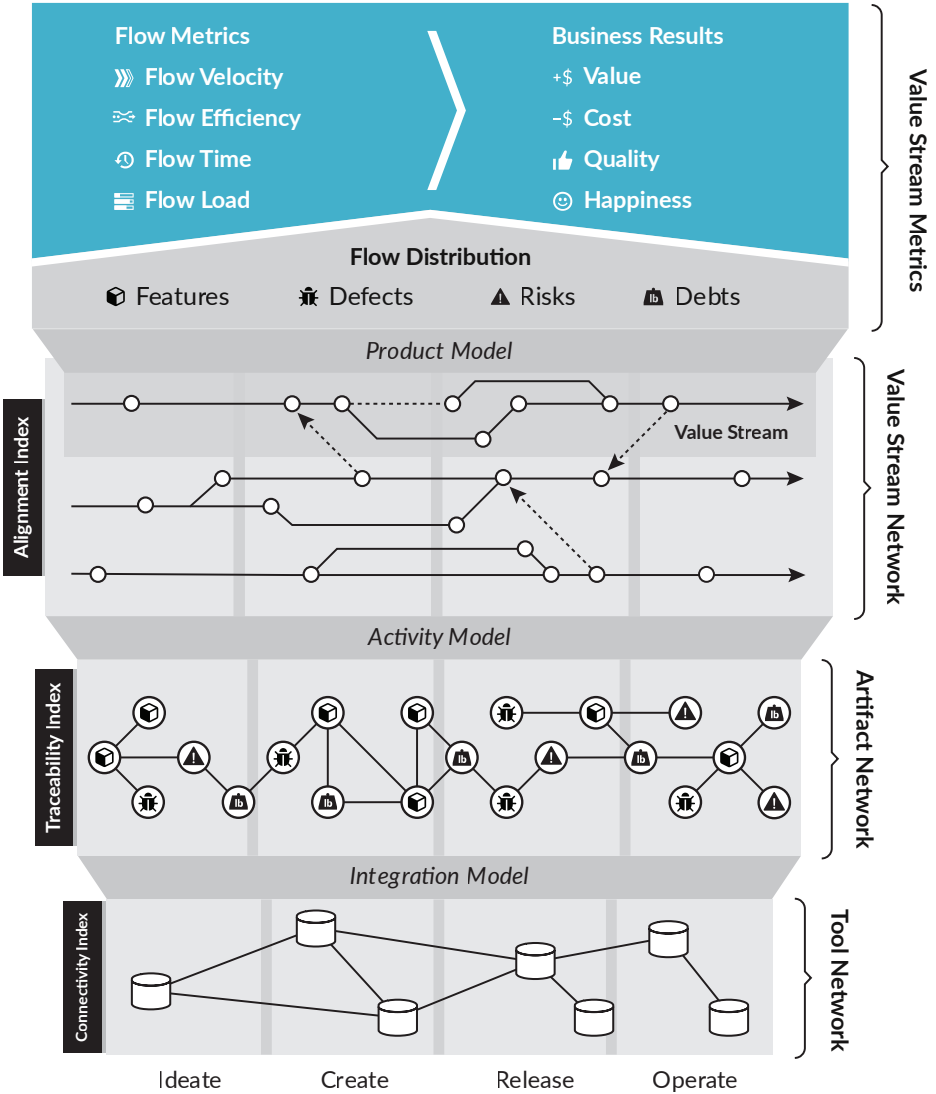
## **RESOURCES**

Flow Framework Quick Reference Guide	47
Glossary	49
Notes	56
Index	67
Acknowledgments	79
About the Author	84



**Figure 0.1: Technological Revolutions and the Age of Software.**

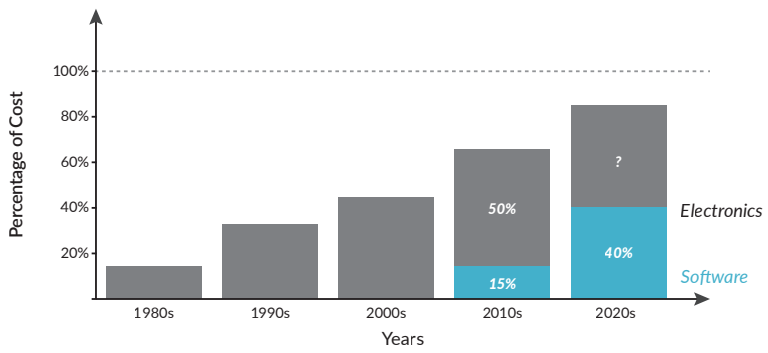
# Flow Framework™



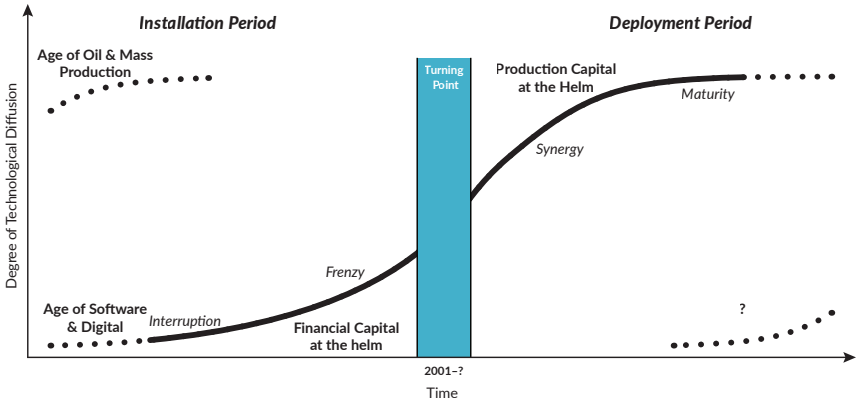
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*Figure 1.1: The BMW Group Leipzig Plant Central Building  
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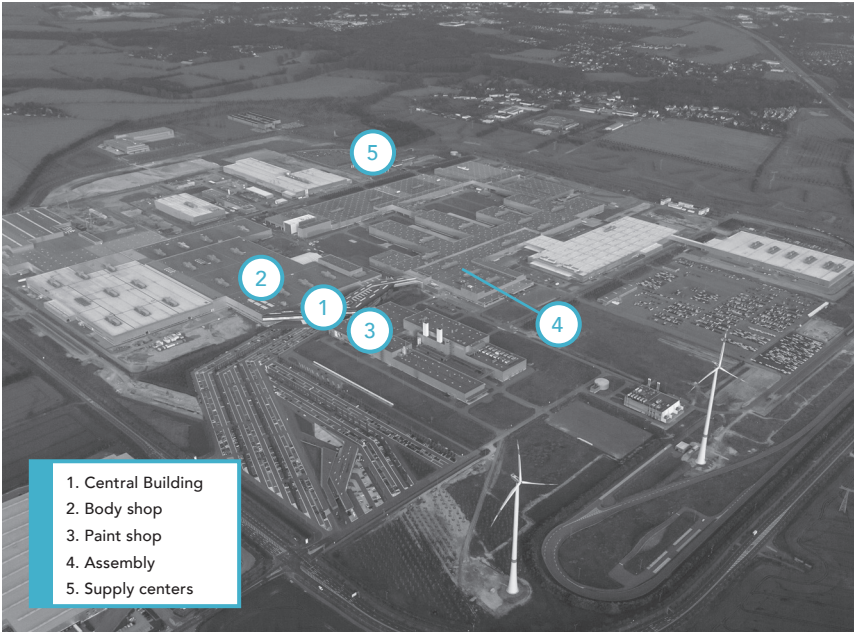
**Figure 1.2: Software as Approximate Proportion of Car Cost**



*Figure 1.3: From Installation Period to Deployment Period*

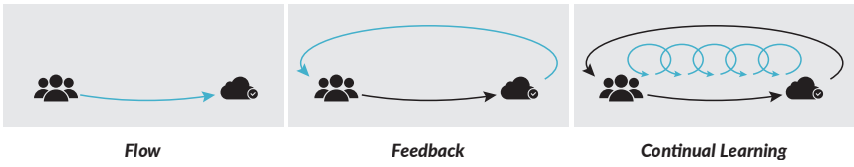
Installation-Deployment	Age	New Technological Systems	New Infrastructure	Triggering Innovations	Managerial Innovations
<b>1771-1829</b>	Industrial Revolution	Water-powered mechanization	Canals, turnpike roads, sailing ships	Arkwright's Cromford Mill (1771)	Factory Systems, entrepreneurship, partnerships
<b>1829-1873</b>	Age of Steam & Railways	Steam-powered mechanization and transport	Railways, telegraph, steam ships	Liverpool-Manchester Railway (1831)	Joint stock companies, subcontracting
<b>1875-1918</b>	Age of Steel and Heavy Engineering	Electrification of equipment and transport	Steel railways, steel ships, global telegraph	Carnegie's steel plant (1875)	Professional management systems, giant firms Taylorism
<b>1908-1974</b>	Age of Oil & Mass Production	Motorization of transport and economy	Radio, motorways, airports	Ford's Highland Park assembly line (1913)	Mass production and consumption, Fordism, Lean
<b>1971-?</b>	Age of Software & Digital	Digitization of the economy	Internet, software, cloud computing	Intel microprocessor (1971)	Networks, platforms, venture capital

*Table 1.1: Technological Revolutions*

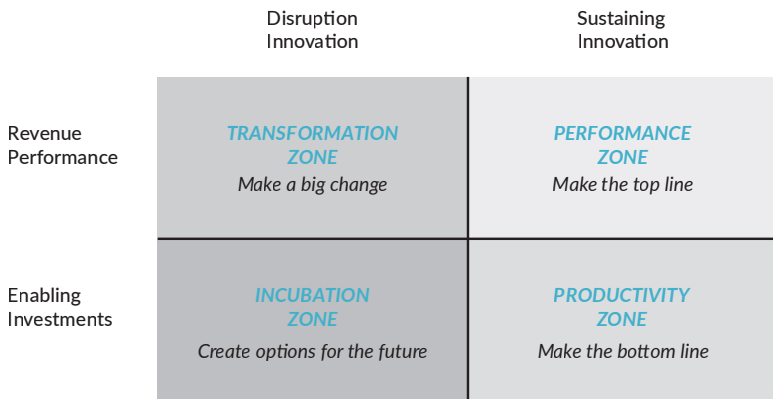


*Figure 2.1: The BMW Group Leipzig Plant  
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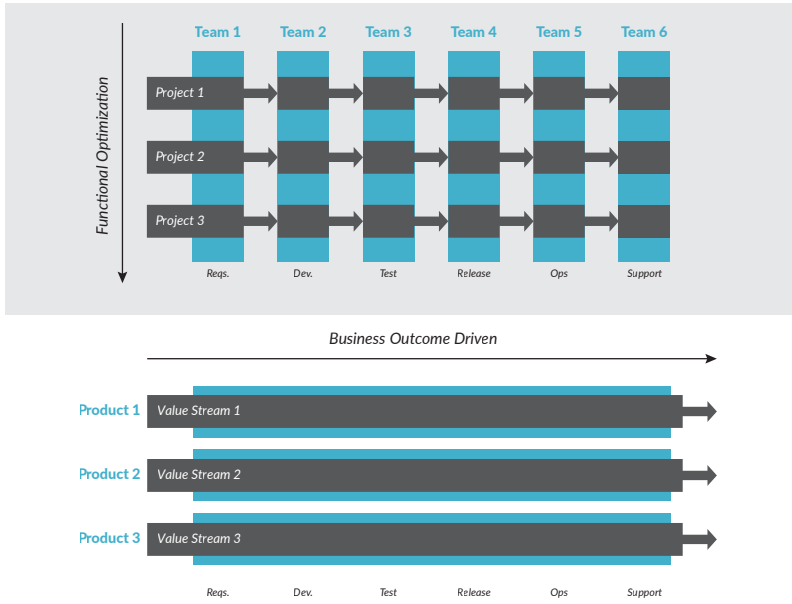
*Figure 2.2 : The Three Ways of DevOps*



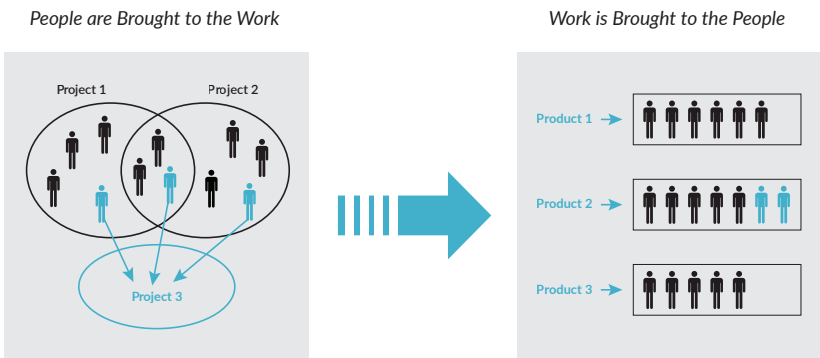
**Figure 2.3: Zone Management**

	Project-Oriented Management	Product-Oriented Management
Budgeting	Funding of milestones, pre-defined at project scoping. New budget requires creation of a new project.	Funding of product value streams based on business results. New budget allocation based on demand. Incentive to deliver incremental results.
Time Frames	Term of the project (e.g., one year). Defined end date. Not focused on the maintenance/health after the project ends.	Life cycle of the product (multiple years), includes ongoing health/maintenance activities through end of life.
Success	Cost center approach. Measured to being on time and on budget. Capitalization of development results in large projects. Business incentivised to ask for everything they might need up front.	Profit center approach. Measured in business objectives and outcomes met (e.g., revenue). Focus on incremental value delivery and regular checkpoint.
Risk	Delivery risks, such as product/market fit, is maximized by forcing all learning, specification, and strategic decision making to occur up front.	Risk is spread across the time frame and iterations of the project. This creates option value, such as terminating the project if delivery assumptions were incorrect or pivoting if strategic opportunities arise.
Teams	Bring people to the work: allocated up front, people often span multiple projects, frequent churn and re-assignment.	Bring work to the people: stable, incrementally adjusted, cross-functional teams assigned to one value stream.
Prioritization	PPM and project plan driven. Focus on requirements delivery. Projects drive waterfall orientation.	Roadmap and hypothesis testing driven. Focus on feature and business value delivery. Products drive Agile orientation.
Visibility	IT is a black box. PMOs create complex mapping and obscurity.	Direct mapping to business outcomes, enabling transparency.

*Table 2.1: Project-Oriented Management vs. Product-Oriented Management*



**Figure 2.4: Functional Optimization vs. Business Outcomes**



*Figure 2.5: Bringing the People to the Work vs. Work to the People*

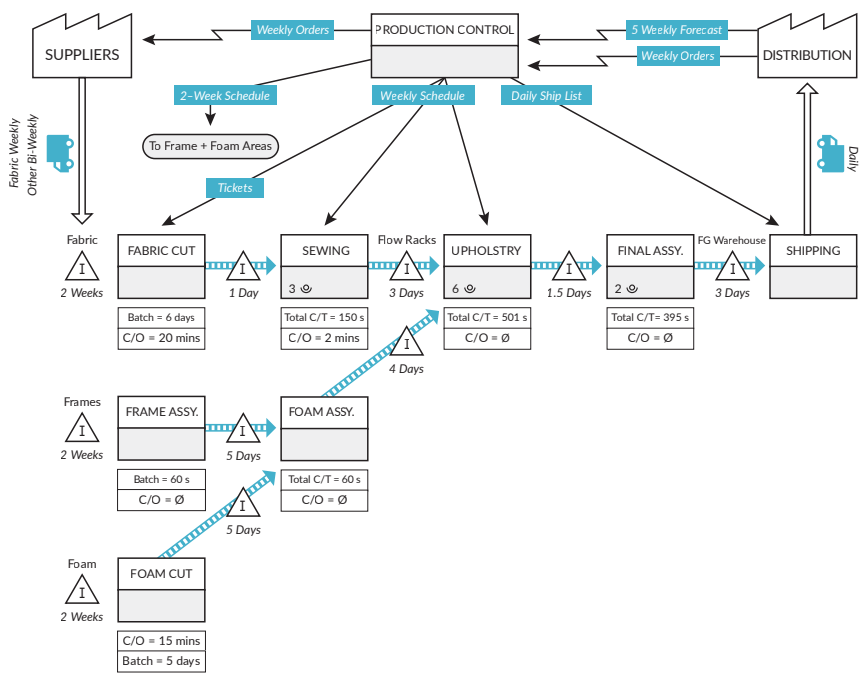
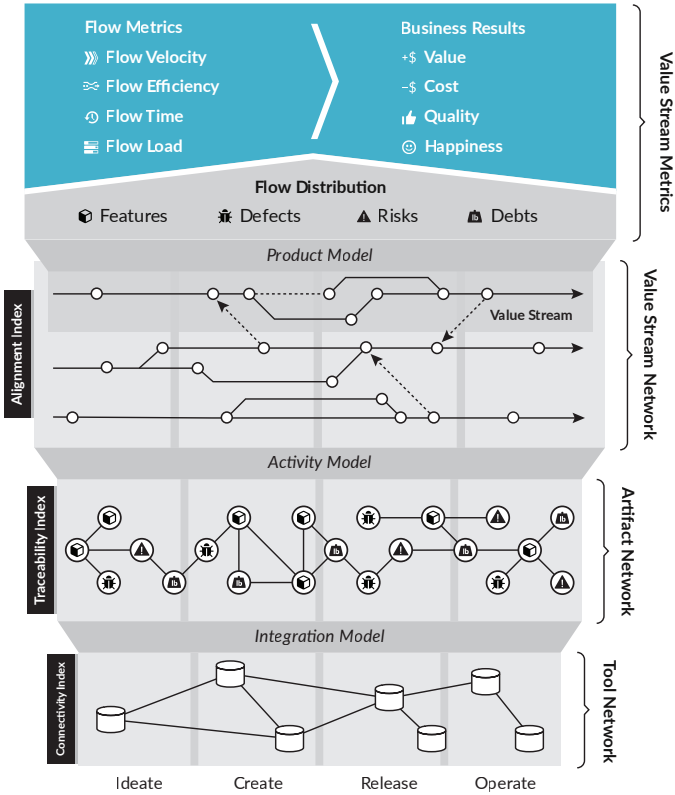


Figure 3.1: Manufacturing Value Stream Map

# Flow Framework™



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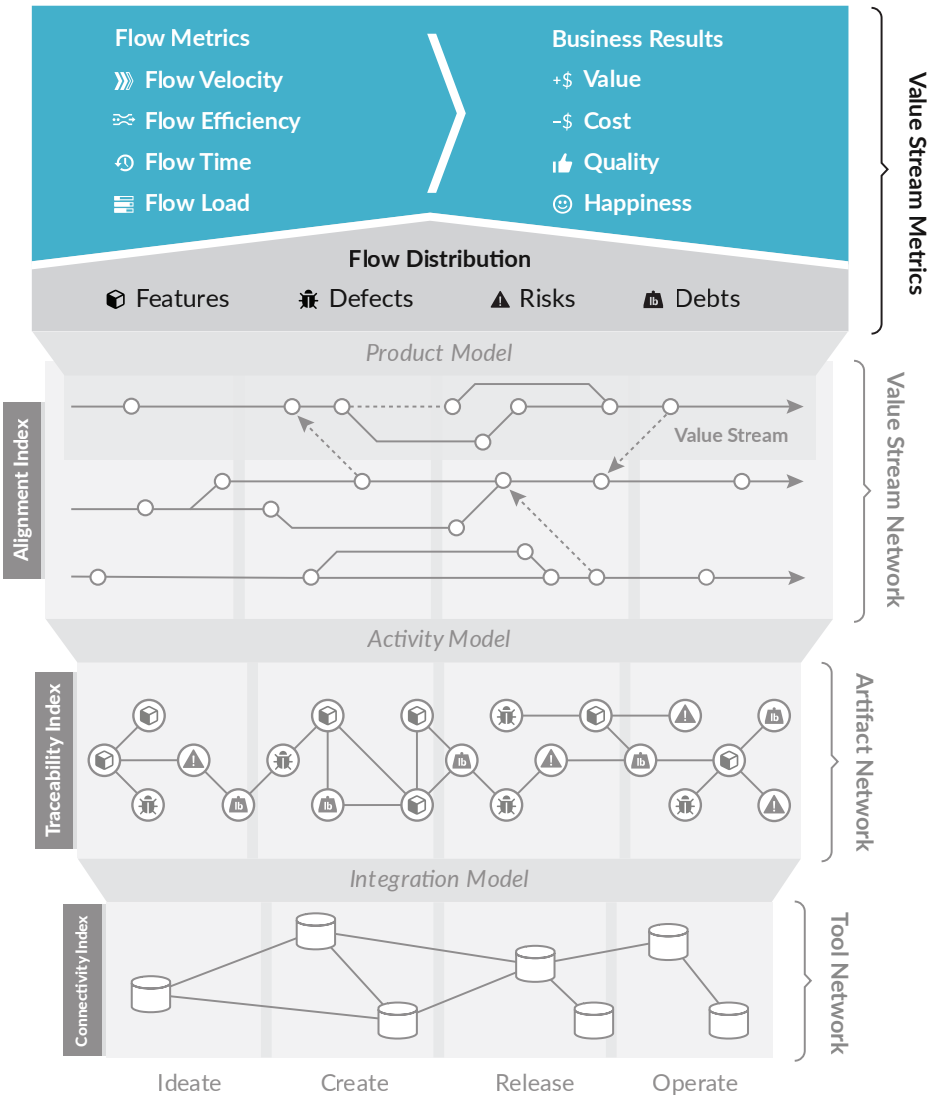
Figure 3.2: The Flow Framework

Flow Items	Delivers	Pulled By	Description	Example artifacts
<b>Features</b>	New business value	Customers	New value added to drive a business result; visible to the customer	Epic, user story, requirement
<b>Defects</b>	Quality	Customers	Fixes for quality problems that affect the customer experience	Bug, problem, incident, change
<b>Risks</b>	Security, governance, compliance	Security and risk officers	Work to address security, privacy, and compliance exposures	Vulnerability, regulatory requirement
<b>Debts</b>	Removal of impediments to future delivery	Architects	Improvement of the software architecture and operational architecture	API addition, refactoring, infrastructure automation

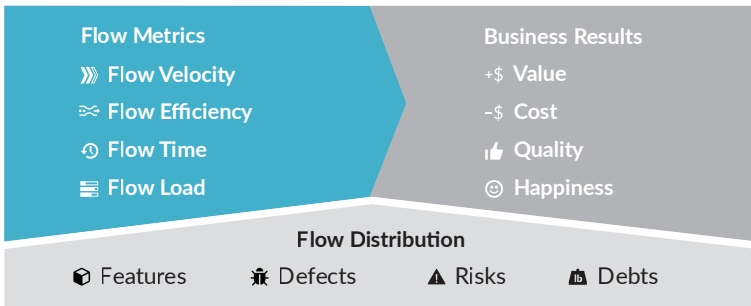
*Table 3.1: Flow Items*



# Flow Framework™

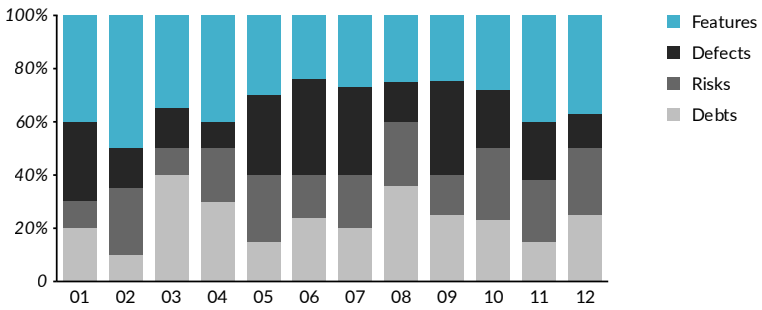


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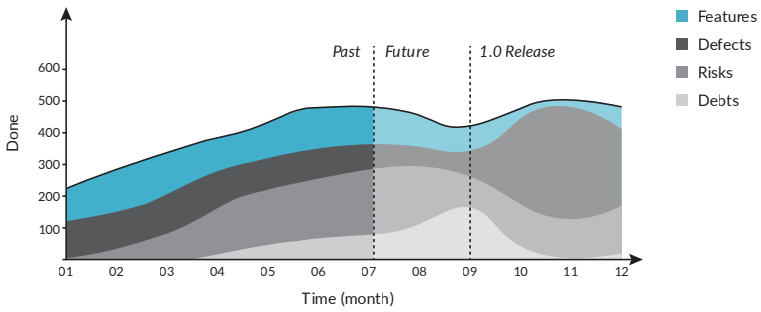
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**Figure 4.1: Flow Metrics**



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**Figure 4.2: Dashboard Showing Flow Distribution**



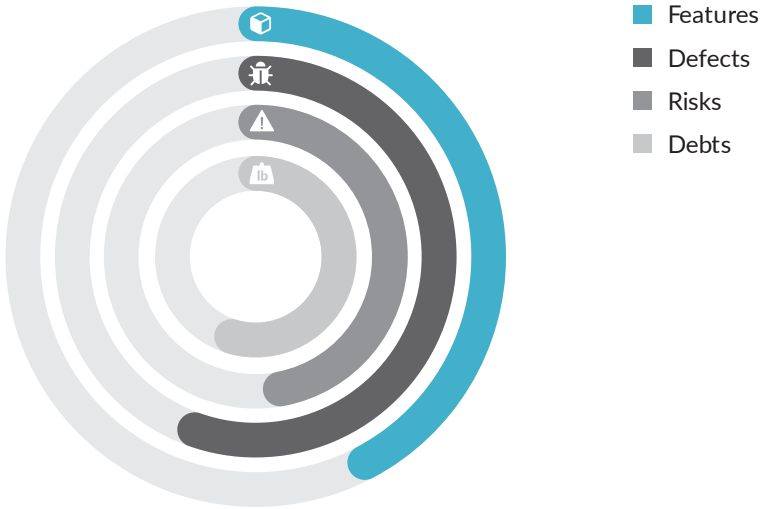
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**Figure 4.3: Flow Distribution Timeline**

Flow Metric	Description	Example
<b>Flow Distribution</b>	Mutually Exclusive and Comprehensively Exhaustive (MECE) allocation of flow items in a particular flow state across a measure of time.	Proportion of each flow unit actively being worked on in a particular sprint.
<b>Flow Velocity</b>	Number of flow items done in a given time.	Debts resolved for a particular release.
<b>Flow Time</b>	Time elapsed from when a flow item enters the value stream (flow state = active) to when it is released to the customer (flow state = done).	Time it takes to deliver a new feature to a customer from when the feature is accepted.
<b>Flow Load</b>	Number of flow items with flow state as active or waiting, (i.e., work in progress [WIP]).	Flow load that exceeds a certain threshold adversely impacts flow velocity.
<b>Flow Efficiency</b>	The proportion of time flow items are actively worked on to the total time elapsed.	Flow efficiency decreases when dependencies cause teams to wait on others.

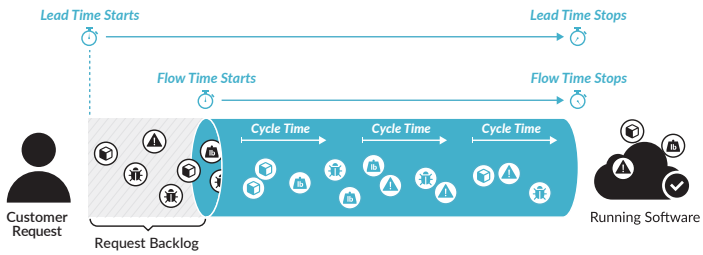
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**Table 4.1: Flow Metrics**



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**Figure 4.4:** *Sample Flow Velocity Dashboard*



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**Figure 4.5: Comparison of Lead Time, Flow Time, and Cycle Time**

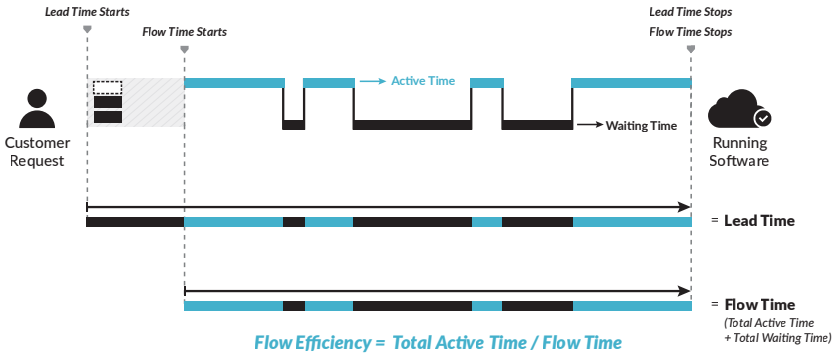
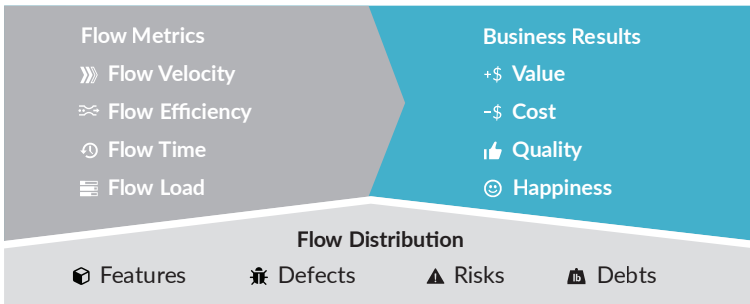


Figure 4.6: Flow Efficiency





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**Figure 5.1: Connecting Flow Metrics to Business Results**

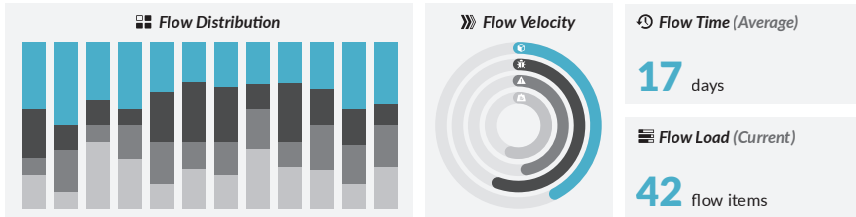
Business Result	Measures	Examples
<b>Value</b>	Benefit to the business produced by the value stream.	Revenue, monthly recurring revenue, annual contract value, monthly active users.
<b>Cost</b>	Cost of the value stream to the business.	Cost of all staff, operations, and infrastructure supporting the value stream. FTEs assigned to the value stream.
<b>Quality</b>	Quality of the product produced by the value stream as perceived by a customer.	Escaped defects, tickets filed, renewal rate, expansion rate, Net Promoter Score (NPS).
<b>Happiness</b>	Engagement of the staff working on the value stream.	Employee Net Promoter Score (eNPS), employee engagement.

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**Table 5.1: Business Results Metrics**

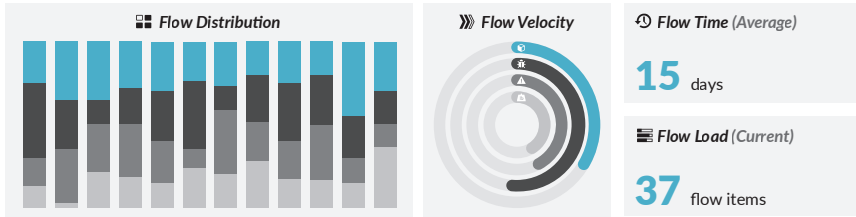
### Hub

External Customer: Fortune 500 (GA)



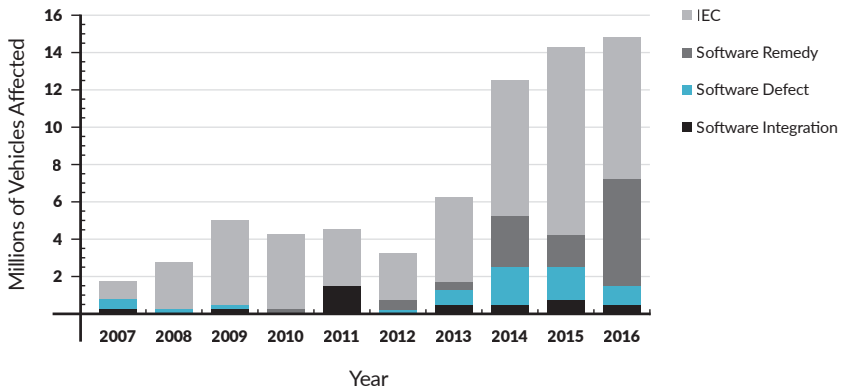
### Integrations

Internal Customer: Hub, Sync, Dev



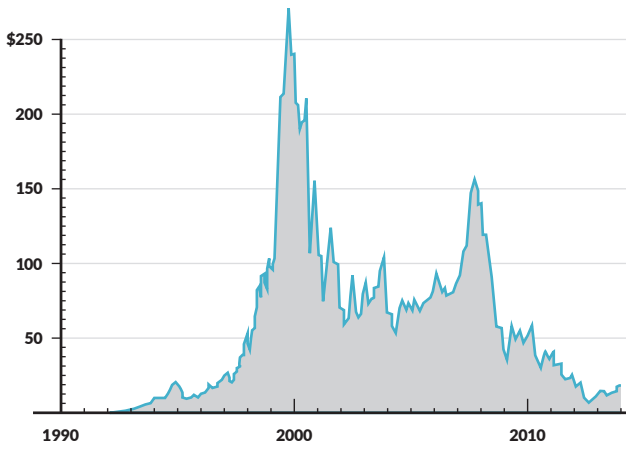
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Figure 5.2: Sample Value Stream Dashboard



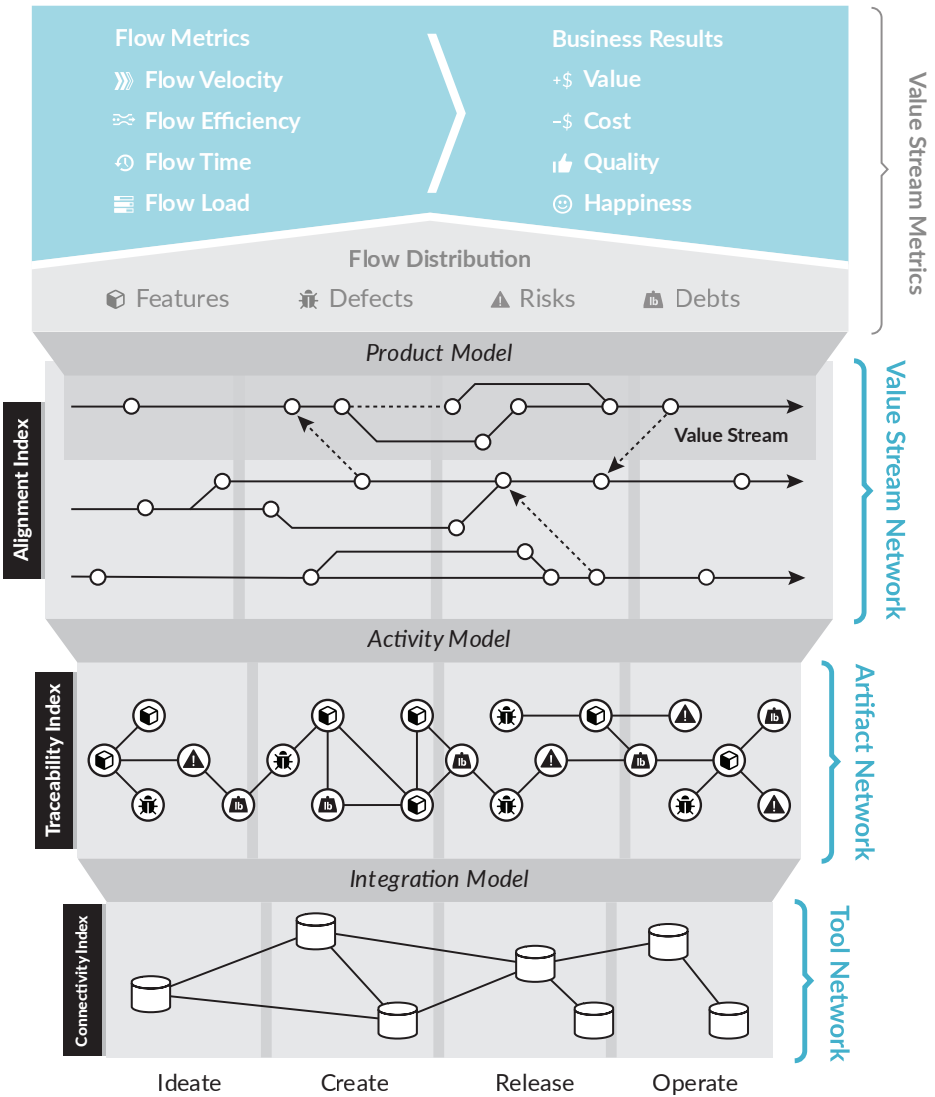
**Figure 6.1: Recalls of Electronic Car Components in the United States<sup>3</sup>**

Contains data for BMW, Daimler AG, FCA, Ford, General Motors, Honda, Hyundai, Kia Toyota, Volkswagen, and Volvo. Identified from data set updated through 2016. Excludes Takata Inflator recall campaigns.

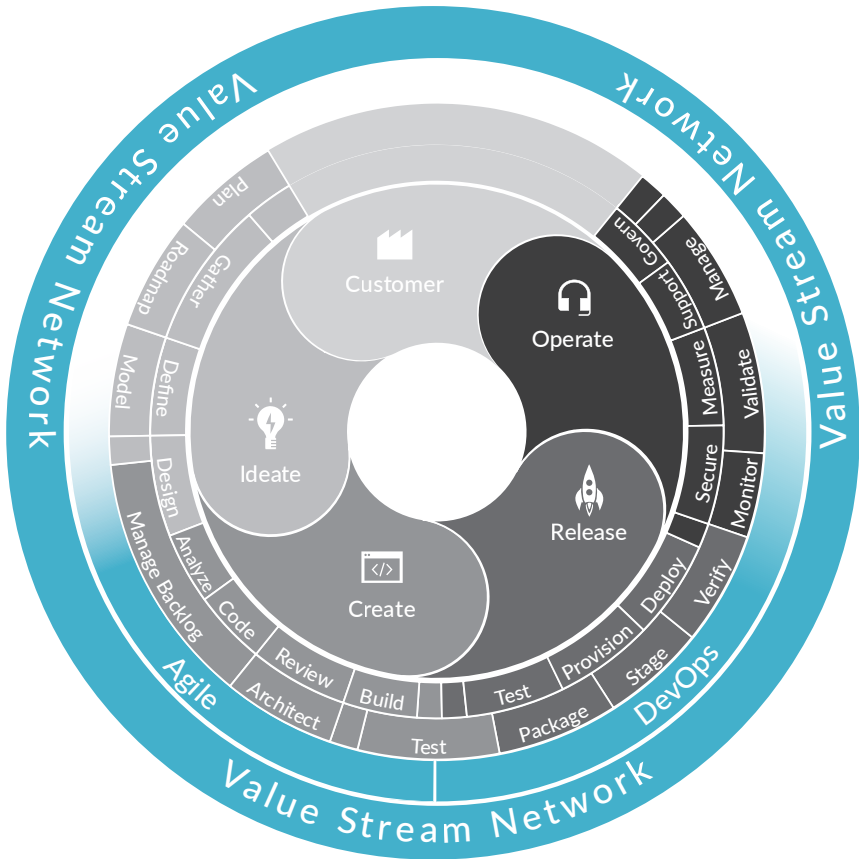


*Figure 6.2: The Rise and Fall of Nokia*

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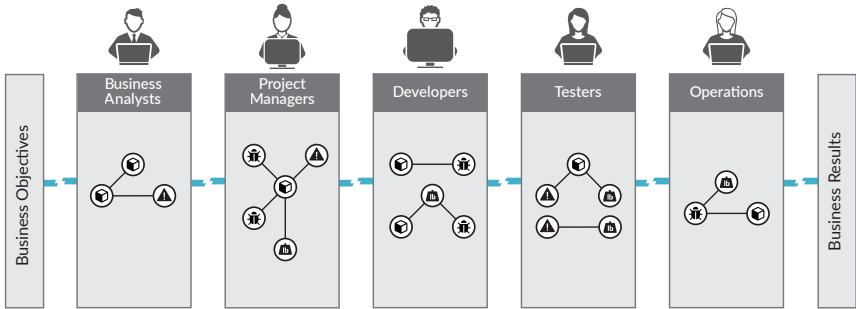
**Figure 8.1: Agile and DevOps Tool Roles and Specialization**

Dimension	Description	Example
<b>Features</b>	The more demanding the application domain, the more complex the feature set and the larger the number of specialists and specialized tools there may need to be.	A car infotainment system is fundamentally more complex in terms of features than an entire streaming service UI such as Netflix, as it contains both media playback and car functions.
<b>Products</b>	The number of products an organization needs to support, both internal and external.	Startups may have a small number of external products and no internal products. A large IT organization may have hundreds or thousands of each.
<b>Partners</b>	The more business partners exist, whether within lines of business or external, the more complex the resulting set of value streams.	Partners may require use of their own specialists or tools, and those need to be connected to the overall delivery process.
<b>Markets</b>	Each market or market segment can require a new edition or configuration of the software, increasing complexity.	If an organization sells both business-to-consumer and business-to-business, it may need two separate support channels connected to multiple value streams.
<b>Platforms</b>	Development and cloud platforms tend to be tightly coupled to delivery tools and require or encourage use of those tools.	Choosing Microsoft Azure as a hosting platform adds the corresponding tools to the tool chain, as the Java ecosystem tools tend not to be tailored for Azure.

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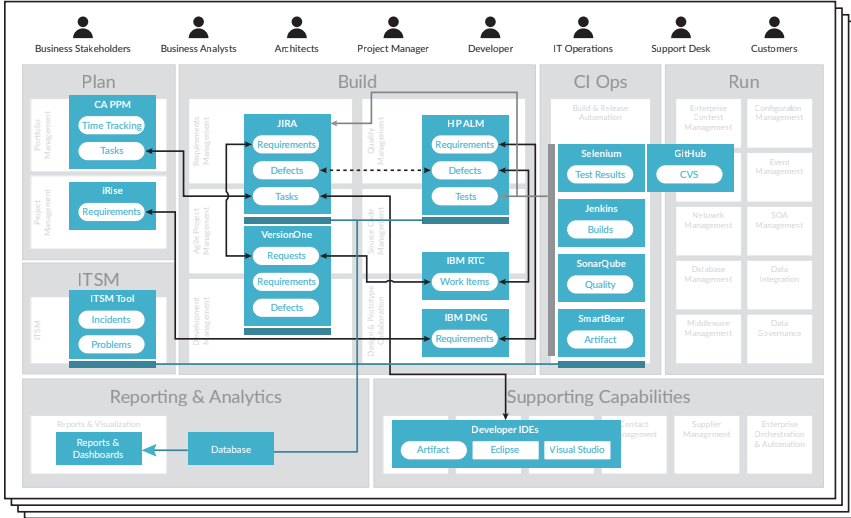
**Table 8.1: Dimensions of Scale**





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**Figure 8.2: Fragmented Value Streams**

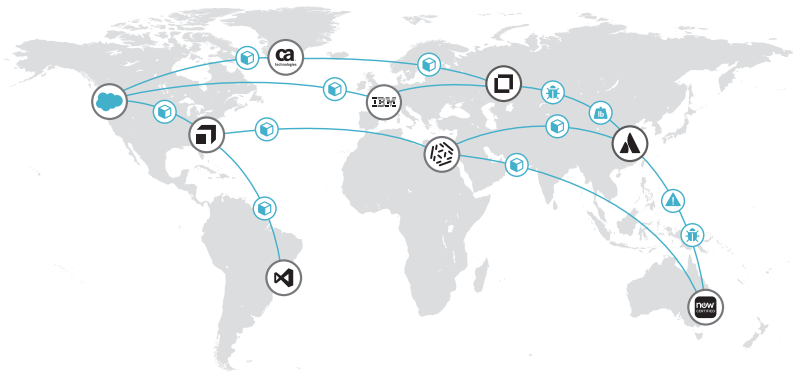


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Figure 8.3: Value Stream Integration Diagrams

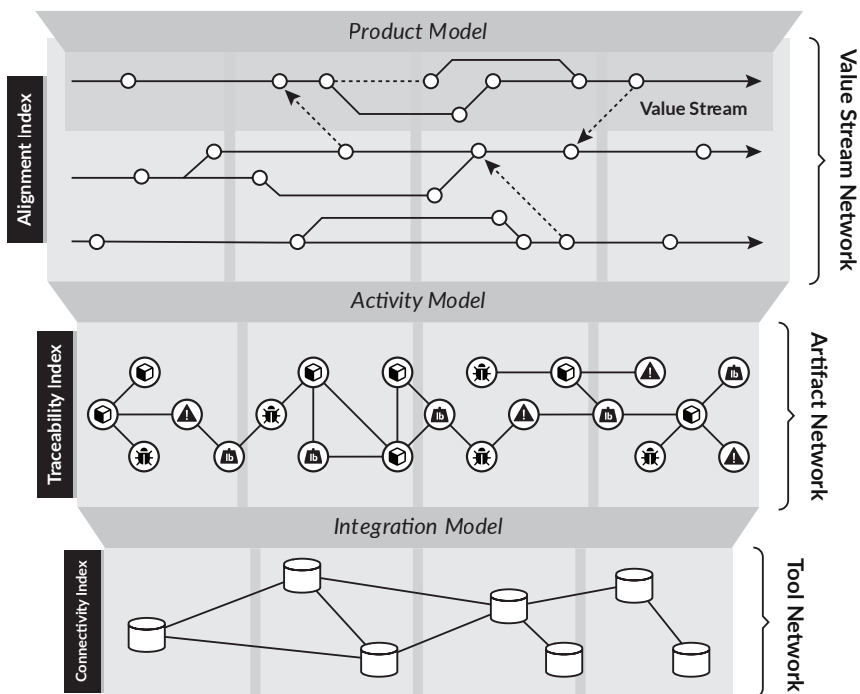
Type of Tool	Tool Usages Reported
Agile Planning	194
Application life cycle management	259
Change or workflow management	9
Content management	9
Enterprise modeling	1
Issue tracker	8
IT service management	133
Project portfolio management	77
Requirements management	79
Sales	1
Security	2
Test management	28

*Table 8.2: Types of Tools Used*



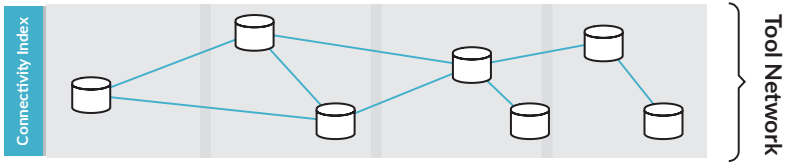
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**Figure 9.1: More Like an Airline Network**



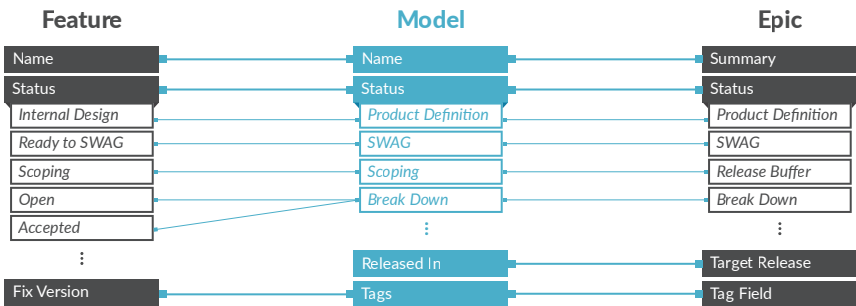
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Figure 9.2: Value Stream Network



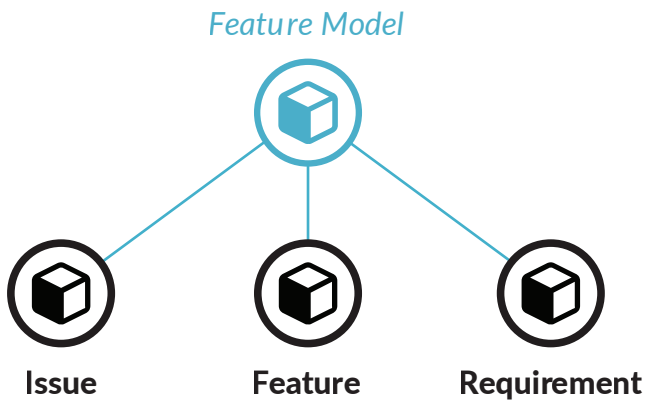
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**Figure 9.3: The Tool Network**



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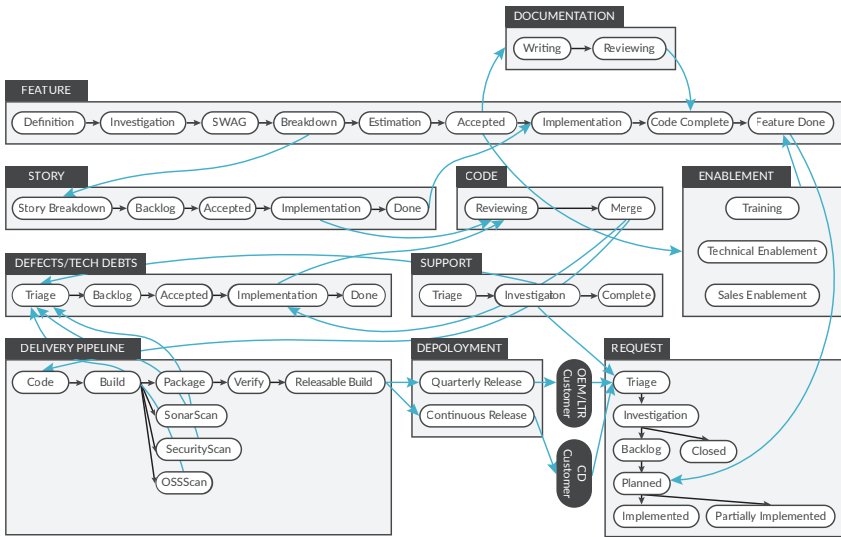
**Figure 9.4: Integration Model Field Mapping**



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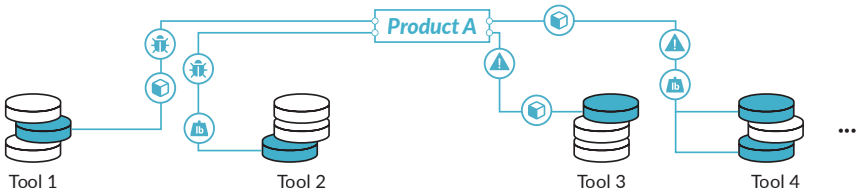
***Figure 9.5: Integration Model Artifact Mapping***





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**Figure 9.6: Sample Artifacts and Workflow States Corresponding to Activity Mode**

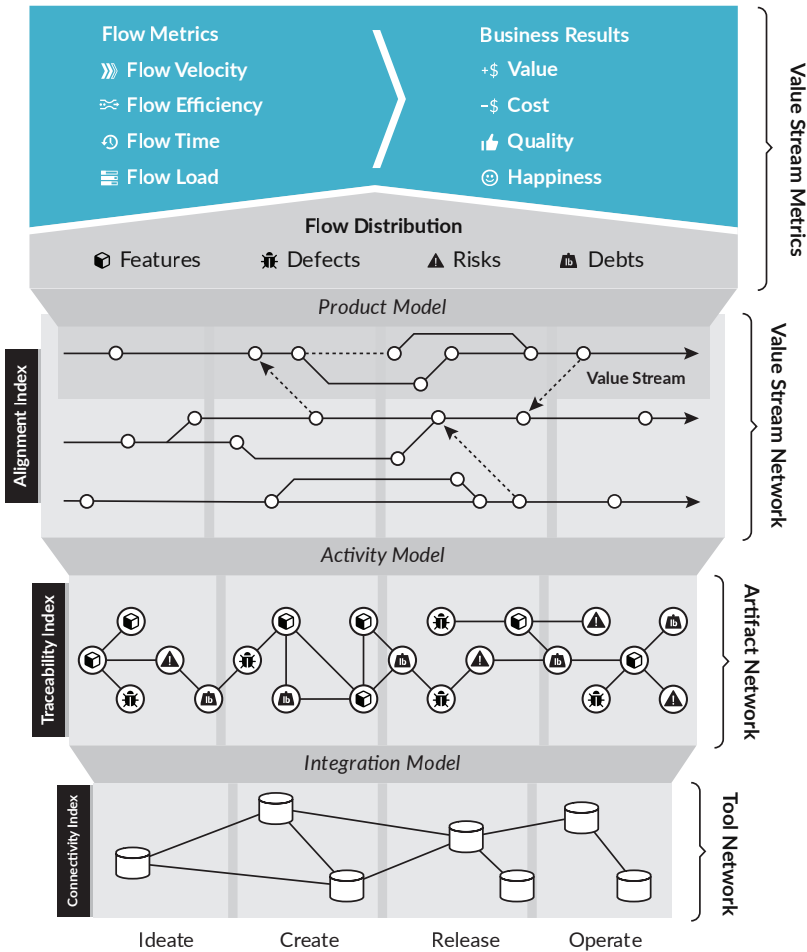


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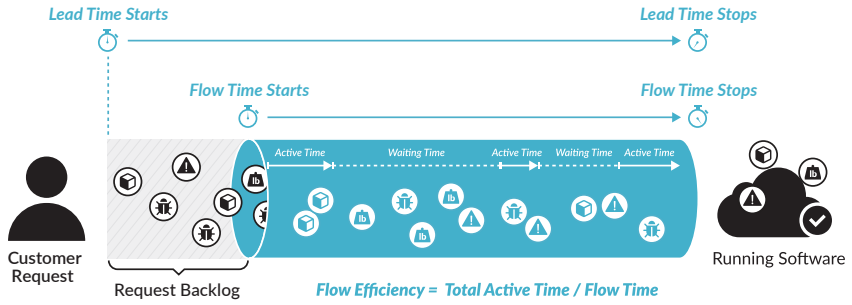
**Figure 9.7: The Product Model**

# QUICK REFERENCE FIGURES

## Flow Framework™



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Comparison of Lead Time, Flow Time, and Cycle Time

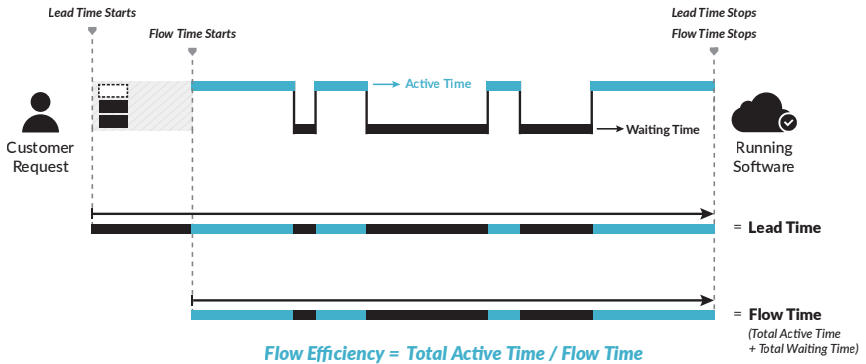
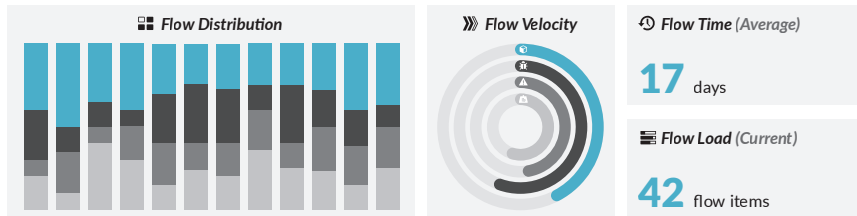


Illustration of Flow Efficiency

### Hub

External Customer: Fortune 500 (GA)



Sample Flow Metrics Dashboard

# GLOSSARY

**Activity Model:** identifies each of the specific activities performed in the value stream and maps those to the concrete workflow states defined by the Integration Model. In addition, it maps these activities to the four flow states, enabling a consistent way of measuring flow across all artifacts.

**Age of Mass Production:** the technological revolution which occurred between 1908 and 1974 and was marked by advances in the mass production of goods, motorization of transport, oil, gas, synthetic materials, motorways, airports, and airlines.

**Age of Software:** the current technological revolution, which began in 1971, and is marked by advances in microprocessors, telecommunication, the internet, and software.

**Agile:** Agile software development is a group of methodologies based on iterative development, where requirements and solutions evolve through the collaboration of self-organizing, cross-functional teams and their customers and end users.

**alignment index:** the ratio of artifact containers connected to a product value stream relative to all artifact containers across the tool network; this determines the portion of the delivery organization that is aligned to products versus projects.

**artifact:** a unit of work or delivery defined by one or more tools in the tool network. Artifacts have different types, such as work item, user story, test, or release, which are defined by the artifact schemas in the

tools. These types can be instantiated; for example, ten specific user stories can be created for a particular release. Artifacts can be mapped to the more abstract flow units using the integration model.

**artifact network:** the full network of instantiated artifacts that span the Value Stream Network. The network is connected through artifact relationships, e.g., a requirement may be related to multiple user stories, change sets, and releases.

**Business Model disruption:** the most profound of Geoffrey Moore's three types of disruption, and one that an established business typically cannot recover from.

**connectivity index:** the ratio of tool repositories and artifact containers in the tool network that have been integrated to those that have not. The lower the Connectivity Index, the less meaningful the flow metrics are, as the metrics are based on end-to-end flow. For example, flow time cannot be measured without connectivity between the customer request system through to deployment system.

**cost center:** a department or other unit within an organization to which costs may be charged for accounting purposes; for example, a human resources department. Unlike a profit center, cost centers only contribute to a company's profitability indirectly.

**Creative Destruction:** the process of industrial mutation, associated with Joseph Schumpeter, that revolutionizes the economy through new innovations and new businesses disrupting and displacing established ones.

**Cynefin framework:** provides a taxonomy of decision-making contexts, including *obvious*, *complicated*, *complex*, and *chaotic*.

**Deployment Period:** the period in a technological revolution, following the Installation Period and the Turning Point, where companies that master the means of production earn increasingly larger portions of the economy and the new infrastructure.

**digital disruption:** the process of established businesses being negatively affected by software-centric companies who displace the

entrenched business models with digital offerings. For example, film photography companies like Kodak are being disrupted by digital photography, including via mobile devices.

**Extreme Programming:** an early flavor of Agile software development that advocates frequent releases in short development cycles.

**feature team:** a long-lived, cross-functional team that completes end-to-end customer features one by one; core part of the LeSS framework.

**First Way of DevOps:** flow, as presented in *The DevOps Handbook*.

**flow distribution:** the proportion of each flow item type within a value stream. The proportion is tracked and adjusted depending on the needs of each product value stream to maximize the business value delivered through that value stream.

**flow efficiency:** the proportion of time flow items actively worked on to the total time elapsed. This can be used to identify inefficiencies such as overly long wait time for particular flow items.

**Flow Framework:** a framework for managing software delivery that is focused on measuring and optimizing the flow of business value through product-oriented software value streams that are correlated to business results.

**flow item:** a unit of business value pulled by a stakeholder through a product's value stream. The four flow items are features, defects, risks and debts.

**flow load:** number of flow items in a value stream with the flow state of active or waiting. This is analogous to a flow item-based measure of work in progress (WIP) in the value stream. Overly high flow load tends to result in inefficiencies and lead to reduced flow velocity or increased flow time.

**flow states:** the generic workflow state of a flow item in the value stream. The four flow states are: new, waiting, active, and done. These states are mapped from the concrete workflow states used by a tool, such as "Completed" or "Waiting for Review," using the Activity Model.

**flow time:** time elapsed from when a flow item enters the value stream (flow state = active) to when it is released to the customer (flow state = done). This corresponds to the total time from when the flow item enters the value stream (i.e., work was started) to when it is completed (i.e., deployed to the customer or end user).

**flow velocity:** number of flow items completed (i.e., flow state = done) in a given time period.

**Incubation Zone:** one of Geoffrey Moore's four investment zones where fast growing products and offerings can be incubated prior to producing a material amount of revenue.

**Infrastructure Model disruption:** involves changes to how customers access a given product or offering. The least disruptive of Geoffrey Moore's three types of disruption and the easiest to adapt an existing business to.

**Installation Period:** the beginning of a new technological revolution. Marked by large amounts of financial capital, such as venture capital, being deployed to leverage the new technological system that has formed a critical mass of technology, companies, and access to capital that disrupts the organizations that were established in the previous technological revolution.

**Integration Model:** defines how artifacts flow between one tool and another by mapping the related artifact types to a common artifact model. This enables artifacts, which tend to span multiple tools, to flow through the value stream by having their states synchronized or otherwise integrated.

**Kondratiev waves:** described as long cycles of economic expansion, stagnation, and recession that result from technological innovation and entrepreneurship.

**Lean:** a methodology for software development based on Lean manufacturing.

**Operating Model disruption:** disruptions that rely on changing the relationship of the consumer with the business. One of Geoffrey



Moore's three types of disruption that requires more change from a business to address than the Infrastructure Model Disruption.

**Performance Zone:** focused on the top line of the business, including the main drivers of revenue; one of Geoffrey Moore's four investment zones.

**primary sector:** economic sector involving resource extraction from the planet; one of four economic sectors defined by Zoltan Kenessey.

**product:** a collection of software features and functionality that delivers value to a customer or user. Products can be delivered through multiple mechanisms, e.g., downloadable software, software as a service (SaaS). Products can be external facing, sold to customers; internal facing, such as billing systems; or developer facing, such as a software development toolkit.

**Product Model:** provides a mapping between the existing artifact containment structure present in the tool network and the product-oriented value streams that are aligned to business value delivery. This enables measuring and tracking all activity, flow metrics, and business results per product.

**product value stream:** all of the activities spanning all artifacts and tools involved in delivering a specific software product to an internal or external customer.

**product-oriented management:** management technique that focuses on the continuous delivery of business value through products consumed by internal or external customers.

**project-oriented management:** management methodology that focuses on the delivery of projects according to a set of milestones, resources, and budget criteria.

**production capital:** capital that it is controlled by companies producing goods and services; in contrast to capital that is controlled by financial institutions.

**Productivity Zone:** focused on making the bottom line; one of Geoffrey Moore's four investment zones.

**quaternary sector:** economic sector involving knowledge work; one of four economic sectors defined by Zoltan Kenessey.

**Second Way of DevOps:** feedback, as presented in *The DevOps Handbook*.

**secondary sector:** economic sector involving processing and manufacturing; one of four economic sectors defined by Zoltan Kenessey.

**software flow:** the activities involved in producing business value along a software value stream.

**technical debt:** cost of software rework that needs to be incurred at a future time, often coming from a simpler solution being done to complete work instead of applying a better approach that would take longer to complete.

**tertiary sector:** economic sector involving services; one of four economic sectors defined by Zoltan Kenessey.

**Third Way of DevOps:** continuous learning, as presented in *The DevOps Handbook*.

**time thieves:** the five sources of waste in enterprise value streams as outlined by Dominica DeGrandis in *Making Work Visible*.

**tool network:** the bottom most layer of the Flow Framework, within which the nodes are tools and the links between them are lines of cross-tool integrations.

**toolchain:** a set of distinct software development tools that are connected, either in a linear chain or a tool network.

**traceability index:** the measure of artifact connection breadth and depth relative to artifact type. The higher the index, the more connected the artifacts are, enabling improved reporting and visibility.

**Transformation Zone:** the place in an organization where Incubation Zone products and initiatives can be scaled to a meaningful size for the organization; one of Geoffrey Moore's four investment zones.

**value stream:** the end-to-end set of activities performed to deliver value to a customer for a product or service. At larger organizations, a value stream tends to span multiple teams, specialists, processes, and tools.

**value stream metrics:** metrics that measure each value stream within an organization in order for that organization to have a way of correlating software production metrics to business outcomes.

**Value Stream Network:** the network formed by the connections within and between software value streams. The nodes in this network are the teams of people and other processing units that create business value by working on, processing, and creating artifacts that correspond, either directly or indirectly, to one of the four flow items. Each node corresponds to a particular activity within the value stream, such as development, design, or support. The edges are the connections between the people, processes, and tools along which the flow items progress, from business objective or initiative through to running software. The network can be represented as a directed graph, which can contain cycles. The Value Stream Network is the top of the three network layers and is produced from the tool network and artifact network.

**work item:** an artifact that encompasses a unit of work to be delivered in the value stream, e.g., a user story or task.

**Zone Management:** a framework from transforming, modernizing, and reengineering a business created by Geoffrey Moore.

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# INDEX

## Numbers

*2017 State of DevOps Report*, 117  
“The 2017 State of Digital Transformation”  
(*Altimeter*), 10

## A

*Accelerate* (Forsgren, Humble, and Kim), 100, 148  
accidental complexity, 167, 169–170, 192  
*ACM Queue*, 172  
active state, 103, 106  
activities and outcomes, disconnect between, 36–37  
Activity Model, 103, 105, 188–189, 188*f*, 195–196, 195*f*, 211  
activity-based dependencies, 199  
Age of Mass Production, *xivf*, 20*f*, 21*t*, 211  
  advanced value streams from, 4  
  BMW Group, 11  
  Bosch, 15  
  Deployment Period transition to Turning Point, 129  
  Fordism, 53  
  highly complex processes, 47  
  Installation Period, 129  
  IT functions in, 29  
  lead time and cycle time, 102  
  misuse of techniques in the Age of Software, 6  
  Nokia, 38, 133–134  
  product-oriented mentality, 63  
  specialization, 178  
  value stream mapping, 71  
  Walmart, 15  
Age of Oil & Mass Production, *xivf*, 20*f*, 21*t*, 89  
Age of Software, *xv*, 4, 9–27, 211  
Age of Software & Digital, *xivf*, 20*f*, 21*t*  
  Age of Mass Production, misuse of techniques from the, 6  
  automobile industry, 128–130  
  beginning of, 20  
  BMW Group, 89  
  cybersecurity, 130–132  
  flow velocity and flow time and, 100  
  IT and the Productivity Zone, 52  
  IT functions in, 29  
  LargeBank, 44  
  mastery of software delivery, 16  
  Microsoft, 138  
  Nokia, 38, 134  
  Perez’s theories, 19–22  
  project-oriented management, *xvi*  
  start of, *xv*, 20  
  transition from Age of Industry to, 10–11  
  the Turning Point, 205  
  Value Stream Networks, *xviii*  
Age of Steam & Railways, *xivf*, 19, 21*t*  
Age of Steel, *xivf*, 5, 21*t*, 52, 53, 133  
Age of Steel & Heavy Engineering, *xivf*, 21*t*  
Agile, 3, 211  
  budgeting, 54–55  
  LargeBank and, 41–47  
  and mental model pitfalls, 184–186  
  Nokia and, 35–39  
  tool roles and specialization, 166*f*  
  toolchains, 26  
  tools, 173  
  velocity, 98–99  
airplane manufacture, 47–50  
Alibaba, *xiii*  
alignment index, 197, 200, 211  
Alphabet, *xiii*  
Amazon, *xiii*, 9, 15, 66  
Andon cord, 53  
Andreessen, Marc, 15  
Android OS, 38  
annual planning cycle, 55  
Apache, 163  
Apple, 22, 37, 38, 137, 206

- Application Lifecycle Management (ALM), 26, 173
- architecting for resiliency, 78–79
- architecture dependencies, 199
- artifact, 211
  - connecting to metrics, 190–192
  - flow items, 78t
  - Integration Model, 190–196
  - network. *see* artifact network
  - type mapping, 192, 193f
  - and the Value Stream Network, 73
  - in value streams, 172–174
  - visibility and connection, 194
- artifact network, 188–189, 193–196, 199, 211
- Activity Model, 195–196, 195f
- artifact visibility and connection, 194
- traceability index, 194
- workflow states, 195
- AspectJ, 133, 155
- Association of American Medical Colleges, 178
- Atlassian Jira, 167, 176, 187, 190
- automotive industry, 11–13
  - Age of Mass Production to Age of Software, 129
  - automotive software, 127–129, 128f
  - autonomous drive systems, 14
  - BMW Group Leipzig plant architecture, 30–34, 33f
  - bottlenecks, 180–181
  - branded clothing, 31
  - car production line, 11
  - Deployment Period, 129
  - features vs. defects vs. risks, 129
  - Installation Period, 129
  - inverter software for electric cars, 129–130
  - IT infrastructure and staff, 31
  - just-in-sequence manufacturing, 32
  - just-in-time inventory, 32, 34
  - lines of code in cars, 14
  - plant extensibility, 33–34
  - production bottleneck, 32–33
  - quality crisis and the Lean movement, 154
  - recalls of electronic car components, 128f
  - robots in, 126–127
  - software as proportion of car cost, 14f
  - Takata airbag failure, 129
  - transitions in, 129
  - Turning Point, 129
  - value streams for quality, 129–130
- automotive software, 127–129, 128f
- Azure, 167, 168, 169t
- B**
- Baldwin, Carliss, 193
- Bank of America, 18
- banks, 17–18. *see also* LargeBank
- Barclays, 119
- Beck, Kent, 35, 40, 155
- Bessant, Catherine, 18
- Bezos, Jeff, 46
- big data, 61, 144, 211
- blame-oriented culture, 131, 136
- Blockbuster, 13, 16
- “blue screen of death,” 140
- BMW Group, 3, 11–12
  - Age of Software, 89
  - architecting for innovation, 88–89
  - assembly line structure, 64–65
  - autonomous vehicles on the production line, 89
  - bottlenecks, 180–181
  - branded clothing, 31
  - the customer and the value stream, 67
  - Deployment Period, 89
  - flow and automation, 126–127
  - Fordism, 53
  - IT infrastructure and staff, 31
  - just-in-sequence manufacturing, 32
  - just-in-time inventory, 32, 34
  - Leipzig plant architecture, 30–34, 33f
  - Leipzig Plant Central Building, 12f
  - Leipzig plant design, 23
  - Next 100 Years presentation, 13
  - plant extensibility, 33–34
  - product development as a profit center, 51
  - production and business results, 112–113
  - production bottleneck, 32–33
  - software-powered innovations, 13
  - specialization and generalization, 164–165
  - tailoring lines to the business, 152–154
  - value streams for quality, 130
  - whole life cycle approach, 89
  - whole product approach, 89
- Boeing, xviii, 47–51
  - 777 aircraft, 48
  - 787 Dreamliner, 48–50, 194–195
  - brake software, 48–49
  - product development as a profit center, 50–51
  - software traceability, 48–49
- Bosch, 15, 153
- bottlenecks, 66–69, 160–161, 180–184
  - at the BMW Leipzig plant, 32–34, 180–181, 187
  - Flow Framework, 75
  - flow time, 102, 105
  - and reduction of flow efficiency, 108
  - to software productivity, 23
  - theory of constraints, 185
  - and transformations, 40–41, 45–46



- brake software, 48–49, 89
- branded clothing, 31
- bringing people to the work, 60, 60f
- bringing work to the people, 60, 60f
- British Airways, 125
- Brooks, Fred, 94
- Bryan, Nicole, 182–183, 234
- budgeting, 53–55
- “burning platform” memo, 135–136
- business and development, disconnect
  - between, 37–38, 44–45
- business and IT, disconnect between, 23, 44–45, 62
- Business Model, 17, 211
- business outcomes. *see* business results
- business results, 111–123, 113f
  - connecting to, 143
  - flow distribution, 92
  - flow metrics, 113–114
  - vs. functional silos, 58
  - indirect monetization, 115
  - metrics, 114f
  - multi-sided markets, 114
  - pre-revenue value streams, 114–115
  - quality metrics, 117
  - revenue proxy, 114
  - revenue tracking systems, 115
  - tuning production to, 112–113
  - value measurement, 114–115
  - value stream cost, 115–116
  - Value Stream dashboards, 120–122
  - value stream happiness, 117–119
  - value stream quality, 117
- business value, 69, 100–101
- business-level feedback, 190–191. *see also* business results

## C

- Cambrian explosion, xiv, 19, 167, 176, 212
- capacitive touchscreens, 38, 136, 137
- Capitalism, Socialism, and Democracy* (Schumpeter), 19
- car production line, 11
- Car2Go, 17
- chaotic context, 58
- coding activity, 155–160
- Common Lisp Object System (CLOS), 156
- complex context, 58
- complicated context, 58–59
- Condo, Christopher, 189
- conflicting priorities, 200
- connectivity index, 189–190, 212
- consumer hardware startup failures, 22
- consumer relations with business, 16
- contexts, 58–59

- continuous integration environment, 4
- cost center, 212
  - IT run as a, 10, 44
  - project-oriented management, 57
- cost center trap, 45–47, 50
- cost reduction, 45–47
- create, 195
- Creative Destruction, 19, 212
- creativity, 187
- cumulative flow diagrams (CFDs), 201
- Cunningham, Ward, 133
- customer relationship management (CRM), 115, 173
- customer value stream, 67, 130
- cybersecurity, 130–132
- cycle time
  - Age of Mass Production, 102
  - Deployment Period, 102
  - flow time, 105
  - and flow time and lead time, 104f
- Cynefin framework, 58–59, 212

## D

- dashboards
  - flow distribution, 93f
  - flow velocity, 99f
  - value stream, 120–122, 121f
- data breaches, 130–132
- decision-making contexts, 58–59
- defects, 76–77, 95–96, 97, 127–130
- DeGrandis, Dominica, 103, 106–107, 198, 199, 200–201
- delivery layer, 36
- Deming, Edwards, 129
- dependencies, 199–200
- “The Deployment Age” (Neumann), 19
- Deployment Period, xiv, 18–22, 20f, 212
  - automotive industry, 129
  - BMW Group, 89, 206
  - cybersecurity, 130–132
  - disconnect between business and IT, 62
  - lead time and cycle time, 102
  - specialization, 174–175
  - Taylorism, 52–53
  - transition to Turning Point, 129
- design frequency, 186–187
- DevOps
  - adoption in the industry, 11–12
  - and BMW Group, 130
  - budgeting, 54–55
  - and LargeBank, 41–47
  - and mental model pitfalls, 184–186
  - and Nokia, 40–41
  - and project-oriented model, 57–58
  - Three Ways of, 41, 41f, 66

- DevOps (*continued*)
    - tool roles and specialization, 166*f*
    - toolchains, 26
  - The DevOps Handbook* (Kim, et al.), 11, 40
  - “DevOps Metrics: Your Biggest Mistake Might Be Collecting the Wrong Data,” 172
  - DevOps Research and Assessment (DORA), 117
  - digital disruption, 9–27, 212
    - Age of Mass Production, 11
    - automotive industry, 11–13
    - business model, 17
    - car production line, 11
    - collaboration technology, 16
    - consumer hardware startup failures, 22
    - consumer relations with business, 16
    - Creative Destruction, 19
    - Deployment Period, 18–22, 20*f*
    - DevOps adoption, 11–12
    - digital marketing and communication, 16
    - digital transformation, 10
    - economic sectors affected, 14–16
    - industry unbundling, 17–18, 21
    - infrastructure model, 16
    - Installation Period, 19–20, 20*f*, 22
    - insurance sector, 10
    - Kondratiev waves, 19
    - in logistics, 15
    - means of production, 10
    - operating model, 16
    - primary sector, 14
    - production capital, 21–22
    - quaternary sector, 15–16
    - in retail, 15
    - secondary sector, 14–15
    - software and technology application to business, 17
    - technological innovation cycle theories, 19–20
    - technological revolutions, 9–13, 21*f*
    - technology companies, investments in, 10
    - tertiary sector, 15
    - Turning Point, 18–21
    - types of, 16–18
  - digital experiences vs. physical goods, 6
  - digital marketing and communication, 16
  - digital talent, shortage of, 10
  - digital transformation, xv–xvi, 10
  - dimensions of scale, 169*t*
  - disconnected value streams, 160–161, 170–171
  - disconnects
    - activities and outcomes, 36–37
    - architecture and value stream, 23
    - business and development, 37–38, 44–45
    - business and IT, 23, 44–45, 62
    - coding activity and value stream, 158–160
    - disconnected tools, 163
    - value stream, 160–161, 170–171
  - disruptions, tracking, 125–144
    - automotive software, 127–129
    - defects vs. features, 127–129
    - Equifax, 130–132
    - Microsoft, 137–140
    - Nokia, 132–137
    - Operating Model disruption, 129
    - product delivery, 137–140
    - recalls of electronic car components, 128*f*
    - risk problems, 130–132
    - technical debt, 132–137
  - DLL hell, 140
  - done state, 103
  - duplicate data entry, 25
- E**
- Eclipse, 163, 165
  - Eclipse IDE, 158
  - Eclipse Mylyn, 48–49, 160
  - electronic car components, recalls of, 128*f*
  - Elop, Stephen, 135–136, 137
  - Elves, Robert, 160, 182–183, 234
  - employee engagement, 118–119
  - employee Net Promoter Score (eNPS), 118–119
  - enablers, 79
  - end-to-end metrics, 68–69
  - Englebart, Douglas, 157
  - eNPS. *see* employee Net Promoter Score
  - enterprise IT environments, 3–5
  - separated from business functions, 5
  - Taylorism, 53
  - visibility of, 61
  - enterprise tool networks. *see* tool networks, enterprise
  - epiphanies
    - first, 155–160
    - overview, 23–24
    - second, 160–161
    - third, 181–184
  - Equifax, 9, 125, 130–132
  - executive staff turnover, 42
  - expertise dependencies, 199
  - Extreme Programming Explained* (Beck), 40
  - Extreme Programming (XP), 35, 155, 212
- F**
- Facebook, 9
  - feature team, 60, 71, 164–165, 196, 212
  - features, 76–77, 97, 129
  - FedEx, 15

- field mapping, 191f
- finance industry, 17–18
- FinCo, 160–161, 165, 170–171
- First Way of DevOps, 212. *see also* entries under flow
- flow, focus on, 78
- flow distribution, 90–98, 91f, 93f, 143, 212
  - balanced, 98
  - business results, 92
  - cascading up, 132
  - defects, 95–96, 97
  - defined, 91
  - features, 97
  - flow metrics, 97t
  - Hub value stream experience, 94–98
  - investments and management, 132
  - for legacy products, 92
  - post release capacity prediction, 93
  - power of, 97
  - risks, 97
  - technical debt, 94–96
  - timeline, 95f
  - value stream for existing product, 91
  - value stream for new product, 91
  - value stream investment, 93
  - Value Stream Network, 96
  - value stream structure and management, 92
  - value streams and business priorities, 96
  - zero-sum game of tradeoffs, 96–97
- flow efficiency, 107–108, 108f, 143, 213
- Flow Framework, xvii, 2f, 63–80, 74f, 213
  - Agile/DevOps metrics, 73
  - architecting for resiliency, 78–79
  - assumptions made, 66
  - beyond the turning point, 205–208
  - bottlenecks, 75
  - business results, connecting to, 111–123
  - cost of using old processes, 66
  - customer pull value, 75
  - defects, 76–77
  - digital disruption, 9–28
  - direct connection to business, 66–67
  - disruptions, tracking, 125–144
  - end-to-end metrics, 68–69
  - enterprise tool networks, 151–162
  - features, 76–77
  - first principles for, 75
  - flow items, 75–80, 78t
  - flow metrics, capturing, 87–110
  - flow of business value, 69
  - focus of, 73
  - focus on flow, 78
  - fundamental production questions, 67
  - goal of, 72–73
  - Incubation Zone, 78
  - introduction to, 63–82
    - Lean concepts, commitment to, 69–70
    - MECE principle, 79
    - need for new framework, 66–70
    - Performance Zone, 78
  - product-oriented management, commitment to, 70
    - proxy metrics, 69
    - risks, 77
    - role of, 73
    - software delivery, 69, 72–75
    - software productivity, 75
    - technical debt, 77
    - and the Three Ways of DevOps, 66–67
    - tool specialization, 163–178
    - transformation methodologies, 66
    - Transformation Zone, 78
    - transformations, 29–62
    - value stream management, 179–204
    - value stream map, 71–72, 72f
    - value stream metrics. *see* Value Stream Metrics
    - Value Stream Network, 68, 74, 79
    - value streams, 70–71
    - velocity, 99
- flow items, 75–80, 78t, 98, 142, 213
  - Activity Model, 195
  - alignment index, 197
  - business value, 100–101
  - conflicting priorities, 200
  - flow distribution of, 90–91
  - flow efficiency, 107–108
  - flow load, 106–107
  - flow metrics, 97t
  - flow time, 103–105
  - flow velocity, 98–102
  - size measurements, 101
  - taxonomies, 79
  - tool network, 189–190
  - Value Stream Metrics, 142–143
- flow load, 106–107, 143, 198–199, 213
- flow metrics, 87–110, 97t
  - business results, 113–114
  - flow distribution, 90–98, 91f
  - flow efficiency, 107–108
  - flow load, 106–107
  - flow time, 102–106
  - Value Stream dashboards, 120–122
  - velocity, 98–102
- flow of business value, 69
- flow states, 103, 195, 213
- flow time, 102–106, 213
  - Activity Model, 105
  - bottlenecks, 105
  - cycle time, 102–103, 105
  - defined, 104

- flow time (*continued*)
    - fast-tracking, 105
    - flow load, 106–107
    - flow states, 103
    - high-severity incidents, 105
    - incubation projects, 105
    - lead time, 102–103
    - and lead time and cycle time, 104*f*
    - Lean metric of, 103
    - longer-than-desired, 105
    - measurement of, 103
    - as a primary metric, 104
    - separating from lead time, 104
    - software delivery vs. manufacturing, 105
    - starting point, 103
    - tracking, 143
  - flow velocity, 98–102, 99*f*, 213
    - vs. Agile velocity, 98–99
    - defined, 100
    - flow items, 99
    - flow load, 106–107
    - measuring, 143
    - metrics, 101–102
    - SAFe terminology, 98–99
    - Value Stream Network, 101–102
    - work in progress, 198–199
  - Ford, 13
  - Ford, Henry, 53
  - Fordism, 53
  - Forrester, 189
  - fragmented value streams. *see* disconnected value streams
  - Freeman, Chris, xiv
  - Fumbling the Future*, 206
  - fundamental complexity, 167–168
  - fundamental production questions, 67
- G**
- Gantt, Henry, 52
  - Gantt chart, 52
  - Gates, Bill, 138
  - Gemba walk, 151, 154, 155–161
  - General Data Protection Regulation (GDPR), 101–102
  - General Electric, 49
  - Giudice, Diego Lo, 189
  - global systems integrator (GSI), 56
  - Goldratt, Eliyahu M., 40, 107
  - Google, 9, 56, 137–138, 147, 176
  - Google Reader, 56
  - Google Wave, 56
  - ground truth, 213
    - of advanced value streams, 4
    - of enterprise tool networks. *see* tool networks, enterprise
  - and the Flow Framework, 69
  - at Nokia, 36
  - of software value streams, 26
  - Gruver, Gary, 184
- H**
- Hadid, Zaha, 31
  - Harvard Business School, 193
  - Hastings, Reed, 15
  - heterogeneous tool, 174–177
  - high-severity incidents, 105
  - Home Depot, 131
  - Hoover Dam, 52
  - “How to Guarantee Failure in Your Agile DevOps Transformation” (Kersten), 42
  - Hub value stream experience, 94–98
  - Hugunin, Jim, 133
  - Hydro-Aire, 49
- I**
- IBM, 24
  - IBM Rational, 147, 163
  - IBM Rational DOORS (Dynamic Object-Oriented Requirements System), 175
  - ideate, 195
  - IEEE Software*, 172
  - IFRS revenue recognition rules, 56
  - incubation projects, 105
  - Incubation Zone, 51, 52*f*, 55, 168, 213
  - indirect monetization, 115
  - Industrial Revolution, xiii, xiv*f*, 21*t*
  - industry unbundling, 17–18, 21
  - Infrastructure Model, 16, 17, 213
  - Installation Period, xiv, 19–20, 20*f*, 22, 213
  - the automotive industry, 129
  - beyond the Turning Point, 205–206
  - disconnected tools, 163
  - IT functions in, 29
  - insurance sector, 10
  - integrated development environment, 158, 160–161
  - Integration Model, 188, 188*f*, 189–194, 191*f*, 213
    - artifact type mapping, 192, 193*f*
    - business-level feedback, 190–191
    - field mapping, 191*f*
    - implement flow with multiple tools, 192
    - large organizations, 192
    - tool network, 190–193
    - work items artifacts, 191
  - Intentional Software, 138
  - International Financial Reporting Standards revenue recognition rules, 56
  - International Symposium on Foundations of Software Engineering, 160

Internet Explorer, 138  
investment zones, 51–52  
iOS, 38  
iPhone, 38  
IT failures, 125  
ITIL process, 79

## J

Java, 167, 168  
Jawbone, 22  
*John Hopkins Medicine*, 178  
Jones, Daniel T., 70  
JP Morgan Chase, 131  
just-in-sequence manufacturing, 32  
just-in-time inventory, 32, 34

## K

kanban boards, 201  
Kay, Alan, 12  
Kenessey, Zoltan, 13  
Kiczales, Gregor, 156  
Kim, Gene, 11, 205  
Kodak, 13  
Kondratiev waves, xiv, 19, 214  
Kruchten, Philippe, 79

## L

large organizations  
Integration Model, 192  
proxies, 46  
tool specialization, 176  
value streams, 71  
LargeBank, xv–xvi. *see also* banks  
Age of Software, 44  
cost center trap, 45–47  
customer and the value stream, 67  
disconnect between business and  
development, 44–45  
failed transformations, 42–43  
IT as part of finance, 44  
transformation as project, 45–47  
transformation management according to  
cost, 45–47  
transformations, 41–47  
value streams, local optimization of, 44–45  
lead time  
Age of Mass Production, 102  
Deployment Period, 102  
flow time, 104  
and flow time and cycle time, 104*f*  
*Leading the Transformation* (Mouser and  
Gruver), 184  
Lean, 4, 129, 214  
automotive quality, 154  
budget approaches, 55

and customer pull value, 76  
Flow Framework, 69–70  
flow time, 103  
Gemba walk, 154  
manufacturing, 102  
at Tasktop, 183  
value stream identification, 70  
Lean Startup, 59  
*Lean Thinking* (Womack and Jones), 70  
*Learning to See* (Rother and Shook), 71  
legacy products, 92  
legacy systems, 168  
Leipzig plant. *see* BMW Group  
life cycle profit, 116  
logistics, digital disruption of, 15  
Louçã, Francisco, xiv  
Lyft, 17

## M

Mac OS, 137  
*Making Work Visible* (DeGrandis), 103, 198  
Management Zones, 118–119  
markets, multi-sided, 114  
McChrystal, Stanley, 178  
means of production, 10, 21*t*  
MECE principle, 79  
medical profession, 177–178  
mental model pitfalls, 184–186  
Metcalf's law, 187  
metrics  
employee engagement, 118–119  
end-to-end, 68–69  
flow. *see* flow metrics  
proxy, 69  
quality, 117  
software quality, 117  
value, 51–52, 115, 120  
Value Stream. *see* Value Stream Metrics  
value stream happiness, 118  
Microsoft, 135, 137–140, 147–148, 176, 206  
“blue screen of death,” 140  
cybersecurity, 138–140  
Gates memo, 138–140  
Internet Explorer, 138  
internet feature focus, 138  
product orientation, 138  
technical debt handling, 138  
Microsoft TFS, 176  
Microsoft VSTS, 167, 176  
minimum viable products (MVPs), 59  
“Mining the Ground Truth of Enterprise  
Toolchains,” xviii, 172  
Modularity 2015 conference, 160  
monetization, indirect, 115  
Moore, Geoffrey, 10, 17, 51

Mouser, Tommy, 184  
multi-sided markets, 114  
Murphy, Gail, 24, 47, 160  
Mylyn. *see* Eclipse Mylyn  
*The Mythical Man-Month* (Brooks), 94

## N

Nadella, Satya, 140  
NATO, xv  
neglected work, 200–201  
.NET applications, 167  
Netflix, 15, 137, 169  
Netscape, 138  
network-based processes vs. linear processes, 186–187  
Neumann, Jerry, 19  
new state, 103  
Nokia, xv, 35–41, 132–137  
  acquisition of Symbian, 134  
  Age of Mass Production, 38, 133–134  
  Age of Software, 38  
  Agile transformation failure, 35–39  
  blame-oriented culture, 136  
  “burning platform” memo, 135–136  
  delivery layer and planning layer, connecting, 36  
  DevOps, 40–41  
  disconnect between activities and outcomes, 36–37  
  disconnect between business and development, 37–38  
  history of, 133  
  need to measure outcomes, 37  
  rise and fall of, 134f  
  strategic missteps, 38  
  technical debt, 57, 134–137  
  Three Ways of DevOps, 41, 41f  
  value streams, local optimization of, 38  
Nokia Siemens Networks, 35  
Nokia Test, 35–36  
Nordstrom, 66

## O

objectives-and-key-results (OKR) systems, 50  
obvious context, 58–59  
old processes, cost of, 66  
operate, 195  
Operating Model, 16, 17, 129, 214

## P

PARC Forum, 157  
Pebble, 22  
Perez, Carlota, xiv, 6, 9–10, 19, 89, 175  
Performance Zone, 51, 52f, 78, 118, 119, 168, 214

*The Phoenix Project* (Kim), 11  
Pink, Daniel, 117–118  
planning layer, 36  
plant extensibility, 33–34  
platform specialization, 168  
Poppendieck, Mary, 50  
post-project software maintenance, 56  
post-release capacity prediction, 93  
power, 97  
pre-revenue value streams, 114–115  
primary sector, 13–14, 214  
*The Principles of Product Development Flow* (Reinertsen), 51, 116  
priorities, conflicting, 200  
prioritization, 60–61  
process as proxy, 45–47  
Product Model, 188f, 189, 197f, 214  
  alignment index, 197  
  function of, 196–197  
  Value Stream Network, 196–197  
  zombie projects, 200  
product-centric value delivery, 47–50  
production, means of, 10, 21t  
production bottleneck, 32–33  
production capital, 20, 21–22, 214  
Productivity Zone, 51–52, 52f, 168, 214  
product/market-fit (PMF) risk, 55  
product-oriented management. *see* product-oriented model  
product-oriented model, 54t, 55, 214  
  Age of Mass Production, 63  
  bringing work to the people, 60, 60f  
  budgeting, 53–55  
  business outcomes vs. functional silos, 58, 58f  
  commitment to, 70  
  design frequency, 186–187  
  focus of, 57  
  Google, 138  
  key parts of mind-set, 59  
  Lean Startup, 59  
  Microsoft, 138  
  minimum viable products (MVPs), 59  
  prioritization, 60–61  
  vs. project-oriented management, 54t  
  value stream and tracking business outcomes, 111  
products  
  delivery, 137–140  
  development, 50–52  
  end-of-life, 56  
  life cycles of, 55–56  
project-end fallacy, 55–57  
project-oriented management. *see* product-oriented model  
project-oriented model, 54t, 214

- and autonomy, mastery, and purpose, 117–118
- bringing people to the work, 60, 60f
- budgeting, 54–55
- costing by value stream, 116
- design frequency, 186–187
- prioritization, 60–61
- vs. product-oriented management, 54t
- resource allocation, 59–60
- risk, 58–59
- Taylorism, 59
- teams, 59–60
- technical debt, 57
- time frames, 55–57
- transformations, 45–47, 53–61
- value streams, 67
- proxy metrics, 45–47, 69
- pull value of customer, 75, 76

## Q

- quality metrics, 117
- quaternary sector, 15–16, 214

## R

- Rational. *see* IBM Rational
- Reichheld, Fred, 118
- Reinertsen, Donald, 51, 107, 116, 183, 198
- release, 195
- repeatability, 186
- repetitive strain injuries (RSI), 24, 156–158
- resiliency, architecting for, 78–79
- results measurement system, 69
- retail, digital disruption of, 15
- revenue proxy, 114
- revenue tracking systems, 115
- risk, 58–59, 77, 97, 129, 130–132
- robots, 126–127
- Rother, Mike, 71
- routing airplanes, 186–187

## S

- SAFe taxonomy/terminology, 79, 98–99
- scale specialization, 168
- Scaled Agile Framework (SAFe), 66
- Schaeffer, Frank, 11
- Schumpeter, Joseph, 19
- Second Way of DevOps, 214. *see also* business results
- secondary sector, 14–15, 215
- security breaches, 130–132
- security tools, 173
- Shook, John, 71
- Simonyi, Charles, 138, 140
- Six Sigma, 129
- size measurements, 101

- Smart, Jon, 118, 119
- software
  - automotive, 127–129, 128f
  - brake, 48–49
  - investment measurement, 57–58
  - maintenance, 56
  - post-project maintenance of, 56
  - production, scaling of, 6
  - quality metrics, 117
  - and technology application to business, 17
  - traceability, 48–49
- software delivery, xviii–xix
  - capacity, 10
  - characterizations of, 79
  - enablers, 79
  - flow in, 72–75
  - flow time compared to manufacturing, 105
  - as a profit center, 50
  - results measurement, 69
  - teams, 4
  - toolchain, 3
- software flow, 73, 215
- Software Practices Lab, 24
- software productivity, 75
  - declining, 24–25
  - and disconnects between architecture and value stream, 23
  - duplicate data entry, 25
  - engineer staffing issues, 56
  - and scaling and thrashing, 155–160
  - value streams as bottlenecks to productivity, 23
- software value streams
  - as bottlenecks to software productivity, 23
  - as complex collaboration networks, 24
  - model of, 26
- software-delivery teams, 4
- specialization and generalization, 164–165
- stakeholder specialization, 167–168
- State of DevOps* survey, 100
- Subversion SCM, 49
- success, 57–58
- supplier diversity, 168
- Symbian, 35, 133–134

## T

- Takata airbag failure, 129
- takt time, 51, 64, 112–113, 164
- Tanenbaum, Andrew S., 15
- Target, 66, 131
- Tasktop, 25, 55, 160
  - Activity Model used by, 195f
  - customer value stream simulation, 130
  - dependencies, 199–200
  - and the eNPS, 118

- Tasktop (*continued*)
  - flow velocity dashboard, 99f
  - product-oriented model and annual planning cycle, 56
  - and software value streams, 59
  - Value Stream Integration diagram, 172, 173f
  - work in progress, 198–199
  - Zone Management, 92
- Tasktop Hub, 93–94
- Taylorism, 5, 52–53, 59
- Team of Teams* (McChrystal), 178
- teams, 59–60
  - feature team, 60
  - happiness of, 117–118
  - project-oriented management, 60
  - reallocating workers, 59–60
  - software delivery, 4
  - Taylorism, 59
- technical debt, 57, 77, 215
  - vs. feature delivery, 94–96
  - Microsoft, 138, 140
  - as neglected work, 200
  - Nokia, 132–137
  - unplanned work, 200
  - Value Stream Dashboards, 120–122
- technological innovation cycle theories, 19–20
- technological revolutions, xiii–xiv, xivf, 9–13, 21t
- Technological Revolutions and Financial Capital (Perez), xiv, 19
- technology companies, investments in, 10
- tertiary sector, 15, 215
- Tesla, 13
- Te-Strote, Rene, 3, 11
- theory of constraints, 40, 184
- Third Way of DevOps, 215
- thrashing, 23–25, 155–160, 170–171
- Three Horizons Framework methodology, 92
- Three Ways of DevOps, 41, 41f
- time frames, 55–57
- As Time Goes By* (Freeman and Louçã), xiv
- time thieves, 198, 215
- timeline, 95f
- tool network, 188–193, 190f, 215
  - connectivity index, 190–191
  - field mapping, 191f
  - Integration Model, 190–193, 191f
- tool proliferation, 165–170
- tool specialization, 163–178. *see also* tool network, enterprise
  - dimensions of scale, 169t
  - enterprise tool networks, 171–174
  - fragmented value streams, 171f
  - heterogeneous tools, 174–177
  - large organizations, 176
  - legacy systems, 168
  - legacy tools, 175
  - platform specialization, 168
  - scale specialization, 168
  - small organizations, 176
  - stakeholder specialization, 167–168
  - startups, 176
  - supplier diversity, 168
  - thrashing, 170–171
  - tool proliferation, 165–170
  - tool roles, 166f
  - tool-repository data, 172
  - types of tools used, 173–174, 174t
  - value stream disconnects, 170–171
  - Value Stream Integration diagram, 172, 173f
  - zone specialization, 168
- toolchain, 215
- tool network complexity, 167
- tool networks, enterprise, 25–26, 77, 151–162, 165–170, 166f. *see also* tool specialization
  - bottlenecks, 160–161
  - coding activity and value stream, disconnect between, 158–160
  - complexity in, 167
  - dimensions of scale, 169t
  - disconnected value streams, 160–161
  - Gemba walk, 151, 154, 155–160
  - ground truth, 154–160, 171–174
  - heterogeneous, 174–177
  - proliferation of tools, 160–161
  - Rational and, 148, 163
  - software developer data capture, 155
  - software scaling and productivity and thrashing, 155–160
  - software value stream activity visualization, 155
  - tool specialization, 171–174
- tools, proliferation of, 160–161
- Toyota, 53
- Toyota Production System (TPS), 4
- traceability, 48–49
- traceability index, 194, 215
- Transformation Zone, 51–52, 52f, 55, 215
- transformations, 29–62
  - Agile transformation failure, 35–39, 41–47
  - airplane manufacture, 47–50
  - BMW Group Leipzig plant architecture, 30–34
  - Boeing, 47–50
  - cost center trap, 45–47
  - cost reduction, 45–47
  - delivery layer and planning layer, connecting, 36



- DevOps, 40–41
- disconnect between activities and outcomes, 36–37
- disconnect between business and development, 37–38, 44–45
- executive staff turnover, 42
- failed attempts at, 42–43
- investment zones, 52
- IT as part of finance, 44
- LargeBank, 41–47
- managing according to cost, 45–47
- need to measure outcomes, 37
- Nokia, 35–39
- Nokia Test, 35–36
- process as proxy, 45–47
- Productivity Zone, 52
- project management, 45–47
- project-oriented management, 53–61
- proxy metrics and decision making, 46
- strategic missteps, 38
- value streams, local optimization of, 38, 44–45
- zone management, 52*f*
- transportation industry
  - airplane manufacture, 47–50
  - automotive industry, 11–14, 14*f*, 30–34, 33*f*, 126–130, 128*f*, 154, 180–181
  - Business Model disruption, 17
  - Infrastructure Model disruption, 17
  - Operating Model disruption, 17
- Tuckman, Bruce, 59
- Turning Point, xiii–xix, 18–22, 175
  - automotive industry, 129
  - beyond the, 205–208
  - blame-oriented culture, 136
  - cybersecurity, 130–132
  - defined, 18–19
  - Deployment Period transition to Turning Point, 129
  - disconnect between business and IT, 23, 44–45
  - five-decade cycle, 22
  - flow velocity and flow time and, 100
  - Microsoft, 138
  - project budgets, 54–55
  - software investment measurement, 57–58
  - specialized tools, 175
- Twitter, 129, 169

## U

- Uber, 9, 17
- University of British Columbia, 24
- unknown dependencies, 199–200
- unplanned work, 200
- user experience (UX) design, 200

## V

- value measurement, 114–115
  - indirect monetization, 115
  - multi-sided markets, 114
  - pre-revenue value streams, 114–115
  - revenue proxy, 114
  - revenue tracking systems, 115
- value metrics, 51–52, 115, 120
- value stream, 4, 70–71, 215
  - business implications of, 48–50
  - business priorities, 96
  - and coding activity, disconnect between, 158–160
  - conflicting priorities, 200
  - cost, 115–116
  - and the customer, 67
  - customer definition, 70–71
  - dashboards, 120–122, 121*f*
  - defined, 70–71
  - in different Management Zones, 118
  - disconnects, 160–161, 170–171
  - employee engagement, 119
  - enterprise IT, 5
  - for existing product, 91
  - flow load, 198
  - fragmented, 171*f*
  - functional silos, 71
  - happiness, 117–119
  - investment and flow distribution, 93
  - life cycle profit, 116
  - local optimization of, 38, 44–45
  - management. *see* value stream management
  - map of, 71–72, 72*f*
  - metrics. *see* Value Stream Metrics
  - neglected work, 200–201
  - for new product, 91
  - orientation, 70
  - quality, 117–119, 129–130
  - structure and management, 92
  - tool specialization. *see* tool specialization
  - tool network complexity, 167
  - unknown dependencies, 199–200
  - unplanned work, 200
  - Value Stream Integration diagram, 172, 173*f*
  - visibility of, 197–201
  - work in progress, 198–199
- Value Stream Integration, 173*f*
- value stream management, 179–201
  - Activity Model, 188–189
  - airline networks, 183*f*
  - artifact network, 188, 193–196
  - bottlenecks, 181–184
  - creativity, 187
  - defined, 189

value stream management (*continued*)  
  design frequency, 186–187  
  identifying flow constraints, 181–184  
  Integration Model, 188, 189–193  
  mapping workflows, 185–186  
  mental model pitfalls, 184–186  
  network management vs. linear process management, 184  
  network-based processes vs. linear processes, 186–187  
  Product Model, 189, 196–197  
  repeatability, 186  
  routing airplanes, 186–187  
  tool network, 189–193  
  Value Stream Metrics, 188  
  Value Stream Network, 187–189, 188*f*, 196–197  
  value stream visibility, 197–201  
  variability, 186  
value stream mapping, 71  
Value Stream Metrics, 73–74, 85–86, 215  
  key aspects of, 142–143  
  and the Value Stream Network, 120–121, 188  
Value Stream Network, xviii, 147–149, 187–189, 188*f*, 215  
  Flow Framework, 68  
  flow velocity, 101–102  
  as a product, 79  
  the Product Model, 196–197  
  and Value Stream Metrics, 120–121, 188  
variability, 186  
velocity, 98–102  
visibility, 119  
  artifact, 194  
  of IT, 61  
  value stream, 197–201

## **W**

waiting state, 103, 106  
Walmart, 15, 66  
waterfall development, 184  
“watermelon” phenomenon, 61  
whole life cycle approach, 89  
whole product approach, 89  
“Why Software is Eating the World” (Andreessen), 15  
Womack, James P., 70  
work in progress (WIP), 106, 108, 143, 186, 198–199  
work items and artifacts, 191  
workflow states, 191, 195

## **X**

Xerox PARC, 24, 133, 155, 206

## **Z**

zero-sum game of tradeoffs, 96–97  
zombie projects, 200  
Zone Management, 17, 51–52, 52*f*, 66, 92, 216  
zone specialization, 168  
*Zone to Win* (Moore), 10, 17, 51

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## ABOUT THE AUTHOR



**D**r. Mik Kersten started his career as a Research Scientist at Xerox PARC where he created the first aspect-oriented development environment. He then pioneered the integration of development tools with Agile and DevOps as part of his Computer Science PhD at the University of British Columbia. Founding Tasktop out of that research, Mik has written over one million lines of open-source code that are still in use today, and he has brought seven successful open-source and commercial products to market.

Mik's experiences working with some of the largest digital transformations in the world has led him to identify the critical disconnect between business leaders and technologists. Since then, Mik has been working on creating new tools and a new framework for connecting software value stream networks and enabling the shift from project to product.

Mik lives with his family in Vancouver, Canada, and travels globally, sharing his vision for transforming how software is built.