



# **Service Innovation in the Cloud: Implications for Enterprise Service Transformation**

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## What do these companies have in common?



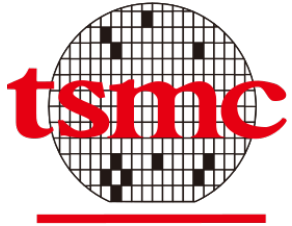
ORACLE



Google



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arm



NVIDIA



at&t



The day science begins to study non-physical phenomena, it will make more progress in one decade than all the previous centuries of its existence.



**Nikola Tesla (1856-1943)**

Inventor of the AC electric generator

# Introduction

- Cloud enterprises have shifted from linear to networked business models through a value-transformation process centered on the development of multisided platforms.
- Service platforms facilitate service exchange and value cocreation by enabling three essential transitions:
  - From control to orchestration of enterprise resources,
  - From internal optimization to external interactions, and
  - From customer value to ecosystem value.
- Large-scale service innovation is most in evidence with native cloud enterprises or companies that have more rapidly and effectively adopted ecosystem-based service platforms such as Google, Amazon, Netflix, Facebook, Uber, and Airbnb.
- Service ecosystems enable the critical processes for value cocreation that is foundational to the continuous development of innovative user experiences.
- However, many developers and adopters of cloud service business models fail to innovate.
- Failure is often blamed on inappropriate business strategy and/or insufficient technological solutions.
- The root cause is more basic. It is the lack of service thinking that is necessary for the development of cloud-based service innovation models.
- Service thinking as a complex mindset essential for successful service innovation.
- The presentation will conclude with a proposed framework for cloud-based service transformations by traditional product-based companies with evidence from IBM's Watson Health Cloud, Microsoft's AI cloud, and Intel's drone cloud.

# The Cloud as a Disruptive Force

- After more than a decade of increasing adoption of cloud computing, most CIOs, business managers, and investors have observed the cloud is faster, cheaper, agile, elastic and offers improved resource allocation over that of legacy computing systems.
- The cloud has become the platform of choice for service innovations that are disrupting existing markets and defining new ones, especially for native cloud companies.
- The cloud is maturing into a platform for IT services across a wide-range of business and consumer functions that include mobile communications, marketing, advertising, retailing, finance, human resources, production, logistics, supply chain management, infrastructure, AI, analytics, autonomous vehicles, drones, 3D/4D imaging, entertainment, social media, and defense to name a few applications.
- Perhaps the most far reaching impact of cloud computing is its ability to empower not only IT innovations, but its ability to drive innovation into nearly every industry and personal endeavor in the form of digital services.
- The cloud is the engine for enterprise and societal transformation.



# The IT Productivity Paradox

- “IT Doesn’t Matter.” Nicolas Carr in his 2003 HBR article proclaimed IT is a non-strategic asset. After more than three decades of high growth in IT, the jig was up.
- Carr argued that IT is mostly built-out infrastructure of commoditized hardware and software services little different from commodity electricity services. IT investments lead to strategic parity between firms, not disruptive innovation.
- There is little expectation for improving productivity or driving innovation through investment in IT.
- IT strategy defaults to defensive “me too” tactics of cost reduction, late adoption of new systems and risk minimization.
- Nobel economist Robert Solow first identified the ‘IT productivity paradox’ in 1987. “You can see the computer age everywhere but in the productivity statistics.”
- The productivity paradox appears to ebb and flow. IT generated a massive investment and productivity boom during the 1990s, which then burst in the dot.com bubble.
- Since then, researchers have proposed that the payoff from IT investment takes time. Firms have to invest additional funds on strategy development, process redesign, implementation and training to begin to see productivity gains over time.
- During the mid-2000s innovative technologies in the form of mobile systems, digital services, and the cloud were beginning to disrupt legacy IT systems.
- Carr’s view was not of the future innovations such as cloud computing, big data, and AI.

## The Rise of Service

- Businesses have adopted services as extensions of product models or began the transformation into service enterprises to improve market positions, and increase sales and profitability.
- Services are *less visible*, *relationship based*, and enable *value co-creation* opportunities. These unique characteristics of services make them more *difficult to copy*.
- Transitioning from a pure-product business model to one that is more service oriented can increase competitive advantage by augmenting product value, opening new markets, redefining old ones, strengthening customer relationships and user experience that can improve financial performance.

# Definitions

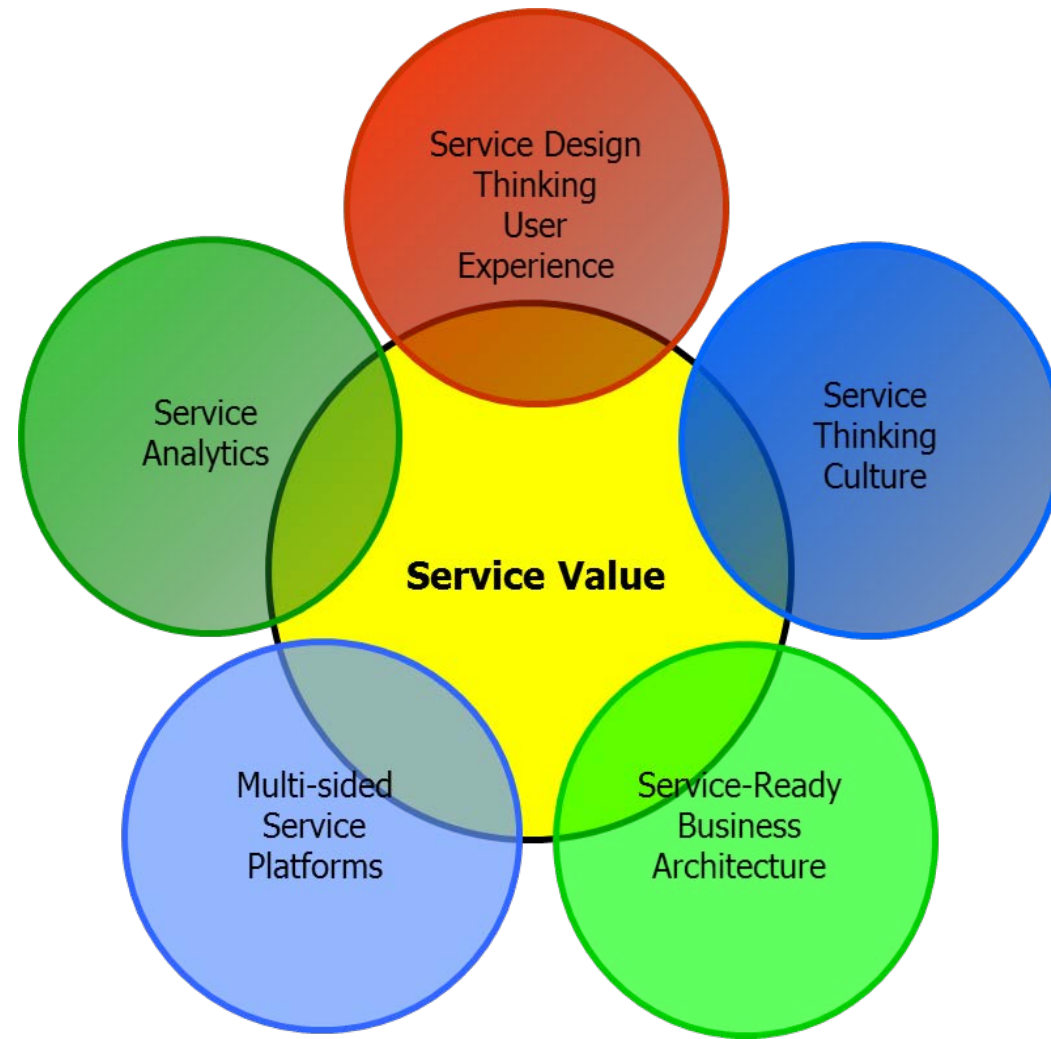
- *Service* is “the application of specialized competencies (knowledge, skills, technologies) through deeds, processes, and performances for the benefit of another entity or the entity itself.” Service strategies require new thinking, processes, and business models.
- *Services* are a residual type of intangible good or noncore add-ons to goods that enhance the value of a product. From a product-marketing perspective, the same principles and management strategies are considered to be applicable to both products and associated services.



# Service Thinking

- Service thinking, or Service-dominant Logic thinking, is a transformational and transcendent mindset.
- This mindset enables a holistic view of the service ecosystem in terms of opportunities, value propositions, value co-creation, dynamic resources and capabilities, customers, suppliers, partnerships, alliances and other engaged actors, service networks, markets, positioning, revenue mechanisms, and strategies for opportunity maximization.
- Service thinking is about developing and executing innovative business plans by mobilizing resources and actors for the co-creation of value that can redefine markets, create new markets and lead to strategic success.
- Service innovation adopts a view of strategy that requires business organizations to reinvent themselves continuously within dynamic complex service systems.
- Service innovators are disruptive change agents.
- Successful innovators have advantageously driven, and/or responded to changes in customer and other ecosystem relationships by incorporating service thinking into their business models.

# The Mindsets of Service Thinking



# 1: Service Design Thinking and User Experience

- Design has historically been the goods-dominant domain of objects, things, and commercial products.
- Tim Brown of IDEO introduced the notion that the design process is a *collaborative* effort among diverse participating stakeholders, competencies, and resources where ideas are envisioned, prototyped, and explored in a hands-on manner. Innovative designs need to be *human centered, aspirational, and infused with empathy and optimism*.
- High-technology designers initially worked on hardware such as computers, mobile phones, electronic devices and appliances. Later, they designed graphical user-interface software and eventually the user experience itself.
- Design thinking is a discipline that integrates the sensibilities and methods of the designer with the understanding of the users' expectations, the feasibility of technology, and the strategy for the business to convert market opportunity into customer value.
- Design thinking helps multiple actors work collaboratively together as a system to create value. It drives the creation of the user experience.
- It is only a short conceptual journey to arrive at the design of the service itself and the framework, infrastructure, and processes needed to create the collaborative interfaces for the user and other actors within the service ecosystem.
- Thinking like a designer helps develop better business strategy.
- Innovative user experiences transform value which transforms markets.

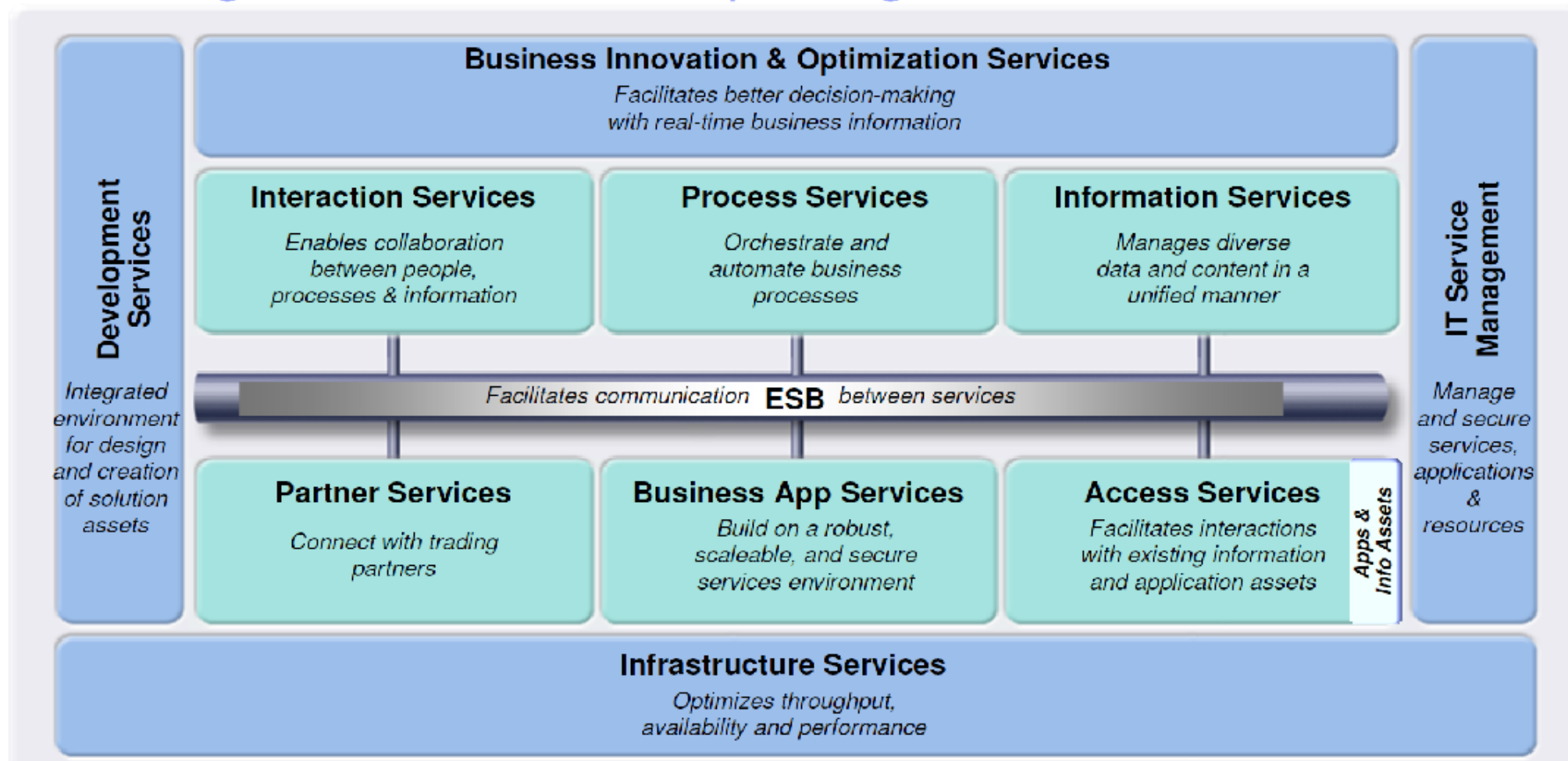
## 2: Service-Thinking Culture

- Developing a strong organizational culture to support service innovation is a key consideration for any enterprise transitioning to service-based business models.
- Visionary leadership is required to develop a service-ready organization with the right mix of service innovation skills, individuals and team members with a service thinking mindset, service specific resources and technologies to ensure service innovation is the priority for the enterprise.
- Service relevant processes ensure collaboration between employees, customers, and service network stakeholders.
- Service innovation champions within product companies are rare, but necessary for driving cultural change. Engagement with suppliers and customers to educate them on your strategy and to encourage their service thinking is essential.
- For cloud-based enterprises, service innovation is global in scope and high-volume in scale. Increasingly, cloud services are mobile, social, and on-demand. Service-thinking leaders need to expand employees' thought horizons accordingly.
- Situation awareness by individuals, teams, and entire organizations is necessary. Service transformations require cultural change, achieving as service ready organizational structure, and developing a ubiquitous service mindset.

### 3: Service-Ready Business Architectures

- Service enterprises are continuously pressured to respond by redesigning or repositioning business functions, assets, and resources such as engineering, production, marketing, finance, human resources, and IT from slow growing businesses to those with greater potential.
- Internal transformation, firm-to-firm collaborations, mergers, or acquisitions of firms that have already transformed themselves into service dominant enterprises are common responses to that pressure.
- *Componentized* business architectures are an approach for enterprises to react to complexity and rapid change in service systems. What components and systems are essential for the enterprise to retain and develop in-house vs. what can be outsourced to other actors in the service ecosystem? Partnering and outsourcing can free up resources, promote specialization, and can benefit from comparative advantage within the service ecosystem.
- Large **systems integrators** such as Boeing and Airbus do not make every part and system for their airplanes. They manage, coordinate, and integrate internal and external components, capabilities, and requirements from a large number of suppliers and demand-side actors. **Solutions** are developed for enabling an experience that will transport their customer's customers anywhere in the world in a day.

## SOA Reference Architecture - *Providing the technical underpinnings for the IBM SOA*





## 4: Multisided Service Platforms

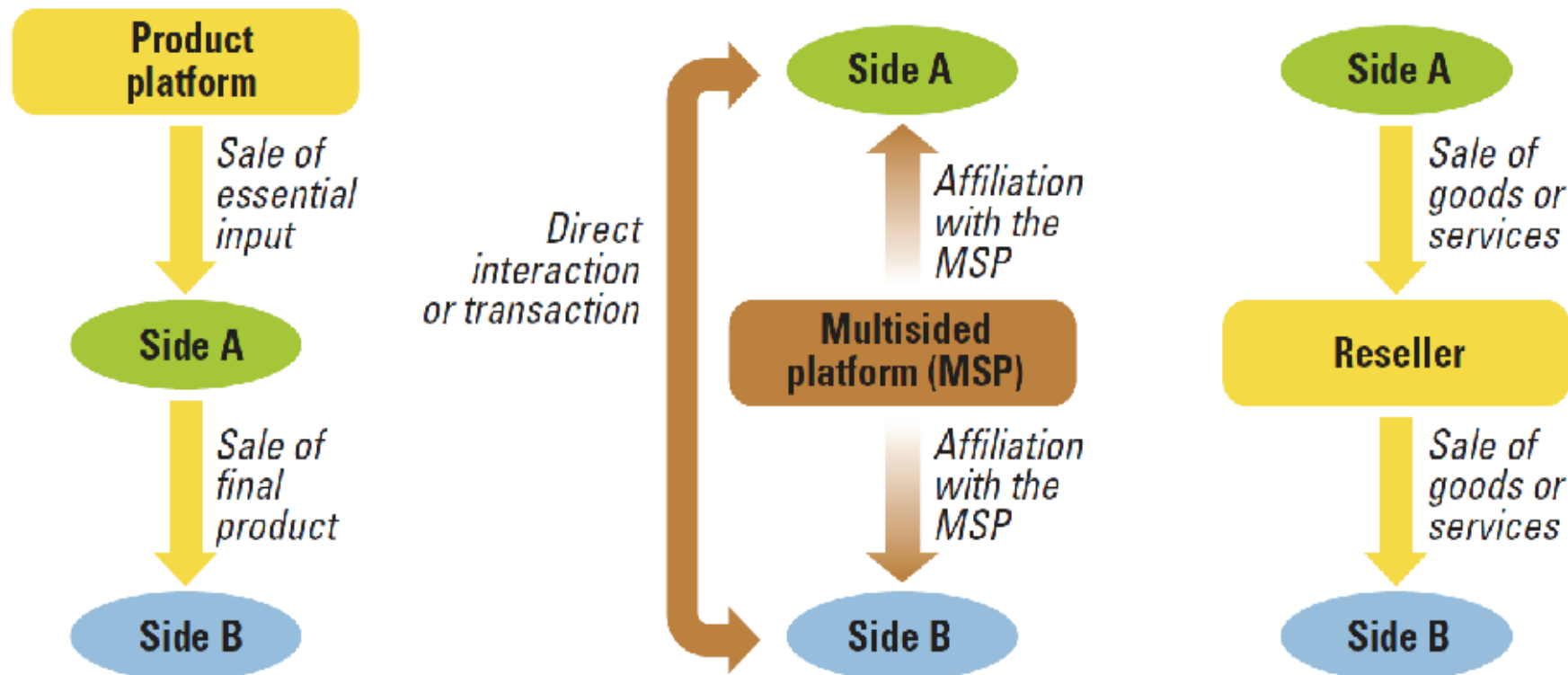


- Multisided platforms (MSPs) enable the transition from linear to networked business models. MSPs shift value creation from the firm to a network of users, partners, and other actors within a service ecosystem. MSPs are digital platforms for value co-creation at the core of service thinking. The potential for value creation and rapid growth is much greater than that of a single product or service.
- It is not necessary for platform owners to own the product or service content since the platform enables service providers and users to engage directly, such as independent merchants and buyers. Direct interactions may involve commercial transactions, relationships, or communications between various actors. Indirect connections are typically suppliers or other service providers for direct participants.
- A two-sided platform connects buyers with third-party sellers. Cloud service MSPs such as those used by Google, Facebook, Netflix, Microsoft, Amazon, and Alibaba are the result of service business models where the platform supports and facilitates an external ecosystem that connects platform managers, service providers, users, customers, payment systems, suppliers, partners, alliances, products, services, complementary resources, and facilitates feedback between the ecosystems' actors.
- MSPs capture data from the service ecosystem. Analytics provide near real-time insights for shaping, managing, and controlling the ecosystem and its individual actors. The platform manager does not have to control all the resources in its ecosystem, just those whose value creation potential is greatest. Multisided cloud platforms can act as institutions that regulate service ecosystems. The emerging platform economy is rapidly reshaping markets, businesses, and global societies. Cloud service platforms are in position to dominate economic growth.

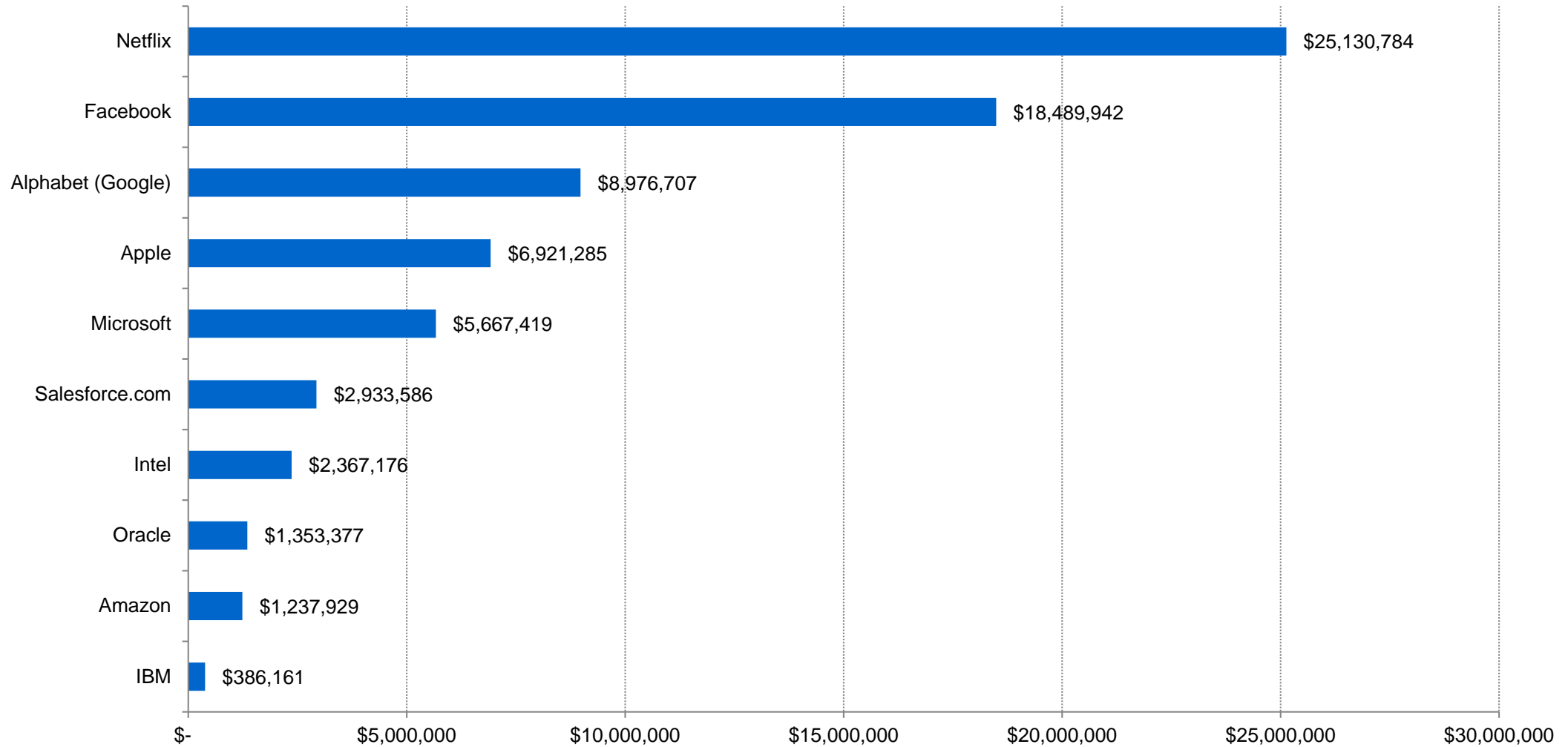


## 4: Multi-Sided Service Platforms

- There are two primary characteristics of multisided service platforms: 1. Each side consists of actors within the service ecosystem of the MSP provider, and 2. the MSP enables interaction between the actors on each side. The MSP is a matchmaker between sellers and customers.
- For product platforms the provider has a direct linkage for a sale of the final product to a customer. It is a dyadic GDL transaction.
- MSPs such as Amazon allow resellers on their platform. In such instances the producer-reseller relationship can be dyadic system that manifests as a two-sided platform instance between the seller and buyer.



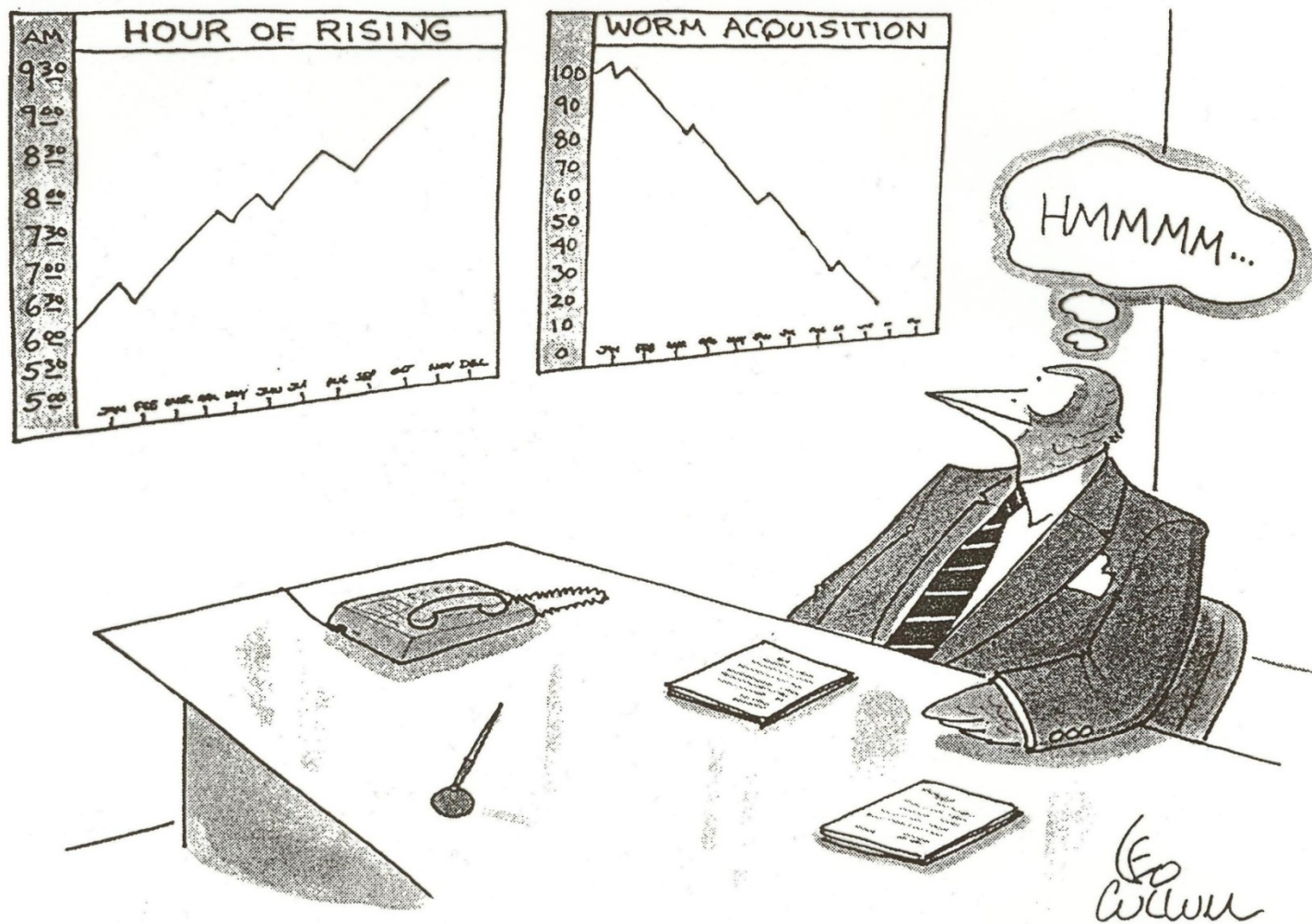
## 4: Market Capitalization per Employee, Dec. 31, 2017.



## 4: Sales per Employee for ITC Companies, 2017

Company	Employees	2017 Sales \$	Sales/Employee
Netflix	5,100.00	\$11,692,700,000.00	\$2,292,686.27
Apple	123,000.00	\$229,234,000,000.00	\$1,863,691.06
Facebook	25,105.00	\$40,653,000,000.00	\$1,619,318.86
Alphabet (Google)	80,110.00	\$110,855,000,000.00	\$1,383,784.80
Microsoft	124,000.00	\$89,571,000,000.00	\$722,346.77
Intel	102,700.00	\$62,761,000,000.00	\$611,110.03
Salesforce	29,000.00	\$10,480,000,000.00	\$361,379.31
Amazon	566,000.00	\$177,866,000,000.00	\$314,250.88
Oracle	138,000.00	\$37,728,000,000.00	\$273,391.30
IBM	366,000.00	\$79,139,000,000.00	\$216,226.78

## 5: Service Analytics



## 5: Service Analytics

- Service thinking drives becoming a smarter enterprise, smarter about markets, customers, solutions, processes, systems, operations, and value creation.
- A smarter enterprise connects people, integrates processes, and makes intelligent use of big data analytics to make better decisions. Analytics has replaced the term business intelligence (BI) to refer to computerized decision support applications.
- Big data analytics can extract the hidden value in data to uncover market opportunities and drive growth. Companies that can acquire accurate situation awareness by leveraging service analytics are likely to grow faster than competitors that do not have this capability.
- Service analytics:
  - **Descriptive analytics.** Descriptive analytics offer a visualization format for analyses that uncover patterns in the data that offer insights about underlying causes and trends relevant to changes in business performance. The goal is to determine why things happened.
  - **Predictive analytics.** Predictive analytics use statistical data mining, modeling and machine-learning techniques to forecast events that might happen in the future.
  - **Prescriptive analytics.** Provides recommendations for one or more courses of action associated with likely outcomes on key performance indicators. The goal is to achieve the best possible performance outcomes to solve specific problems or to address specific opportunities.

## 6: Service Value

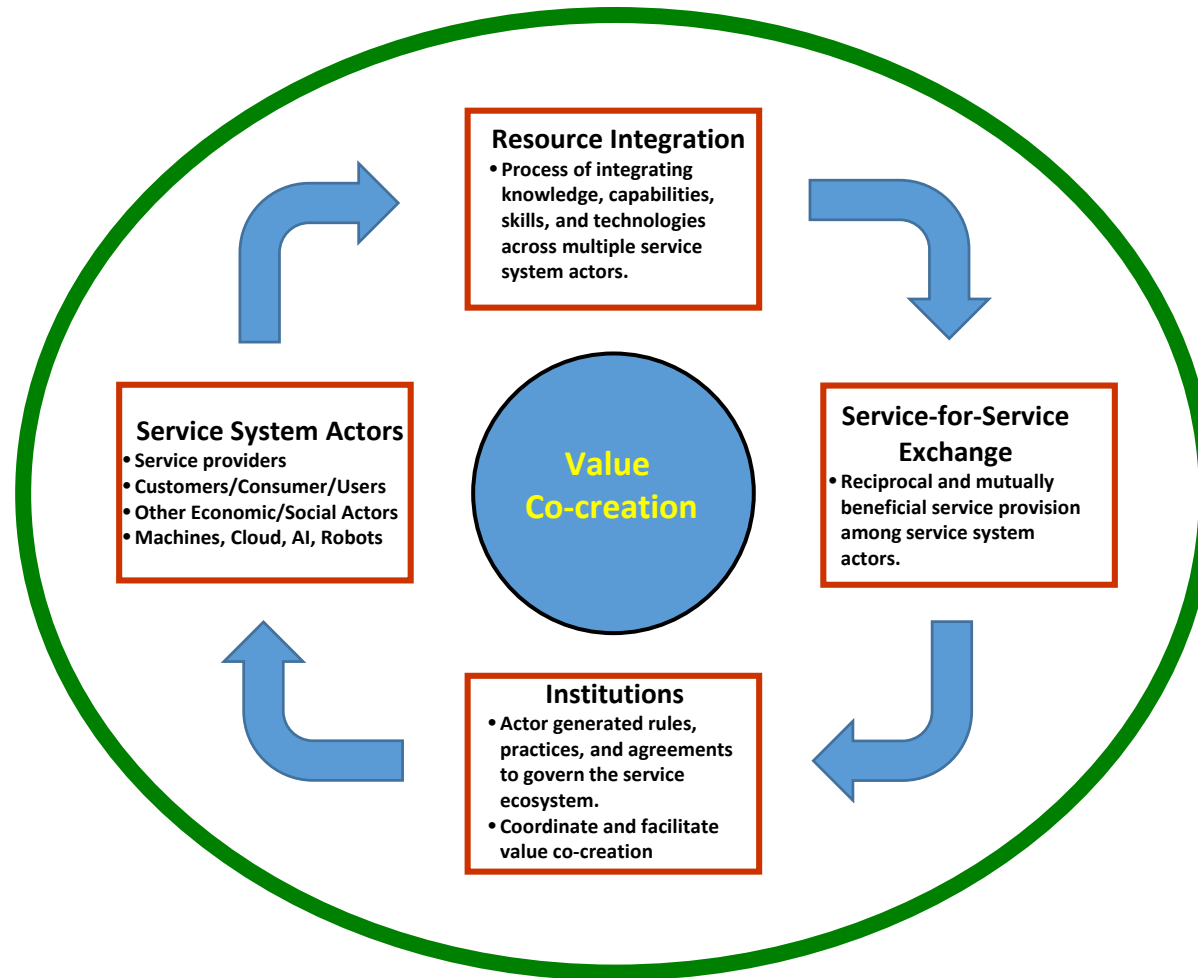
- **Value** is expressed in terms of the tradeoff between benefits and costs within an exchange transaction. SDL considers value to be co-created by a process among actors in a service ecosystem.
- **Business value** is the total value received by the enterprise resulting from sales of its products and services. Business value is difficult to measure solely in monetary terms. It is the aggregation of all forms of value derived from business operations that determine the long-term value of the firm such as economic value added, employee value, supplier value, alliance partner value, and managerial value.
- **Customer value** is the overall benefit derived from the product or service, as perceived by the customer, at the price the customer is willing to pay. Customer value derives from engagement with the customer and other ecosystem actors for the purpose creating superior customer experiences.
- **Societal value** holds that companies should meet their business goals in such a way that enhances the long-term wellbeing of customers and society.
- **Both customer value and societal value** support SDL concepts value-in-use and value-in-context, where *higher ratios of service in the solution can minimize societal impact*.
- **Societal value is ecosystem based** which raises awareness of the need for aligning the economic and social health of the service ecosystem with the physical health and sustainability of the natural ecosystem.

## 6: Service Value - Asymmetry in Service Ecosystems

- **Asymmetric value** is realized when some actors in an exchange-based relationship achieve differential outcomes that result from one-sided advantages over other actors. This situation can increase their relative benefits and lower costs.
- **In SDL**, the potential for asymmetric outcomes is associated with the underlying principle of value-in-context. Each actor's context affects its ability to directly access and leverage resources and indirectly do the same beyond its immediate context.
- **Contextual advantages** may be derived from superior intelligence capabilities and other knowledge-based resources such as brand power, installed base of users, IT and other infrastructure, processes, solution scope, financial capability, logistics systems, long-standing relationships and partnerships, and the ability to preferentially leverage institutional complexity within the service ecosystem.
- **Asymmetric power in relationships:** SDL relies on collaborative business relationships among actors within a service ecosystem for the value co-creation process to succeed. To reduce asymmetric outcomes actors should consider knowledge sharing practices, relationship-specific investments, complementarity of resources and capabilities, and adhering to established norms (institutions and institutional arrangements) that can increase openness, quality and perceived equity in A2A relationships.
- **Information asymmetry** occurs when some participants in an exchange relationship have superior information. Actionable intelligence (e.g. C4ISR capabilities) can cause inequitable sharing of resources and superior outcomes for the actor or actors that can exploit their superior knowledge to the detriment of other network participants. Asymmetric information can result in service ecosystem failure if the disadvantaged actors become aware of the imbalance and choose to exit the exchange network or take other action.
- **Adverse effects** are minimized when each actor in the network has an open and collaborative relationship where all critical information is available to all relevant actors. Continuous monitoring, big data analytics of actor performance and openly available crowdsourced ratings of actors can reduce information asymmetry.



## Processes within the Service Ecosystem



## SDL Processes within the Service Ecosystem

- **Categories:** The Business-to-business (B2B) and business-to-consumer (B2C) concepts from GDL have been broadened to an actor-to-actor (A2A) focus for SDL. A2A applies to consumer-to-consumer (C2C) and business-to-business-to-consumer (B2B2C) relationships which characterize service ecosystem platforms.
- **Actors** include service providers, customers/consumers/users, suppliers, partners and allies as well as all enterprises from individual humans to large organizations. Actors also include machines, smart technologies and machine-to-machine and technology-to-technology interactions. Sensor-based smart systems, the Internet of Things, robotics, artificial intelligence, cloud-based big data analytics, cognitive computing, and autonomous vehicles are examples of technology-based actors in A2A service ecosystems.
- **Resource Integration:** Service ecosystem platforms can function as multisided intermediaries for communications and other connections that enable actors to engage other actors in resource integration for value co-creation.
- **Service-to-service exchange:** Provides access to complementary resources that can provide benefits (value) for actors within their own individual context. The service ecosystem provides a platform for bilateral or multilateral actor engagement that ultimately joins networks together when individual actors connect with each other. Every actor has a reciprocal and mutually beneficial role of provider and beneficiary of value enablement.
- **Institutions:** Consist of actor generated rules, practices, and agreements to govern the service ecosystem. Institutions enable interactor cooperation and coordination the facilitates value co-creation. Institutions can be informal or contractual between actors, more generalized industry standards, or legal entities with enforcement power.
- **All service system actors** may be considered as **allies or partners** as they collaborate to co-create value. Actor relationships may be short-term, long-term, intermittent, or continual in nature. They can also be disruptive.

## Why Organizations Fail to Adopt Service-Thinking Mindsets

- Lack of service knowledge, product-thinking organization
- Insufficient support from corporate leadership to transition to service business models
- Lack of a service strategy, no service innovation business model
- Lack of a service innovation champion
- Lack of service-oriented skilled personnel
- Organizational culture hostile to change, risk averse
- Organizational barriers
- Technical debt in legacy technology systems
- Poor technology decisions, lack of implementation
- Lack of, or poor allocation of internal resources
- Lack of or poorly designed innovation strategy
- Financial barriers
- Fighting to preserve the old product model
- Lack of market intelligence
- Incentive system not tied to innovation
- Poor marketing communications

## Service Transition or Service Transformation?

- A *Transition* is defined as “a movement, development, or evolution from one form, stage or style to another.”
- More dynamically, *transformation* is defined as “a complete or major change in something’s appearance or form.”
- Service *transitions are incremental* and intended to add value to the product. They are smaller steps, more tactical, and not initially intended to result in a service dominant business model.
- Service *transformations are larger*, more comprehensive, and intended to *fully change the business model* to service dominance.
- Service transformation involves a change from a *transactions* orientation to one of *customer relationships*, it is a change from value creation by the provider and delivery to the customer, to value cocreation between actors in a service ecosystem.

## Hybrid Offerings

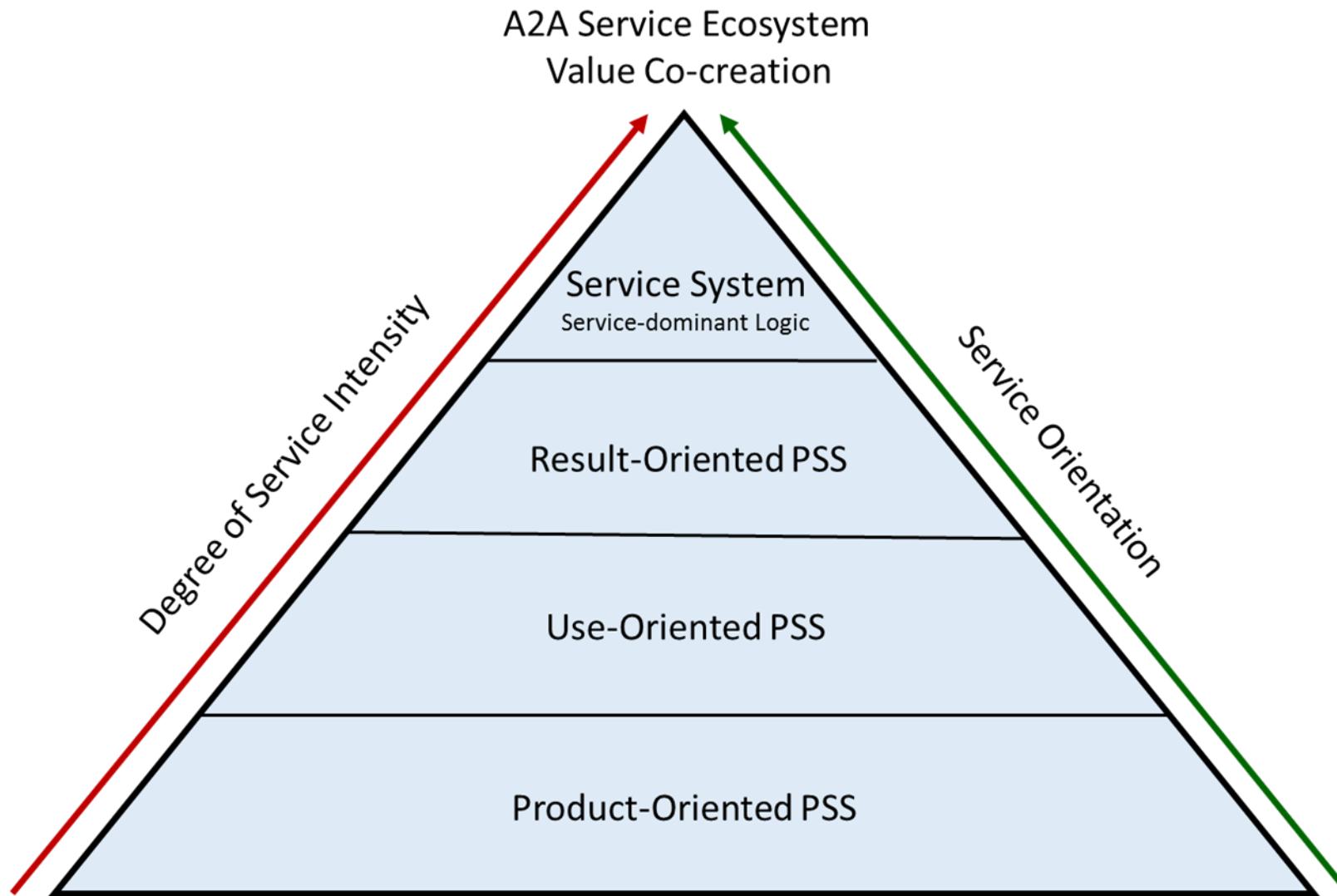
- Hybrid offerings are a form of Product Service Systems (PSS) that combine industrial goods and services in business markets.
- Conceptually, hybrid offerings can provide a strategic roadmap for transitioning from product solutions, where services support the product, to services that support the customer's business processes or perform them on behalf of the customer.
- Hybrid offerings are an important step in the service transformation process. At some point along the continuum, as firms increase the service component, services revenues, and profits will reach sufficient intensity to support a more service-dominant, customer-centric PSS business model.

# Types of Product-Service Systems

- **Product-oriented PSS:** Traditional product firms primarily focus on manufactured goods while including add-on services that may be bundled with the product, sold separately, or optional. Services are offered at the time of sale or after sale in the form of warranties and service contracts for training, maintenance and repair.
- **Use-Oriented PSS:** Customers desire the service the product provides rather than its ownership. Customers purchase the use of physical products that they do not own, the provider retains ownership. The customer experiences the value-in-use offered by the service provisioned by the product. Examples include renting, leasing, or sharing physical products.
- **Result-Oriented PSS:** The provider and user agree on a specific result or a capability without predetermining a product-service configuration. Result-oriented PSS provide value-in-use services that include activity management, outsourcing, and pay per service options.

This involves assuming a client's function or process such as manufacturing, maintenance, accounting, finance, marketing, logistics, and IT services. Examples include data services, cloud services, storage services, and printing services, video and music streaming, etc.

# Service Orientation and PSS



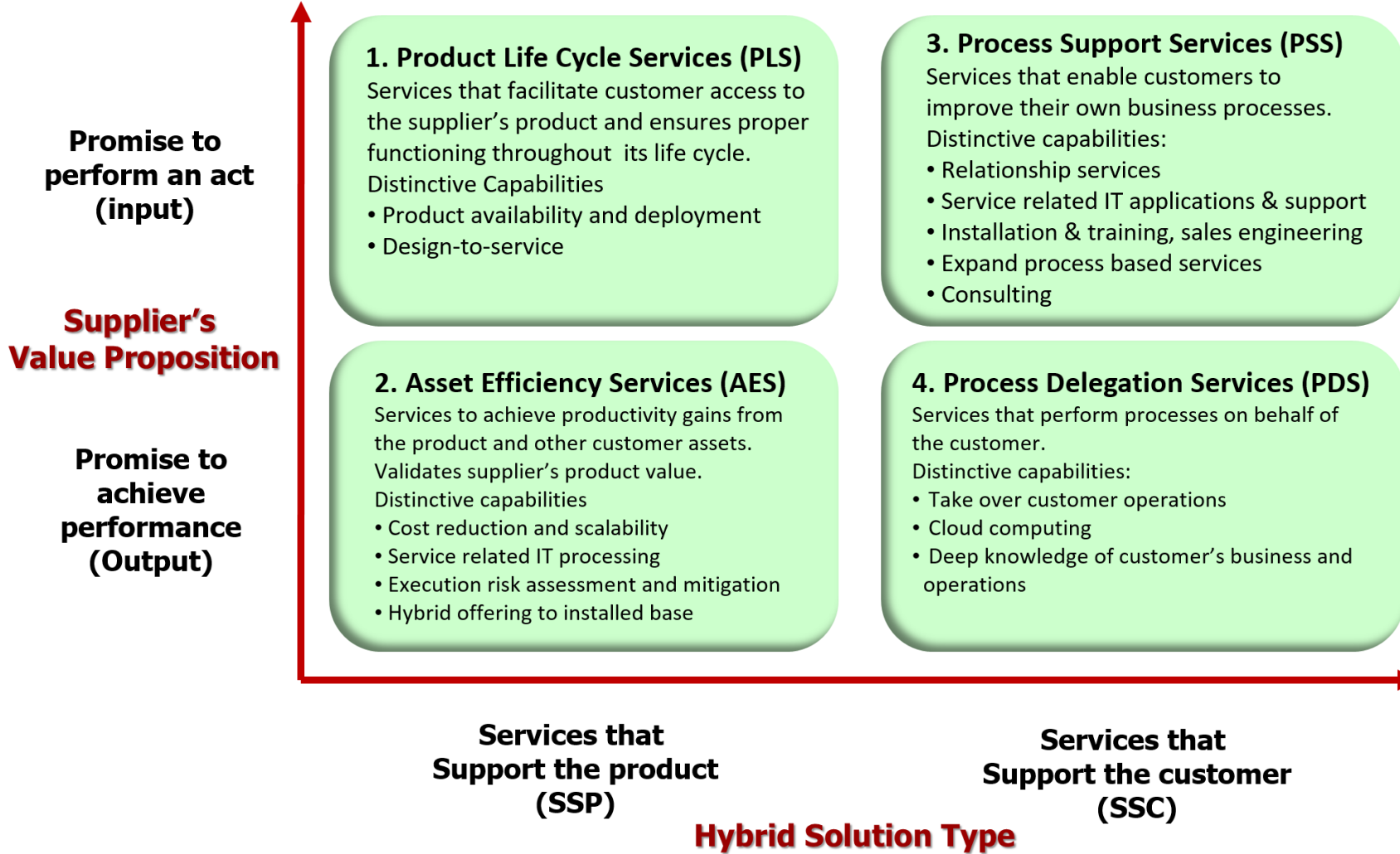


# Service Transformation from Products to Service

Service Construct	#	Goods-Dominant Logic Characteristics	Hybrid Product-Service Systems	Service-Dominant Logic Characteristics
Service Exchange	1	Goods	Services	Service
	2	Products	Offerings	Experiences
	3	Features/attributes	Benefits	Solutions
	4	Transactions	Touchpoints	Relationships
Value Creation	5	Value-added	Co-production of value	Co-creation of value
	6	Embedded value/Utility	Value delivery	Value proposition
	7	Value-in-exchange	Value-in-use	Value-in-context
	8	Economies of scale: products	Economies of scale: products-services	Economies of scope
	9	Business value	Customer value	Ecosystem/societal value
Resource Integration	10	Operand resources	Operand/Operant resources	Operant resources
	11	Producing	Resource acquisition	Resourcing
Actors and Service Ecosystems	12	Value delivery sequence	Supply chain, EDI, CRM	Actor-to-actor value network
	13	Equilibrium systems	Dynamic systems	Complex adaptive systems
	14	Internal IT systems, client-server	Data centers, SOA, SaaS	Cloud, smart systems, multisided platforms

Adapted from: Vargo, S., Lusch, R., and Mele, C., "Service-for Service Exchange and Value Co-Creation: The Service-Dominant Logic Perspective", In Fisk, R., Russell-Bennet, R., and Harris, L., (Eds.), *Serving Customers: Global Services Marketing Perspectives*, Tilde University Press, 208-228, 2013.

# Service Innovation Strategies for Hybrid Offerings



# Service Transformation Framework

Stage	Offering Type	Service Strategy	Primary Value Orientation	Customer/Actors Relationships	Service Applications
5	Pure service No product required from same provider	Integrated cloud services that are typically product agnostic	Service-dominant, value-in-use, value-in-context. Input and output based	Highest service ratio. Focus on scale, scope, and engagement with actors within service ecosystems, service system institutions and arrangements.	Multi-sided cloud platforms, social media, streaming media, cognitive services, crypto currencies, cognitive assistant services, AI services, service ecosystem management, smart city integration, C4iSR, block chain applications.
4	Process Delegation Services (PDS)	Services performed on behalf of customers that are critical for business operations.	Service-dominant value in use, output based	High service ratio. Actor-to-actor service ecosystem. Service provider takes over end-user processes.	Cyber-physical systems such as in-flight jet engine monitoring and maintenance, drone inspection services, autonomous vehicle services, IT service management, smart systems services, analytics services, digital advertising, contract electronic manufacturing services, biometric security, identity management.
3	Process Support Service (PSS)	Results-oriented services that enable the improvement of the customer's operations	Service-dominant, value-in-use, input based	Moderate to high service ratio. Developing actor-to-actor service ecosystems. Service leads, product provisions.	SaaS, PaaS, and IaaS services in public, private, and hybrid cloud deployments. Co-development, process consulting, training, etc.
2	Asset Efficiency Services (AES)	Use-oriented services that increase output and/or reduce costs associated with supplier's product	Goods-dominant, value-in-exchange, output based	Low to moderate service ratio, mostly transactions focus. Service enables product efficiencies. Rudimentary service systems	Productivity improvement, upgrades, updates, product customization, consulting, training, private data center, cloud-based storage and customer service.
1	Product Lifecycle Services (PLS)	Product-oriented services that ensure product availability and performance over the useful life	Goods-dominant, value-in-exchange, input based	Low service ratio, transaction focus. Product dominant with services required to support sales and maintenance of product.	Product integration services (design-in), field engineering support, transportation, installation, quality assurance, documentation, installation, inspection, and testing. Refurbishing, recycling. Hotline help desk.
0	Pure Product	Product-oriented manufacturer with minimal or no services	Goods dominant, value-in-exchange, input based	Transaction focus, provider created value and provides to customer	Range from no service to industry standard customer service, support, and warranty.

## Service Intensity

- Service transition involves concurrent changes in customer relationships, organization structure and culture, processes, technology, and leadership principles to create new value opportunities.
- The “service ratio” metric is actual service sales to total sales. It is used to indicate the progress of a firm’s service strategy migration.
- As service intensity reaches 20-30% of sales the effects of transitioning to services become apparent in terms of increased firm value.
- Higher returns result from service innovation in new markets with higher margins.
- Successful companies that have become sufficiently service oriented have transitioned beyond the product-focused transaction-based customer relationship to service-focused collaborative relationship with customers based on the co-creation of value.

## Service Intensity Threshold Effects

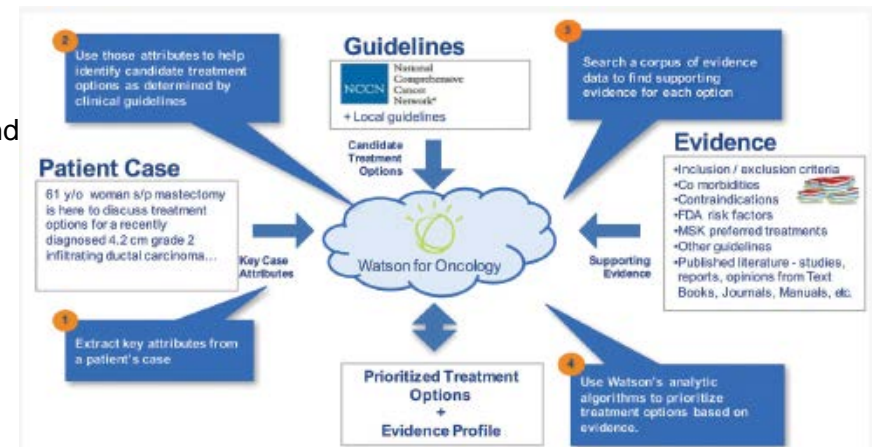
- Service transition involves concurrent changes in customer relationships, organization structure and culture, processes, technology, and leadership principles to create new value opportunities.
- Service intensity has threshold effects that are situation specific. These threshold effects are indicative of changes in value perception and service acceptance by the service provider, customers and other ecosystem actors.
- The threshold effects include:
  1. Changes in markets. E.g. streaming digital content rather than purchasing CDs and DVDs. The “sharing economy.”
  2. Changes in technology. E.g. cloud-based services, multisided platforms.
  3. Changes in consumer behavior. Experiences vs. owning things.
  4. Changes in value execution. Delivery of value vs. cocreation of value, transactions vs. relationships.
  5. Changes in product-first thinking. Services are product extensions vs. products are agents of service provision.
  6. Changes in organization culture. Product thinking vs. service thinking. Services are not important vs. service is our future. The value is in the product vs. the value of the product is the service it enables.
  7. Changes in market and financial performance. Services become a larger percentage of sales and profits.
  8. Changes in the rate of change of service-related parameters.

## Service Intensity Metrics

- Percent of sales and profits from service. Research across industries indicates that as sales of services approach 20-30% of total sales the impact of service innovation on firm value becomes apparent.
- Number of service-based customer interactions vs. total customer interactions.
- Customer relationship intensity. Type and intensity of partnerships with customers.
- Service ecosystem growth in terms of actor members and value created.
- Percent of service content in the solution value proposition.
- Percent of new business from services. Number of new customers, revenues and profits.
- Lifetime value of the customer, percent for services.
- Service value as percent of product value.
- Resources dedicated to services vs. products.
- Employees with direct service responsibility vs product responsibility.
- Percent of T-shaped employees vs. I-shaped.
- Number and percent of customer inquiries focuses on services vs. products.
- Website and social media engagement on service solutions vs. products.
- Service productivity vs. product productivity (Revenues per employee, etc.)
- Increases in the rate of adoption of new services.

# IBM's Watson Health Cloud

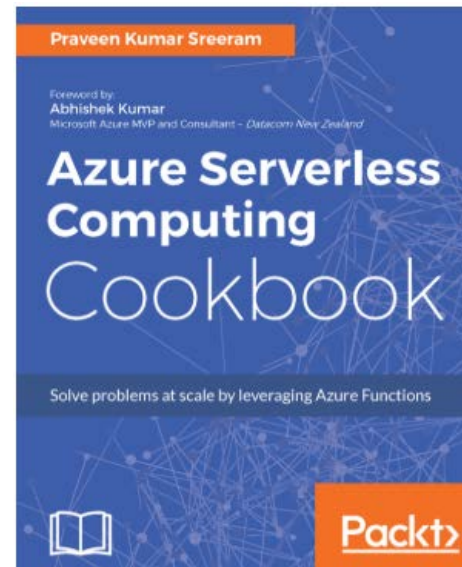
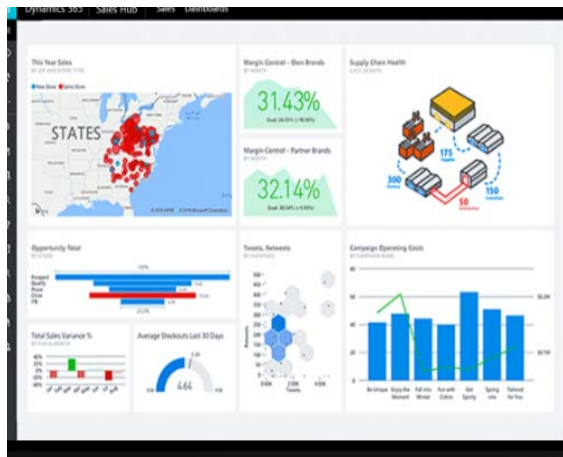
- IBM Watson Health Cloud is an open cloud platform for physicians, researchers, patients, healthcare organizations, medical technology companies, pharmaceutical companies, insurance companies, business firms, and governmental organizations.
- IBM develops health and wellness applications for the Watson cognitive computing system to improve the quality and efficacy of personal healthcare.
- Watson health services are HIPAA (Health Insurance Portability and Accountability Act) compliant with privacy and security rules for patient information and enable secure access to individual health data and a comprehensive view of factors that impact personal health.
- The service platform consists of Watson's advanced cognitive computing capabilities to connect to an ecosystem of researchers, physicians, and hospital, medical, and pharmaceutical partners within the healthcare community on an open, secure, and scalable platform.
- IBM partners with the AMA and Cerner Corporation to bring data structure and best practices to health care data (research, practice and patient outcomes). This collaboration addresses the problem of a lack of a common data structure for organizing health data. The initiative is focused on organizing research and patient-centric data to identify factors that are most predictable in patient outcomes.
- Other organizations in the IBM service ecosystem engage in data collection, analysis, and solution development with IBM:
  - **Apple** and **IBM** have integrated Watson's cloud services and analytics with Apple's open-source ResearchKit to develop apps for iOS and iWatch. Watson Health collects and analyzes data from watch users and surveys. The SleepHealth app is a research study and wellness tool that uses iWatch sensors, gyroscope, accelerometer and heartrate monitor to record sleep activity. The data helps users to improve sleep. Physicians and researchers use the data to explore relationships between sleep quality, alertness, productivity, general health, and medical conditions. User data is stored on the IBM Health platform.
  - Medtronic uses the Watson platform to collaborate on the development of highly personalized care management solutions for diabetic patients.
  - Johnson & Johnson is collaborating with Watson Health on pre and postoperative patient care and management of chronic health conditions that account for more than 89% of global healthcare costs.
  - IBM's Watson for Oncology Initiative partners with Memorial Sloan Kettering Cancer Center (MSK). After 5 years of training, Watson is able to more rapidly analyze millions of medical research publications and patient data to prioritize and recommend treatment options. In one study, Watson agree with the treatment board 96% of the time and arrived at the recommendation 78% faster (Cavallo 2017).
- Strategy: The IBM Watson Health Cloud may be viewed as a Stage 3 Process Support Service (PSS) initiative that improves customer/partner operations. Fully implemented the platform could achieve Stage 4 Process Delegation Services (PDS) that perform diagnostics and health management applications now performed by healthcare organizations that lack Watson's cognitive computing capabilities.





# Microsoft's AI Cloud Service Strategy

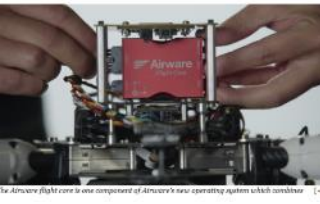
- Microsoft, is a legacy software firm from the PC era. It was not an early advocate for the cloud service business model.
- It was a disruptive innovator with operating systems and applications software. However, as competitive technologies challenged the market leader, the firm was and continued to be GDL product and services-as-a-product focused.
- The company protected its dominant position in operating systems and office productivity software. It was slow to innovate.
- Bill Gates almost missed the Internet. Microsoft fought open source and missed the mobile revolution to continue focus on the PC. The company failed to see the cloud. Bing is a “me too” search engine. Windows 8 was a disaster and Windows 10 adoptions have been relatively slow when compared with Windows 7.
- Microsoft plays catch up with Amazon Web Services with Azure and Google with Office 365 and Outlook.
- Outlook is morphing from just email to a cloud platform that connects users to other Microsoft and third-party services such as Skype, LinkedIn, Uber, Evernote, and Yelp.
- Microsoft has deemphasized the role of Windows. It is shifting applications from the desktop to the cloud. Since 4Q 2017 Azure Cloud Services revenue grew 98% and Office 365 grew 41%. Windows operating system grew only 2%. Cloud applications are the largest areas of growth.



## Microsoft's AI Cloud (Cont'd)

- Microsoft's cloud service strategic imperatives:
  1. Implement a seamless architecture across the entire "digital estate." Customers choose Microsoft Cloud for its operational consistency, productivity and security that spans the entire digital estate, including Windows 10, cloud security and management, Dynamics 365, Enterprise Mobility and Security, and Azure. Microsoft has a customer focused service thinking mindset.
  2. Deliver on consistency. A consistent stack across the public cloud and the edge is needed to support emerging applications such as Intelligent Cloud and Intelligent Edge. Consistency across development environments, operating models, and technology stacks. Microsoft's hybrid cloud's consistency is one reason nearly all Fortune 500 companies have chosen Azure.
  3. Partner 'deeply' with global corporations. Help them build their own software capability. The company transfers its capability to customers to build their own industry and firm specific applications.
  4. Hybrid cloud is a strategic destination. Intelligent cloud and intelligent edge are centered on AI and IoT.
  5. AI is the new heart of competitive advantage. The core competency of any business in future will be its ability to convert data into AI that drives competitive advantage. Microsoft introduced Windows Mixed Reality. The application, which has a voice, gaze, and gesture interface, aims to change how teams collaborate.
  6. Reject the software suites-for-everyone mentality. Connections between diverse applications are much more important. For example, Dynamics 365 seamlessly connects with Microsoft 365. Dynamics 365 consists of CRM applications that are called the Customer Engagement Plan. Microsoft 365 consists of Office 365, Windows 10, and Enterprise Mobility + Security. New connections to follow.
  7. Expand, deepen, and accelerate the infusion of AI into not only everything Microsoft makes, but also everything its developer community makes.
- Strategy: Microsoft is closing the gap with cloud-industry leader AWS. The company is assuming a Stage 4 Process Delegation Services (PDS) position with a platform-based approach that infuses AI into enterprise and consumer applications. Customers are finding it easier and economically attractive to move to Microsoft's cloud. The company has come a long way from a Stage 1 GDL company with an opportunity to become a Stage 5 pure service enterprise.

# Intel's Drone Cloud



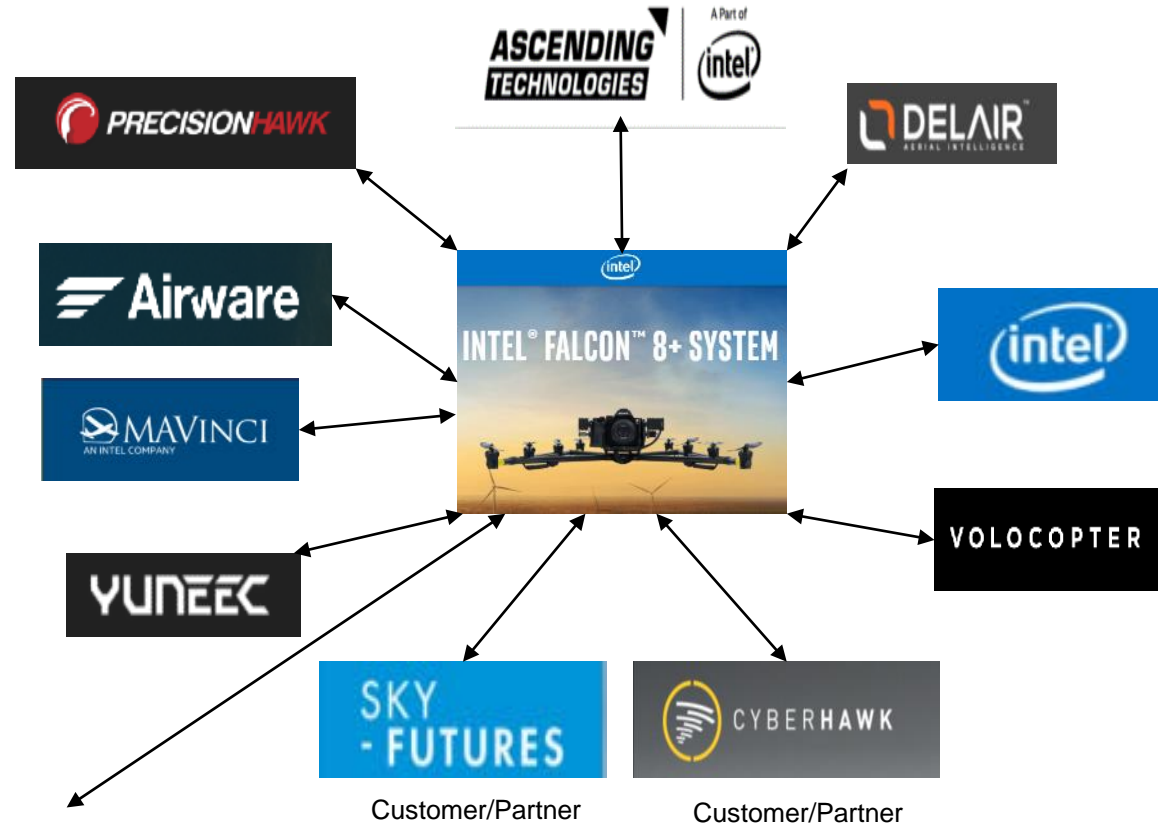
- The market for aerial drone systems is one of the fastest growing in the IoT sector.
- The drone industry presents a major opportunity for technology companies.
- Drones have become flying cloud-based computer systems with 3D/4D imaging, autonomous navigation, advanced communications, and analytics. Drone technology is transferable to air, sea, undersea, and land-based autonomous vehicles.
- Applications include aerial inspection and monitoring of industrial assets, construction sites, solar towers, offshore drilling platforms, agriculture, mining, forestry, security, perimeter defense, and anti-drone solutions.
- Intel's drone strategy is to become the keystone actor in the professional autonomous aerial vehicle service ecosystem.
- The Falcon 8 and 8+, Intel's first entries in the autonomous UAV market are end-to-end complete drone systems. Intel has become a systems integrator of the drone components including ICs, 3D cameras sensing systems, drone operating, navigating, and flying systems, communications, analytics, data management, reporting and cloud services.
- Service Ecosystem Development:
  - 2014, Invested \$10M in fixed wing professional drone manufacturer PrecisionHawk.
  - 2015, invested \$60M in Shanghai drone aerospace company Yuneec. 1M+ drones per year for commercial and hobby markets.
  - 2015, invested in startup Airware, developer of drone flight systems: hardware, vision systems, control software, and cloud data storage.
  - 2016, acquired MAVinci GmbH, aerial drone developer and software systems.
  - 2016, strategic partnership with Delair-Tech, developer of fixed-wing professional drones for mapping, surveying, and inspections/monitoring of commercial infrastructure.
  - 2016, acquired Ascending Technologies, developer of the octocopter Falcon 8. Has sense-and-avoid and follow me technologies. Uses *Intel RealSense* imaging technology with depth-sensing and distance ranging. The drone has obstacle avoidance and repeatable autonomous missions capability. Falcon 8+ is an upgrade.
  - 2017, September, Intel introduced its *Intel Insight Platform*, a cloud-based analytics service that processes, analyzes and reports data generated from drone platforms. The platform allows customers to store, share, and manage the data collected during drone flights. *Intel Insight* generates 2D and 3D models, take measurements, and make annotations for sharing across teams and runs advanced data analytics such as change detection and structural problems.
  - 2017, Intel invested in and formed a strategic partnership with Volocopter, the world's first certified passenger electric VTOL air taxi.
- Strategy: Intel is becoming an essential actor in the professional drone market. Its developing service ecosystem creates a market for Intel components, software, aerial control systems, 3D sensing, and cloud-based analytics, reporting and full-service drones. Evidence suggests that Intel is taking a position in Stage 3 Process Support Service (PSS) of the service transformation process. Intel's drone initiative is providing Intel an opening for its entry into other segments of the autonomous vehicle industry.



# Intel's Drone Service Ecosystem

## Markets Segments

- Commercial
- Recreation
- Government
- Educational Use
- Training
- Military



## Institutions



- RealSense SDK 2.0
- RealSense D400-series depth cameras
- Windows 10, Ubuntu 16.04, Android
- ROS, LabVIEW, PCL, OpenCV
- C, C++, Python, Node-JS



# Service Transformation Assessment

Service Thinking/Strategic Approach	IBM Watson Health	Microsoft Corporation	Intel Corporation
<b>Service Thinking:</b>			
<b>Service Design/User Experience</b>	Strong Capability	Good capability, developing	Transitioning from product focus
<b>Service Culture</b>	Service Culture being promoted enterprise wide	Moving from product culture. Service-oriented leadership	Good for Drone unit. Still product DNA company wide.
<b>Service Ready Business Architecture</b>	Transitioning	Transitioning to AI focus	Good, developing for drones
<b>Service Platform</b>	Strong platform	Strong platform	Good, developing for drones
<b>Analytics</b>	Industry leading capability	Developing	Integrating capability from acquisitions and partners.
<b>Value Co-creation Enablement</b>	Strong for Watson Health	Good for individual users. Strong for Enterprise	Good with partners, customers and acquisitions
<b>Strategic Approach:</b>			
<b>Service Ecosystem Development</b>	Strong ecosystem	Good, developing	Strong ecosystem
<b>Cloud Application Integration</b>	Very good	Very good	Transitioning for drones and other business units.
<b>Service Transformation</b>	Stage 3 Process Support Service (PSS). Could move to Stage 4 Process Delegation Service (PDS)	Stage 3 Process Support Service (PSS), moving to Stage 4 Process Delegation Service (PDS)	Stage 2 Asset Efficiency Service (AES). Taking a position in Stage 3 Process Support Service (PSS)

# Conclusions

- This presentation reviews the current state of the service transformation process for three formally product-oriented enterprises that have adopted service innovation strategies.
- The current progress of the companies in terms of evidence of service thinking and within a framework for service transformation is apparent.
- In each instance the companies IBM Watson Health, Microsoft, and Intel's drone organization appear to have integrated service thinking into their business strategy and have developed commercial hybrid solutions with strong service components.
- Both IBM and Microsoft have a clearer opportunities to move to Stage 4 Process Delegation Services and Stage 5 pure service providers. At their core these companies are software-focused cloud service companies. Intel is a product company with some operations that are becoming service focused.

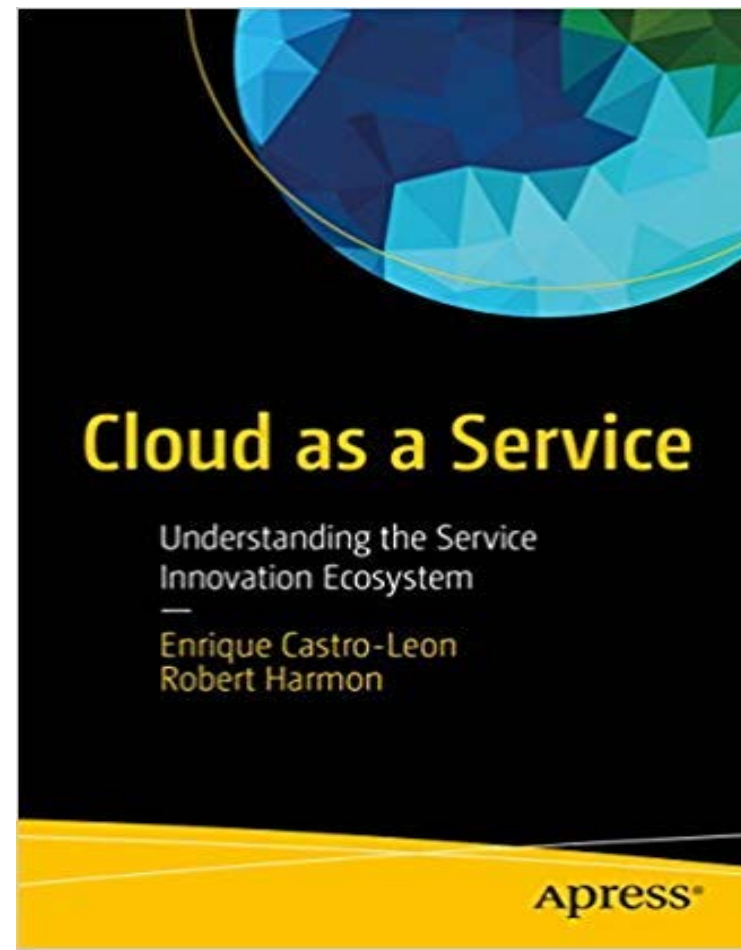
# Research Agenda

- Developing new model of service innovation with the introduction of 5G mobile technology and IoT strategies such as smart services and smart service systems for the creation of compelling customer experiences.
- Development of cyber-physical systems and services. CPSSs are physical and engineered systems that are monitored, coordinated, controlled, and integrated with ICT. Examples include smart medical devices, intelligent highways, robotic systems, autonomous vehicles, defense systems, process control systems, factory automation systems, and building and environmental controls, smart spaces, smart cities, and associated real-time analytics.
- Development of predictive models for roadmapping threshold effects in the transition from SSP to SSC.
- Leveraging service asymmetry for value cocreation in the cloud. What impact will new technologies that can drive asymmetric service innovation such as cognitive computing, quantum computing, AI, robotics, autonomous capabilities, energy harvesting devices, smart systems, smart sensors, and the Internet of things (IoT) have on enterprise business models?

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