

# Service Science: A Human Economy

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## Abstract

The following document presents an analysis, with a focus on its economic and technological involvement, of the article written by IBM's Jim Spohrer titled *Service Science, Management, Engineering, and Design (SSMED): An Emerging Discipline*, where a new vocabulary is defined for the emerging discipline of Service Science.

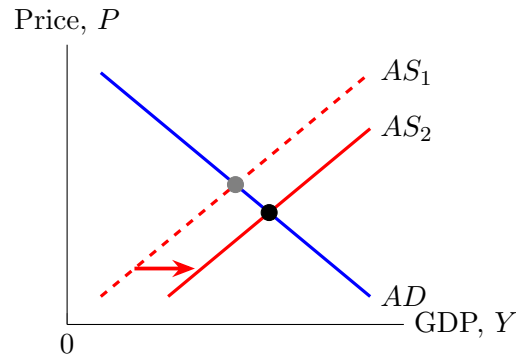
The first thing that comes to the mind of any person when talking science, whether one is a scientist or not, is the fact that science can and must be proved. Hence, if we are set to talk about a new emerging -and even dominant- science discipline called Service Science, the first thing to say on its behalf is that Service Science is fundamentally based on the crude fact that population is increasing. It is a dominant science in the actual economic system due to its roots in the increase of population. One of the many outcomes of the Industrial Revolution is the Law of Acceleration by Henry Adams, where the growth of technology, production and, most evidently, population, can be modelled by an exponential function. But what does the exponential increase in population actually entails in global economy? In the market? In our lives?

Service science involves an specific vocabulary that defines ten key concepts: resources, (Service System) entities, access rights, value proposition interactions, governance mechanisms, (Service System) networks, (Service System) ecology, stakeholders, measures and outcomes. Out of these ten, the first eight are the ones that fundamentally helps one to communicate in the service science field. Therefore, an analysis of what is presented in the article requires some brief definitions for the reader:

- I **Resources**: any nameable physical and non-physical thing. There are four types, which are all the permutations of physical, non-physical, with right and without rights.
- II **(Service System) Entities**: dynamic configurations of resources, where at least one resource has rights (including access rights to the other resources in the configuration). Examples: people, businesses, organizations, cities, open-source and online communities.
- III **Access rights**: these can be of four types: owned, leased, shared access and privileged access.
- IV **Value proposition interactions**: a value proposition is a value co-creation mechanism. Entities interact via value propositions, which seek to co-create value for both entities. These mechanisms reconfigure an entity's resources or access to them. The outcome of this mechanism is a win-win relationship.
- V **Governance mechanism**: prescribe a process for resolving a dispute. A dispute is the result of unrealized expected value between entities.
- VI **(Service System) Networks**: the patterns of interaction of a population of entities.
- VII **(Service System) Ecology**: populations of entities. The universe of all entities are the (Service System) World.

**VIII Stakeholders:** there are four main stakeholders: customer, provider, authority and competition. From these, one can deduce the Measures: quality, productivity, compliance, innovation.

By knowing these, we can proceed. Service is associated with knowledge-intensive interactions, and thus it is key to keep in mind throughout the analysis of the article that service is expertise, knowledge. If this is considered, then the mentioned exponential rise in population means an increase in services offered, or an increase in the Aggregate Supply of services in a market. In the diagram below, global service market is presented:  $AS_1$  moves to the right and becomes  $AS_2$ , representing this increase in service supply. The intersection with the Aggregate Demand sets the price, and thus we see that the increase in supply would decrease the price people are willing to pay for a service now when compared to the past. Therefore, from an exponential growth in population, and if people are expertise, and if expertise is service, then the supply of services grows with population, decreasing the price of services and hence the GDP of an economy, as shown below:



If this is what is happening now, then why would Service Science be dominating if the price of services is decreasing everyday? This is where the article takes the bull by the horns when it states: *"In cities, division of labor reaches new heights as population increases."* With this, Adam Smith's theory of absolute advantage and David Ricardo's theory of relative advantage come to the table. Smith noted that countries have different production costs due to differences in input availability, and therefore a country's costs of production would decrease if it traded with a lower cost country. Then Ricardo stated that a country will benefit from specialization in the production of goods for which it has a lower cost, because trade would happen. Smith's theory results in the division of labor for increase in capacity, while Ricardo's theory results in appropriately dividing tasks among nations for increase in individual and collective capacity.

Therefore, if there is specialization of labor as Smith and Ricardo suggest, less workers offer the same service, since there is competitive differentiation among them. When the amount of labor for an specific good decreases, the price of labor increases as it became scarce, and thus the dominance of services nowadays: the theoretical decrease in the price of service illustrated above is based on the assumption that labor is abundant and thus the offer/supply shifts to the right, but since there is division and specialization of labor, workers' differentiation makes a service unique and hence the labor becomes scarce again, increasing the price people are willing to pay for it, which neutralizes the decrease in price in  $AS_2$  and even suggest that  $AS$  for each service in particular is moving left-wise due to the decrease in supply given by its uniqueness, increasing the price and thus GDP in nations, as stated by Spohrer.

With this dynamic shifting of the curves in the global market of services, we see that offering services requires more than what product offering requires. This has an impact in Marketing as well, since entities interact with value co-creation mechanisms or interactions, involving communication and thus the Marketing field is in charge of communicating the appropriate image to attract and maintain customers. This lead to the additional three P's in the service marketing theory: appart from the four P's in product marketing (product, place, promotion, price), service marketing adds people, physical evidence and process, all consequences of interactions.

Spohrer states that *knowledge and relationships are about people*, and with this the present thesis becomes a full-circle statement: if expertise is service and expertise is knowledge, where knowledge is about people, then service is about people, which is what the phenomenon of exponential increase in population resulting in the dominance of service market is trying to tell us. Service science, apart from being provable by nowadays market phenomena explained, must also be *measurable*. The measures of service science are a result of what stakeholders measure naturally, as mentioned above: quality (customer), productivity (provider), compliance (authority) and innovation (competitors). Let's analyse these.

Quality is measured by the customer, depending on what it receives from the provider. Since service is about people, this interaction of value evaluates the quality based on human phenomena, where empirical studies show that service quality levels inside the firm are reflected outside the firm in the value experience of the service. This is a human phenomenon, since humans transmit their identity (history, experiences, culture) in what they do, which includes providing a service to another entity. This emphasizes business culture practices for the employees, which may be the reason of the rise of Social Responsibility requiring the evidence of an appropriate working environment inside a company.

Moving to the Productivity measure, which is evaluated by the provider, means moving towards Operations. Operations and productivity center on the process inside an entity that leads to the delivery of value. By looking at the Operations side of an entity, we unveil a concept that appears more and more inside each measure of service science, which is *balance*. Operations must balance flexibility and optimization of the process, and this measure or stakeholder view relates to the other two remaining by involving balance. What sticks together the four stakeholder views is the sharing of the concept of balance. We can see another example of balance from the authority stakeholder's view: the compliance measure.

The image of Government becomes the biggest and most universal form of authority. The market, considered as "the invisible hand" by Smith, is regulated formally by the government authority, generating the compliance measure. It is a measure and not a constant, since it must shift, and hence involves the balance we mentioned. There must be an ever-changing adjustment of the percentage of compliance and risk, in a way that the sum of the two percentages give out the 100%: the bigger the compliance level percentage is, the smaller the percentage of present risk will be. Risk emerges from the absence of compliance because said absence makes entities self-govern, which gives space for risk due to the increase in possible situations for which decisions are required. By allowing risk in a Service System, there is a steeper (bigger rate) learning curve for the entities, which forces them to change and thus innovate. Therefore, an important conclusion is reached: government mechanisms adjust the learning rate of entities. Whenever risk percentage lowers, it means that government mechanisms act like policies, and these can be either expansionary or restrictive policies.

A compliance percentage increase means that policies are applied by the government authority stakeholder to shape the market, and thus risk lowers as possibilities of action for entities narrow towards what the government states: for example, an expansionary monetary policy from a Central Bank often means the increase in money supply so that entities are pushed towards spending more money. But when we say risk lowers, didn't it mean a reduction of learning rate? It is in fact a lower learning rate by the reduction of self-government from entities, but by following a policy whenever there is high compliance, an entity stops exploring (learning) and starts exploiting (applying): policies are used with a purpose (in the expansionary monetary policy example, it would be to increase Aggregate Demand), and this makes a market predictable, which enables an entity to anticipate and prepare if the entity is familiar with previous studied scenarios, and this is in fact exploitation (appliance) of knowledge instead of learning.

Thus, it is important to note that the balance involved in any measure of service is in fact balancing exploration and exploitation: in Operations the balance was between flexibility and optimization, which is reduced to meaning exploration and exploitation basically; in Government mechanisms the balance is between risk and compliance, which has been proved to be the same as exploration and exploitation as well.