On the Development of a
Modelling Framework for Value Co-creation[*]

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Western countries have transitioned from a goods-oriented economy to a services-oriented economy. Marketing literature suggests that the notion of economic exchange, core to the economy, has shifted from following a goods-dominant logic to a service-dominant logic. These sources also observe how this transition results in a growing awareness that value, and value co-creation in particular, should be taken as a (if not *the*) leading factor in the design of the service systems that drive the service economy.

This results in the challenge of ensuring that the modelling frameworks used in designing different aspects of service systems, indeed also cater to the design of *value co-creation* aspects. In line with this, this paper reports on ongoing work towards the development of a modelling framework, called ValCoLa,[4] that also caters to the design of *value co-creation* constellations.

We start by further clarifying the need to include value co-creation aspects in the regular modelling frameworks used when designing / architecting service systems. We then continue by exploring the concept of value co-creation from the perspective of marketing literature. This also results in the observation that a stable definition of the underlying concepts has not yet been reached, while an understanding of the actual design challenges confronting enterprises in practice is also lacking. We finalise this paper by critically reflecting, from a design science perspective, on the best strategy to develop the envisaged language framework. In doing so, we will also include experiences in the development of the ArchiMate enterprise architecture modelling language. This results in some key strategic choices for the development of ValCoLa.

1   Introduction

Western countries have seen a transition from a goods-oriented economy to a services-oriented economy. Marketing literature [42, 12, 24, 43] suggests that the notion of economic exchange, core to the economy, has shifted from following a goods-dominant logic to a service-dominant logic. An important assertion underlying service-dominant

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[4]ValCoLa (Value Co-Creation Language) will be developed in a collaborative project involving the Luxembourg Institute of Science and Technology, and the University of St. Gallen, Switzerland

logic is the notion of *resource integration* [41, 42, 44], based on the view that value results from a process of *co-creation* between actors, including the beneficiary.

As a consequence, value, and value co-creation in particular, should be taken as a (if not *the*) leading factor in the design of the service systems that drive the service economy [31, 32, 23, 33]. Marketing literature [42, 12, 24, 43] also suggests that the shift towards service as the fundamental basis of economic exchange has profound implications on the way enterprises[5] are operated and value is created.

In designing and developing service systems, and enterprise in general, different modelling frameworks are used that typically cover different aspects, while maintaining coherence between the different aspects. Examples include ARIS [39] and ArchiMate [22]. The shift from goods-dominant logic to service-dominant logic, and the growing awareness of the role of *value co-creation*, results in a natural expectation for such modelling frameworks to also caters for *value co-creation* considerations.

In line with this, this paper is concerned with ongoing work towards the development of a modelling framework, called ValCoLa,[4] that supports value co-creation. As such, the main contribution of this paper lies in summarising the motivation for ValCoLa, and a reflection on the strategy that will / should be used in its development.

The remainder of this paper is structured as follows. In Section 2, we start by further clarifying the need to include a value co-creation perspective in the modelling frameworks used when designing / architecting service systems. We then continue in Section 3 by exploring the concept of value co-creation from the perspective of marketing literature. This will also lead to the observation that a stable definition of the underlying concepts has not yet been reached, while an understanding of the actual design challenges confronting enterprises in practice is also lacking. In Section 4 we will then critically reflect on the best strategy to develop ValCoLa. In doing so, we will take a design science perspective, while also including our experiences with the earlier development of such a language framework (ArchiMate) in the context of enterprise architecture, as well as reported experiences in the development of domain specific modelling languages. This reflection results in some key strategic choices for the development of ValCoLa.

2 The need to model value co-creation

As mentioned in the introduction, marketing sciences [42, 12, 24, 43] suggests that the shift towards service as the fundamental basis of economic exchange has profound implications on the way enterprises are operated and value is created, and that as a consequence, value co-creation should be taken as a (if not *the*) leading factor in architecting and designing service systems [31, 32, 23, 33].

When enterprises start to develop their service systems, e.g. with the aim to support value co-creation, they will also need to do *infrastructural* investments, to prepare themselves for the actual co-creation of value between the involved partners. Such infrastructural investments could e.g. include cultural / knowledge assets, such as institutions in terms of rules, norms, meanings, symbols, practices, and similar aides to

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[5]Be they commercial enterprises (i.e. businesses / companies, governmental bodies, not-for-profit organisations, temporary organisations such as large-scale construction projects, etc.)

collaboration [43], social / contractual assets in terms of defined institutional arrangements [43], contracts with partners in the value web, etc, as well as technological assets such as shared technology platforms, etc.

To ensure that such investments remain controllable, manage coherence [45], ascertain if key quality concerns (e.g. sustainability, security, privacy, flexibility) are met, etc., one generally suggests to use an design / architecture oriented approach [28, 36], enabling *informed design* [25, 34].

For value co-creation, it is important to not only architect one enterprise / service system in isolation, but rather consider the entire value co-creation context. Concerns, such as sustainability, equity between partners, etc, can only be considered sensibly at the level of such co-creation networks. Behind all of this, is the core driver of service-dominant logic [43] to integrate resources between partners.

As already mentioned in the introduction, when architecting service systems, and enterprise in general, different modelling frameworks are used that typically cover different aspects, while maintaining coherence between the different aspects. Examples include ARIS [39] and ArchiMate [22]. The shift from goods-dominant logic to service-dominant logic, and the growing awareness of the *value co-creation* aspects, results in a natural need to also be able to include *value co-creation* aspects.

This triggered the start of the ValCoLa project, aiming to develop such a modelling framework. It is important to note that in the development of the ValCoLa language framework, no a-priori stance is taken with regard to the question if a *new* language should be developed, or if (fragments of) existing languages can be "re-used".

3 Value co-creation

A major challenge in the context of value co-creation is the fact that the notion of value itself is inherently a subjective and situational matter. For a given person, the value of e.g. a fifty Euro bill and a bottle of water will change depending on wether the person is sitting on the terrace of a restaurant, or is wandering thirstily through a desert. When designing, and running, value co-creation constellations it seems beneficial to at least have some "approximation" of the potential / attributed value by a consumer to a service / product. However, one should remain aware of the fact that this is only an approximation of the actual value (in use) as ascribed [3] by a user / consumer (in a specific situation). Furthermore, it is known that customers not only focus on economic or functional benefits but also on emotional, social, ethical dimensions [26, 2, 27].

Management literature [42, 12, 24, 43] motivates the shift from goods-dominant logic to service-dominant logic by observing that it is ultimately the customer who attributes value to a good or a service. Goods and services, "at rest", only have a *potential* value to a customer. The actual value is "experienced" when the resources / goods are actually *used* by the customer to some purpose.

For example, in the airline industry, jet turbine manufacturers used to follow a classical goods-dominant logic by selling turbines to airlines. However, since airlines are not interested in *owning* turbines, but rather in the realisation of *airtime*, manufacturers nowadays sell airtime to airlines instead of jet turbines.

Management literature [42, 12, 24, 43], therefore, also suggests that one should shift from considering the *value in exchange* of a good or service, to its actual *value in use*. The concept of *using* goods or services, should then specifically also be seen to include: *experiencing* a work of art, *enjoying* a massage, *impressing* other people by wearing a fancy watch, *enjoying* the ownership of an old timer car, *watching* a movie, *savouring* a well cooked dinner, *reading* a book, *listening* to music, etc.

In each case, the "-ing" ending also indicates a need for the consumer to participate in the value creation. An important assertion underlying service-dominant logic is therefore the notion of *resource integration* [41, 42, 44], where resources (goods, competencies, processes, etc) of a supplier are integrated with the resources of the consumer.

Combined, value co-creation and resource integration, do lead to interesting trade-offs. For instance, in the context of the smart energy grid,[6] an often used example of (value) co-creation is the use of solar panels on houses, as well as the use of local batteries (e.g. in house batteries, or the ones in an electric vehicle) to store excess energy from the grid. Most of these examples assume that the owners of the house also own the solar panels and batteries. However, are house owners really willing to *own* and *maintain* the solar panels and the batteries? Conversely, are the energy companies / "smart grid provider" keen to *own* and *maintain* these resources? An alternative would be a situation in which the producers of the solar panels and the batteries would *rent* these to the smart grid provider, while the owners of family houses would rent out *roof space* and *garage space* to accomodate the solar panels and batteries respectively. Of course, the owners of the house would then have to pay for electricity that may be generated on the roof of their own house.

A critical reader might wonder if value co-creation is really new in the first place. Was / is the work done by e.g. consultancy firms, not already a form of value co-creation? We certainly would not want to claim that value co-creation did not occur in "the past". In our understanding, the definitions of value co-creation and service-dominance, as provided by marketing literature, would not necessarily exclude such examples from fitting the definition of service-dominant logic. Given the fact that *resource integration* and *value in use* are key elements in defining value co-creation, one could indeed argue that delivering consultancy services has always been a form of value co-creation. A good consultant should integrate their resources with the resources of the client, in order co-create value for the latter.

Nevertheless, what we do observe as being new, is that the shift from goods-dominant logic to service-dominant logic oriented towards value co-creation, would imply a dramatic *servitisation* and *mass customisation* of existing products and services. These latter developments also pose the bigger design challenges to existing (and startup) enterprises, further fuelling the need to ensure that the modelling frameworks used are indeed able to capture value co-creation considerations.

In [43], eleven foundational premises defining service-dominant logic and value co-creation have been provided, based on their earlier work reported in [41, 42, 44]. In Figure 1, we have listed these foundational premises.

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[6]https://www.smartgrid.gov/the_smart_grid/smart_grid.html

FP01	Service is the fundamental basis of exchange.
FP02	Indirect exchange masks the fundamental basis of exchange.
FP03	Goods are distribution mechanisms for service provision.
FP04	Operant resources are the fundamental source of strategic benefit.
FP05	All economies are service economies.
FP06	Value is co-created by multiple actors always including the beneficiary.
FP07	Actors cannot deliver value but can participate in the creation and offering of value proposition.
FP08	A service-centered view is inherently beneficiary oriented and relational.
FP09	All social and economic actors are resource integrators.
FP10	Value is uniquely and phenomenologically determined by the beneficiary.
FP11	Value co-creation is coordinated through actor-generated institutions and institutional arrangements.

Fig. 1. Foundational premises of service-dominant logic (adopted from [43])

In [13], the authors introduce spheres for value co-creation, while identifying different roles that may be played by the actors involved in a value co-creation process (see Figure 2). The critical aspect that needs to be highlighted from this work is that the only "real" value creation occurs in the joint sphere, where customer and supplier are co-creator and co-producer respectively, and in the customer sphere, where the roles are creator and facilitator respectively. An important point to stress is that the role of the supplier in the provider sphere is not one of value-creator but of value-facilitator, i.e., the entire internal process of the provider does not create any value per-se.
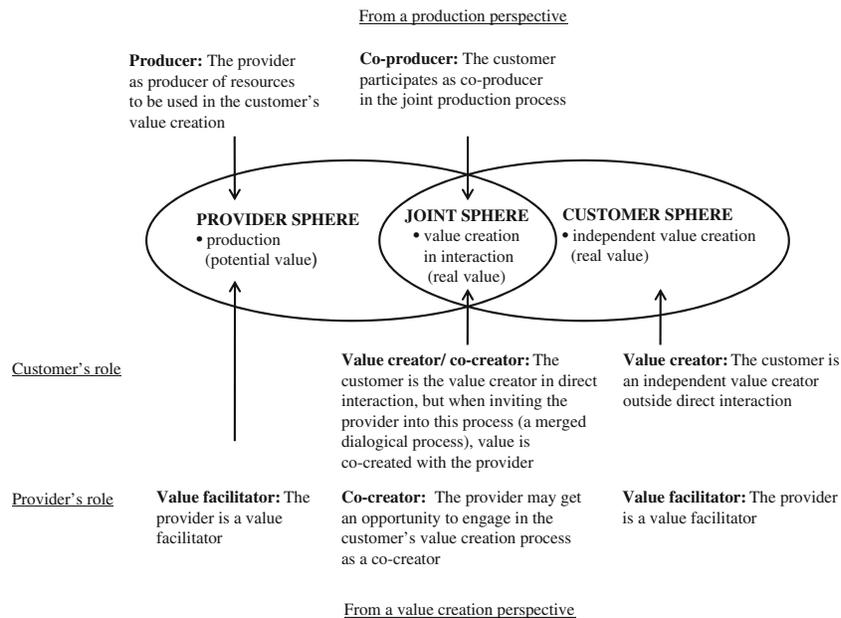

Fig. 2. Value creation spheres (adopted from [13])

It is relevant to observe that in [43], Vargo and Lusch include a discussion that points out fundamentally different views on value co-creation and service-dominant logic. For

instance, [43] reports on fundamental differences between the views of these authors, and the work reported by Grönroos, et al, in [11, 15, 13]. This indicates that there are strongly opposing views regarding core notions in the context of service-dominant logic (or service logic, as coined by [11]) and value co-creation.

What is also interesting to note is the fact that the key (in terms of citations) papers within the field of service-dominant logic, do not include many (let alone real world) case studies involving actual value co-creation. Involving (real world) studies, could possibly have improved the clarification of different views / opinions regarding core concepts. In addition, in our view, the development of a modelling framework for the architecting / design of service systems, while taking value co-creation aspects into consideration, such cases certainly become essential. These cases, in particular the underlying design challenges, should provide the *use cases* of the modelling framework.

4   A participatory, case-driven, and fact-based, approach

In line with [16, 17, 18, 8, 7], we argue that a modelling language, and designed languages in general, should reflect the actual (intended) use of the language. As discussed in Section 2, the intended use of the ValCoLa modelling framework is to be able to express value co-creation constellations, including the needed infrastructural elements, such as assumed institutions (in terms of rules, norms, meanings, symbols, practices, and similar aides to collaboration), institutional arrangements, contracts, (information) technological assets, etc, in support of the design / architecting of service systems.

A purposely developed language (framework) is fundamentally an artefact in a design science research [30] sense. As such, it would be appropriate to use the design science research process as suggested in e.g. [30]. This process follows a traditional (iterative) design process in the sense of requirements elicitation, design and development, and then some form of testing / evaluation. In line with most design processes, it also involves possible iterations. The process for the development of domain specific modelling languages as suggested by [8] follows a similar pattern.

The development of the ArchiMate [19] language also followed such a design process. The creation of the (original version of the) language, involved three Netherlands based industrial partners[7] with a rich experience in doing enterprise architecture, and with a rather compatible understanding of enterprise architecture in terms of the purpose, core concepts, layers, etc. Within the Netherlands, there was already a tradition of exchanging views on, and experiences with, enterprise architecture.[8] As a result, the ArchiMate project partners had a similar understanding of the scope and purpose of the language, the underlying core concepts, access to ample real-world cases, as well as experienced enterprise architects.

This enabled the ArchiMate project to establish a set of initial requirements [4, 20], while the availability of real world cases from the partners, and the active involvement of enterprise architects from these partners, allowed for an immediate inclusion of their

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[7]The ABN-Amro bank, the ABP pension fund, and the Belastingdienst (Dutch Tax Administration).

[8]Amongst others resulting in a national platform such as the Netherlands Architecture Forum (`www.naf.nl`).

experiences into the architecture of the language [21], which then finally resulted in its final detailed design [22]. Based on the broad acceptance in industry, the language was consequently adopted as an industry standard [19].

For value co-creation the initial situation is quite different. As observed in the previous Section, definitions of key concepts defining value co-creation are still debated, while there is also no well documented body of cases that could potentially use cases for the development of a modelling language. Furthermore, such cases could also be beneficial to illustrate the definition of value co-creation in terms of positive and negative examples of value co-creation. While the lack of cases might be seen as a signal that such a language would not (yet) be called for, the discussion in Section 2 suggests differently. We rather see it as a signal that, given the further servitisation of the economy, real world cases of the development of value co-creation constellation, and the development of the needed language framework, should go hand-in-hand. Having (first versions of) a language framework, will also enable organisations to actually design value co-creation constellations.

In our view, the traditional design science research process falls short for the development of ValCoLa. In [40], the authors suggest a variation of the design science process, replacing the traditional build-evaluate pattern by a more finer grained evaluation pattern that accommodates the emerging nature of artefacts. This would indeed be more in line with the approach needed for language engineering, given the context in which ValCoLa is to be developed. Therefore, for the development of ValCoLa, we plan to use an iterative approach, where real world *use cases* are used for experiments with different variations of the language. In doing so, we also plan to use a *participative* approach involving language engineers and designers / architects. At the Luxembourg Institute for Science and Technology, one of the two partners in the ValCoLa project, this will involve real world cases in the context of compliance and risk management, security and privacy management, the smart energy grid, as well as the use of open data in the context of tourism and smart cities. Some of the initial experiments have already been reported on in [37, 5, 6, 38].

In future case studies, and experimentation, we will use the roles as identified in [13] (see Figure 2) as a reference model, while using the foundational premises as articulated in [43] as design / architecture principles [10], that will guide the design of service systems for value co-creation.

We consider it to be key to keep an open mind about which modelling constructs are actually needed in the language, i.e. requiring explicit concepts in the abstract syntax, as well as symbols / icons in the concrete syntax. To enable this, we will use a fact-based modelling approach [14] to express the value co-creation constellations in terms of "flat" conceptual models first. By "flat", we refer to the fact that such models will be stated in terms of fact types involving roles and object types only, based directly on the facts / statements used in the design dialogue involving designers / architects. These flat conceptual models, will therefore not (yet) involve compound modelling constructs (such as e.g. activity type, value object, business object, etc). In [35], it is discussed how, e.g. ArchiMate models can be underpinned / grounded, in terms of a flat conceptual model, using the verbalisations as used in the actual design dialogue.

Based on the flat conceptual models from different value co-creation cases, we then gain an evidence-based insight into *what* concepts needs to be embedded in the language, and *why* this is needed. From this, we can then infer what compound modelling constructs would be useful to indeed include in the language in terms of concepts in the abstract syntax, and symbols in the concrete syntax.

As mentioned in Section 2, in the development of the ValCoLa language framework, no a-priori stance is taken with regard to the question if a *new* language should be developed, or if (fragments of) existing modelling languages can be "re-used". We will therefore also use relevant language constructs / concepts from e.g. e^3value [9], the notion of Value Encounters [46], the value stream concept introduced in the latest version of ArchiMate [1], as well e.g. the business model canvas [29]. Using the flat conceptual models taken from different cases involving value co-creation, we can make evidence-based selection of the compound modelling constructs that are actually needed for ValCoLa.

5   Conclusion

The primary focus of this paper was on a strategy for the development of ValCoLa, a modelling framework for value co-creation constellations. This strategy has been motivated in terms of a discussion of the concept of value co-creation from the perspective of marketing literature.

This also resulted in the observations that (1) a stable definition of the underlying concepts has not been reached yet, while (2) an understanding of the actual design challenges confronting enterprises in practice is also lacking, and even more importantly, (3) reports on real-world cases involving the design of value co-creation constellations are scant. As a result, the initial situation for the development of ValCoLa differs quite substantially from the situation at the start of e.g. the ArchiMate project, thus also requiring a different strategy.

Based on this situational analysis, we plan to take a participatory, case-driven, and fact-based, approach towards further experimentation and case studies in the further development of the ValCoLa modelling framework.

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