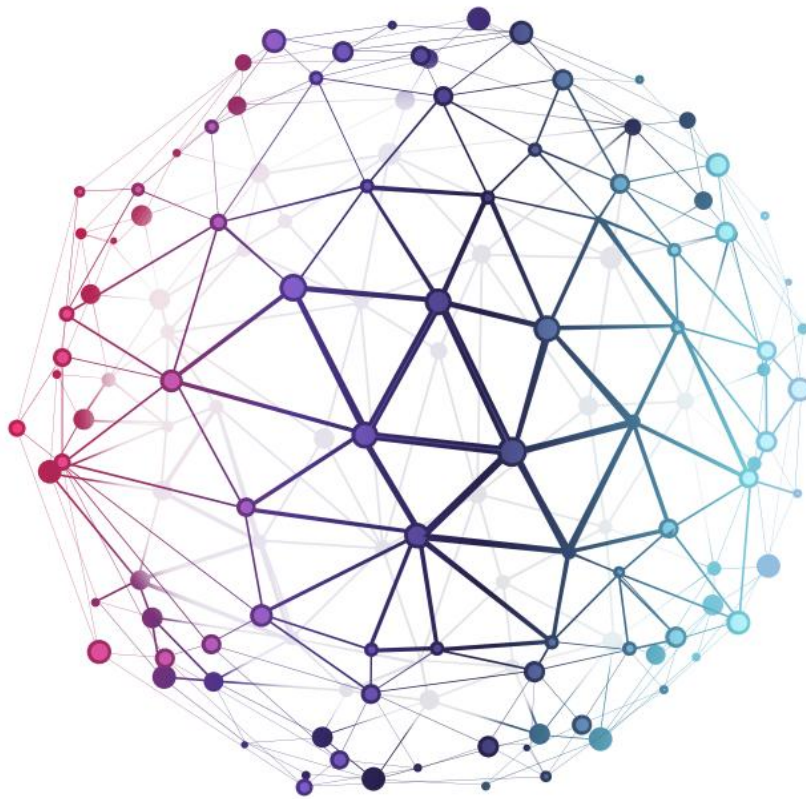




Data Driven Service  
Innovation  
a visual checklist



## Preface

Most service development methods I encountered were point solutions focusing on details. Rarely I saw methods that supported me to get a consistent umbrella overview of the whole service operation I was responsible for. During the nearly 20 years of managing field-service and professional-service organizations in sales, marketing, service delivery and ICT roles I searched for such a tool. A tool that is some sort of collaborative method (or visual model) that assists multidisciplinary teams to build innovative data driven services.

Luckily the Responsible Value Creation with Big Data (VWData) programme gave me the opportunity to develop a tool myself. The VWData is a starting impulse programme of the Big Data Route of the National Science Agenda (NWA) that focuses on these issues. The VWData consortium distinguishes itself from other Dutch programmes and initiatives around Big Data by focusing primarily on the question: How can we use Big Data in a way that is legally and ethically responsible and socially acceptable?

So, I formulated the following research question: Can I produce a visual model like checklist (in Dutch called a 'praatplaat') that can be used by organizations to keep overview of the build and fulfilment of an innovative (digital) service and accompanying data-use in that is workable in complex service contexts? This white paper is my first attempt. Hopefully my attempts are not in vain and the first results are of use to you. Then again without overview responsible data driven service innovation is not feasible.

## About Eric van Tol

Eric van Tol CTO of Advanced Programs had different management positions at NCR, Olivetti and Ordina fulfilled, before he founded Andarr; a consulting firm specialized in ICT migrations and transitions of complex infrastructures. Besides CTO of Advanced Programs, he is also Director of the Fontys University of Applied Science Expertise Centre Big Data, Manager at Floridata (an independent data platform for traders in the horticultural industry) and Member of the Economic Board Utrecht.





# What is data driven service innovation?

**Service is everywhere. Services accounts for more than 80% of economic activity. Also, the boundaries between manufacturing and services continue to blur with servitization of products. The framework of Lusch & Vargo Service-Dominant Logic take a step further and see service is the fundamental basis of any exchange.**

The proliferation of (big) data has brought about services in which data use contributes to value creation. Most examples of value creation are service process improvements and changes in existing services. More and more new data driven service concepts or new customer experiences based on data are seen in the market. New services can create even more value than just optimize existing services. These new services are mostly personalized services and have attributes like predictive behaviour, immediate response (realtime), tracking (location based) and immersive & contextual experiences (where virtual reality, mobile and gamification is combined). The discovery of these new services is complex endeavor because these innovative services often try to establish desires that previously did not exist, and which are sometimes unarticulated and non-tacit. An important goal for much enterprises is to create new or better services based on data or in short: 'data-driven service innovation'.

## What is the situation?

Institutes running and building services are often part of an ecosystem consisting of several companies. These institutes are ranging from a single contractor, a small company until a global corporation. Together these institutes are end-to-end responsible for a chain of steps like buying/finding proper data, designing a working service, creating consumer awareness, delivering

a reliable and desired service, supporting consumer reliance, respecting privacy, etc. The institute must keep an overview of all aspects of the implementation and development of services, of the influence of new regulations, the possibilities of ICT, the market position, social developments and the reaction to new market developments.

Most available methods and solutions are 'point solutions' focusing on a specific element or functional role of this ecosystem. The institutes themselves are responsible to tie everything together. Institutes need a holistic and integrative approach that supports these end-to-end process steps. Maintaining an overview that makes data driven service innovation more explicit especially in multi-disciplinary groups of the service ecosystem.

## What is our ambition?

Can we produce a visual model like checklist (in Dutch called a 'praatplaat') that can be used by organisations to keep overview of the build and fulfilment of an innovative (digital) service and accompanying data-use in those complex service contexts? Can we create a collaborative visualization to be used to articulate what an institute knows (or not know) about total service life cycle and how well steps are connected (or not, or not even visible)?

### Four archetypal roles

The visual model is depicting a combination of four perspectives of archetypal roles (the user, the seller, the builder, the datafyer/informer) found in any organization. This service perspectives are kept simple, so they are easy to understand and projected on the most important roles in a service ecosystem: the customer, sales marketing, service delivery and ICT.

These perspectives should be in view of any data driven service ecosystem and contains thus:

1. **Use the service:** the consumer experience and behaviour,
2. **Sell the service:** guide and convince the consumer,
3. **Build the service:** develop and provision the actual service,
4. **Operate the service data:** and getting the accompanying data needed to run the service

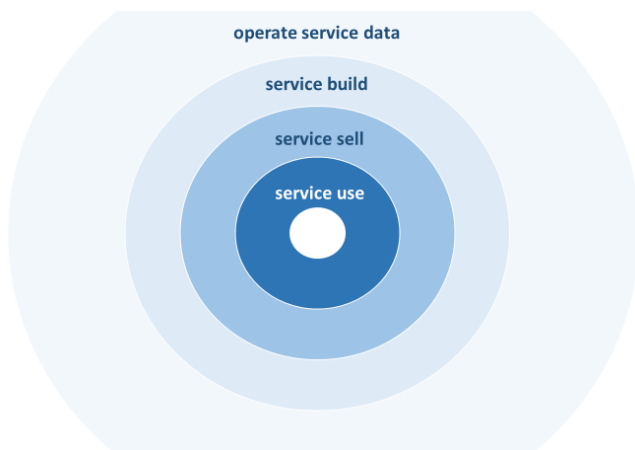


Figure 1 The four archetype roles

### The self-reinforcing network effect cycle

Successful data driven service development is often a 'network effect' cycle. A endless cycle of self-reinforcing actions: get a data set, develop a service on this data, more users create more data, more data improves the service, better service attracts more users, again creating more data,.. etc. The ultimate goal to enter this cycle is to dominate the market with a critical mass of consumers. Obvious examples are Uber, Google or Booking.com.

All steps can be done manual or can be fully automated. Of course in the case of digital services a lot of steps are automated or should be automated. In a complex service eco system it is difficult to determine what is done exactly by whom and when.

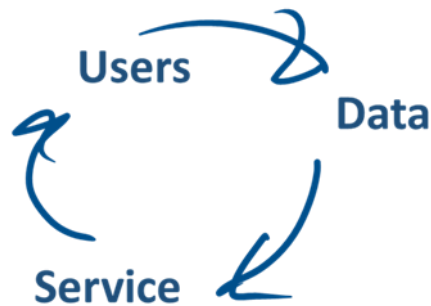


Figure 2: Self-reinforcing network effect cycle

# From 4 archetypal roles to 4 Service Cycles

For each archetypal role the different tasks of building and running a data driven service are described. Resulting in visualisation are four endless feedback cycles on: user perspective, the sales/marketing perspective, the service provider perspective and the ICT perspective.

A cycle consisting of:

1. **service use** the typical consumer actions: aware, interest, desire, buy
2. **service sell** managing the offer by sales marketing organisation: prospecting, qualifying, aligning, proposal
3. **service build** running the service by the service delivery organisation: design, minimal valuable solution, test, deploy
4. **operating the service data** or inform/datatify the service build role by the ICT organisation: intake, select target data, find patterns, actionable insight

## Sort of stretched Deming cycle

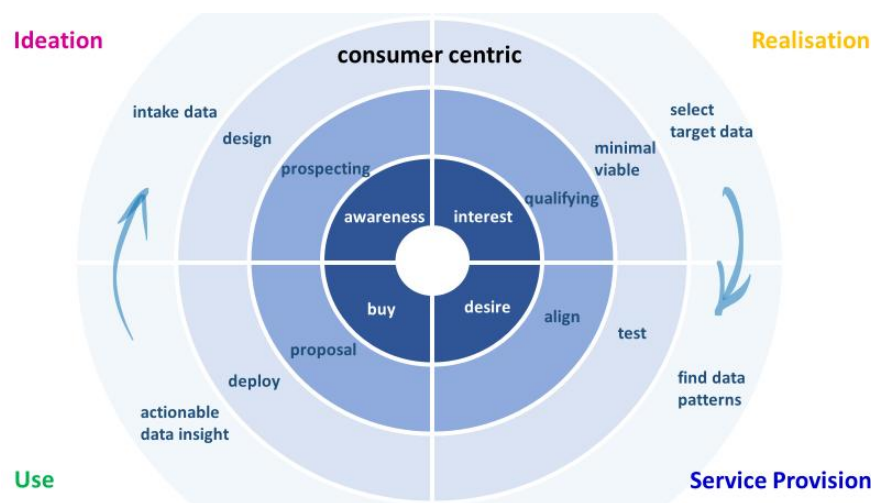


Figure 3: Four Service Cycle consumer centric depicted

The cycles are linked to the General method outline of Marlies van Steenberg and Jeroen Grondelle of Hogeschool Utrecht containing the steps ideation, realisation, service (provision) and use. These steps can also be seen as a Deming cycle: plan, do, check act and the four archetypal roles or perspectives as a sort stretched Deming cycle. The visualisation is then a combination of a plan do check act "Deming Cycles" on different levels of organizational operation. For each of the archetypal roles or perspectives there are many examples.

**Plan:** **Ideation** phase cover the steps: awareness of the user, prospecting the offer, design the service, data is made available (intake data)

**Do:** **Realisation** phase cover the steps: the user has interest, the offer is qualified, the service is ready (minimal viable), target data is selected

**Act: Provision** phase cover the steps: the user wants to buy, the offer is aligned, the services is tested, the data patterns found & verified

**Check: Use** phase cover the steps: the user buys, the proposal is final, the service can be deployed, actionable data insight used (mostly by fetching data with the right decision criteria)

This Service Cycle can also be read axially. The axial sequence of steps can be inside out or outside in depending how the service system is organized or automated. Especially in (near) real-time services these steps go back and forth in milliseconds and are not necessary neatly sequential. Most service eco systems are difficult to follow and seldom behave like this clean idealized geometric model. It should be emphasized that it services as a checklist not as a real description of the processes at hand.

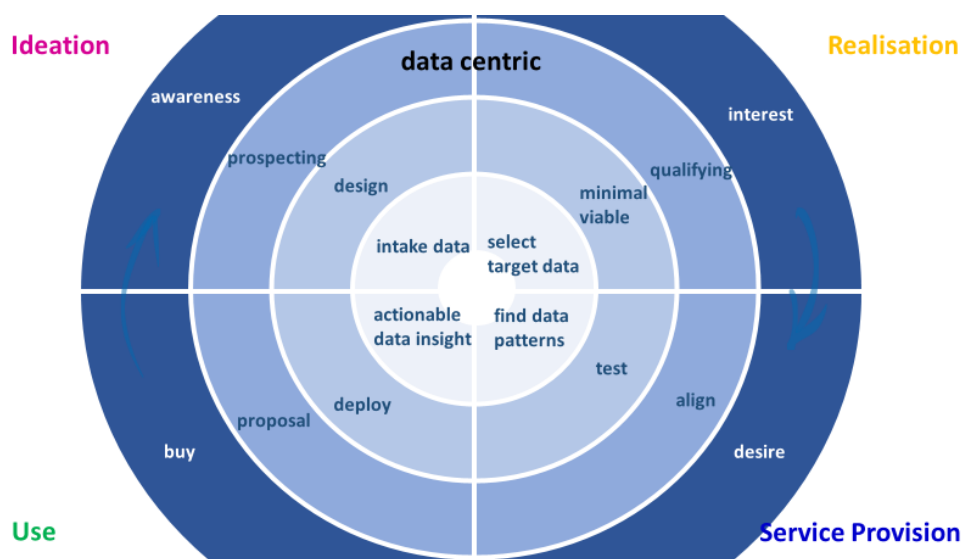


Figure 4. Four Service Cycle data centric depicted



# Service projects are messy experiments that are Data centric and Consumer centric at the same time

The figure 3 shows the consumer in the center, but you could also put the data in the center see figure 4. The cycles can be depicted inside out or outside in.

Most data driven service projects are messy experiments with a continuous interaction between poor requirement articulation and naive exploration of data sets. A continuous iteration between knowing the problem (hopefully in co-operation with consumer) and having the data (a search of the right data). Data driven services can start at the available data or at the consumer requirements. The cycles can initiate with the consumer in the center, but you could also put the data in the center. New data can support refining questions and better questions can start the search for better data. All steps can happen simultaneously and can be crisscross connected at all levels. Most projects data driven services are a messy combination of both approaches in a mostly very complex ecosystem of stakeholders. So, the concentric cycles can be depicted inside out or outside in.

The cyclically and axially steps from the previous figures 3 and 4 can also be represented as a matrix:

	Ideation	Realisation	Service provision	Use
Service use:	awareness	interest	desire	buy
Service delivery:	prospecting	qualifying	align	proposal
Service build:	design	minimal viable	test	deploy
Operate Service data :	intake	select target data	find data patterns	actionable data insight



## Spit Service Data Operation cycle in two

As an example, we describe the Service Data Operation or inform/datafy role in more detail. The Service Data Operation role is again spit in two (in practice heavy intertwined) roles: A **data wrangling** role describing data management processes and a **data analysis** role describing the data science processes. The cycle of analyzing data contains the steps: gathering data, understanding data, modelling & analyse and deploy model. The cycle of wrangling the data contains the steps: intake & store raw, structure/refine, profile/enrich and publish data/prediction. The two cycles are depicted in the matrix below:

<b>Operate data:</b>	intake data	select target data	find data patterns	actionable data insight
<b>analyse data :</b>	gathering data	understanding data	modelling & analyse	deploy model
<b>data wrangling :</b>	intake & store raw	structure/refine	profile/enrich	publish data/prediction

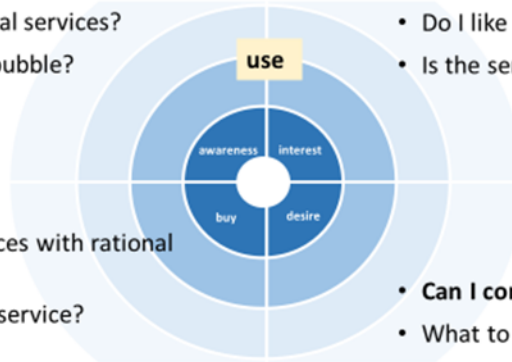
The archetypal stakeholder of the data wrangling role and a data analysis role is the ICT organization. These roles are performed by software development, data science and data engineering teams that are responsible for running the supporting ICT. All information of data sources, data owners and data operating software applications needed to run the service is useful. These qualitative inputs help to increase effectiveness.

## Check questions examples as inspiration

Check questions should be seen as aid and inspiration for your own questions suited for your specific situation. The check questions are examples from archetypal role perspective per process step per cycle. So, we have  $4 \times 4 = 16$  sets of questions per process step.

## 1 - Checklist for consumer actions: aware, interest, desire, buy

- Do I know what profile I have?
- What is my budget?
- Do I shop impulsively online?
- Why do I like in a pedicular brand?
- What time do I spent on digital services?
- Am I aware of my own filter bubble?



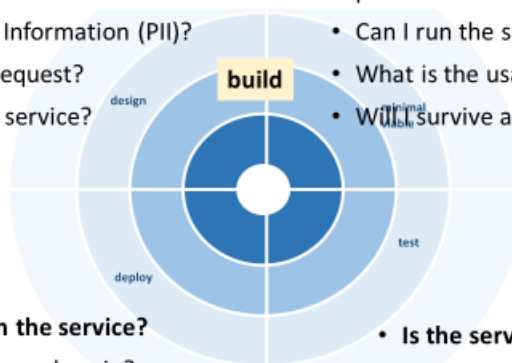
- What do I like, want and need?
- Can I avoid spending triggers?
- What services are mandatory?
- How do I find the right service?
- Do I like the service or service provider?
- Is the service provider proven sustainable?

- Can I explain my choice?
- Do I justify my emotional choices with rational reasons?
- How easy can I get out of this service?
- Can I file a complaint?
- Is there a form of guaranty?
- Can I cancel the service easily?
- Am I addicted to this service?
- Can I tweak or hack this service?

- Can I compare different services (online)?
- What to do when I buy a service?
- Does the service have a fair price?
- Do I understand the terms and conditions?
- What is the quality of the service?
- Do I understand what service does?

## 2 - Checklist for service sell steps: prospecting, qualifying, aligning, proposal

- Do I consider the experience of all the people affected by the service?
- Can I explain the basic components of each service-features and service-benefits?
- Can I estimate service usage?
- Do I need Personally Identifying Information (PII)?
- Can I report and erasure PII on request?
- Can the consumer co create the service?



- Is the service functioning?
- What analytic and recommendation models work? What to loose or add?
- How dynamic and real-time should the service personalization be?
- Can I run the service the affordable?
- What is the usage?
- Will survive an audit?

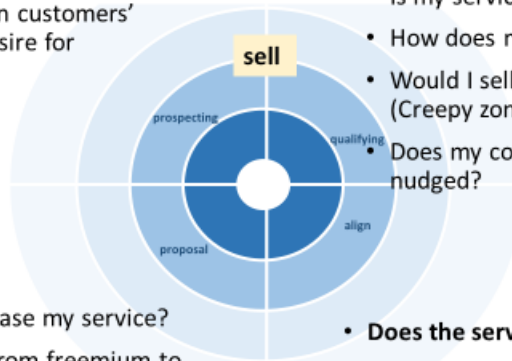
- How do I monitor and maintain the service?
- Which same issues do I see time and again?
- Do I run the service according (still) to regulation?
- Can the user see and adapt personally identifying information (PII) at any time?

- Is the service save to use?
- Can the consumer tune or adapt the service?
- Can I recognize new service desires during use?
- Can I modify the service easy?
- Can reconstruct an algorithmic decision?



### 3 - Checklist for service build: design, minimal valuable solution, test, deploy

- **What is my unique selling point?**
- What do I know of the competitor(s)?
- Do I know a need for a service that nobody else provides?
- Can I find the balance between customers' desire for privacy and their desire for personalized service?



- **Can I find buying arguments and convince the consumer?**
- Can I translate buying desires expressed in consumer language on social media?
- Is my service recommended by others?
- How does my consumer lifecycle look like?
- Would I sell this service to my mother? (Creepy zone or unethical)
- Does my consumer know he or she is being nudged?

- **Is the consumer satisfied?**
- Why did the consumer purchase my service?
- Can I broaden the service? (from freemium to paid?)
- Do I have a new consumer or recurring one?
- Can I create a lock-in?
- Can I make the service sticky?

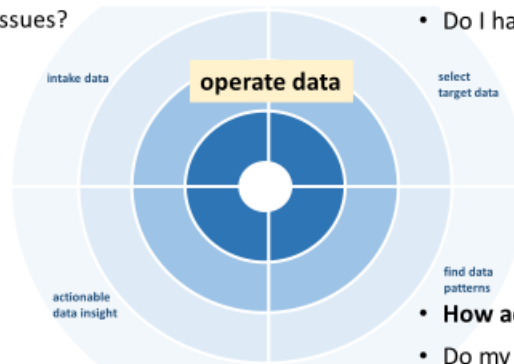
- **Does the service have the right price (or cost)?**
- Do I know how consumers perceive our service emotionally?
- Do I know which consumers I loose and why?
- Is the consumer interface recognizable for all channels?



4 - Checklist for operating the service data intake, select target data, find patterns, actionable insight

- **Can I find the right data?**

- Do I have the data?
- Do I own the data? (intellectual property)
- Can I make or buy the data?
- How reliable is the data (source)?
- Do I know privacy & ownership issues?



- **Can I extract useful information?**

- Do I have the data in time?
- Is the data in use biased?
- Is the data validated and by whom?
- Do I have to clean the data?

- **Does my data trigger a customer action?**

- Can I understand the meaning of this trigger in context?
- Does my ICT infra work?
- How can I govern and maintain all data sources?

- **How accurate are my predictions?**

- Do my models or analysis work?
- How do I aggregate and present the data?
- Is the data still valid?
- Can I run the model with less data?
- Can I fake data?



# Conclusions and application

**The simplicity keeps the Service cycle communicable but still shows the complexity of end-to-end service dynamics.**

An application of the Four Service Cycle is a collaborative visualization used to articulate what an institute knows (or not know) about total service life cycle and how well steps are connected (or not, or not even visible). It externalizes knowledge and experience about the Service Cycle over all departments of an institute in order to create a shared understanding end-to-end of steps of the main archetypal roles.

It can be used as a checklist for organizations to keep overview of the build and fulfilment of an innovative (digital) service and data-use in complex service contexts. The Four Service Cycle can easily be extended with more detailed processes or more domain specific applications. The Four Service Cycle can be used to zoom in on parts that do not work. It helps to keep an overview on what service ecosystem should do without losing sight through a lot of detail. The Four Service cycle shows the basic steps needed to run operations of a service ecosystem and shows also the complex linkage between all the different processes. The simplicity keeps it communicable but still shows the whole playground of service dynamics. The Four Service Cycle can be used to recognize blind spots or problem areas in a service ecology.

**All relevant operational information fuels the Four Service Cycle.**

All information for running a service is rarely consistent and readily available. Service Cycle is a qualitative method, so qualitative inputs like operational internal data, external marketing data helps to increase effectiveness. In a brainstorm phase a lot of qualitative inputs is not necessary, but in any other the phase in the service project it probably is. Understanding and categorizing issues end-to-end for all roles of the Four Service Cycle' is helpful. Especially at the handshake from one role/layer to the other or at typical go no-go service cost decisions.

If an external issue presents itself like an unexpected market change or a new regulation it can be used to locate the area that need most attention or when critical issues arise at the handshake moment from one department to another that typical manifest itself at major events like the a first test, a service launch, a mayor software adaption or service end of life. Of course, the real acid test of overarching capabilities of the model is letting others use it.



## Further work on complexity

There are many visualisations on the separate four roles service use, sell, build and operate data but not combined or only partly combined. When you zoom in on a perspective it is easy to fill in some other available model that you are familiar with. You can incorporate any different visualisation available on any perspective or specific domain and customize to your view.

The issues that need further work deal with the problem how to cope with the complexity of the service eco system. These complexity related issues are described below:

The model has a strong consumer (can be a patient, citizen, student, employee, subscriber, victim or gamer) perspective, but a service can be sold and delivered to a whole organization then the consumer process steps interest or buying is a complex group activity. *How does the model should look like when the consumer is a whole organisation?*

On the other hand, the model does not give any suggestion on solution direction or needed organizational/system change or level of severity of issues and does not portray the real complexity. *How can we get an overview on organizational capacities and tight to the situational complexity?*

To keep the model understandable and communicable, the defined process steps are simple and archetypical actions as seen in any institute. Of course, in real organizations these steps are more complex, entail more detail and are crisscross entangled and even not always visible. In most cases the steps are not well described or measured due to complexity running and developing the services across departments or separate companies. *How do we live with this ignorance and switch to approaches that increase the chance of finding these steps using this model? How deal with a halve filled model?*

**For questions and more  
information**

Call or send an e-mail:

T +31 (0) 88 400 23 00

E [info@advancedprograms.nl](mailto:info@advancedprograms.nl)