Business Model Transformation from Value Chain to Value Network Perspective: a Stakeholder and Network Theory Approach

Research Proposal

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1 Introduction

A firm's business model (BM) represents the basic underlying rationale of how the firm creates, delivers and captures value (Al-Debi, El-Haddadeh, and Avison 2008). The three main aspects of a BM are customer value proposition, profit formula, and key resources and processes (Porter 1996). Clinton and Whisnant (2019) describe the BM as *"the engine of economy"*.

We now see firms such as FAANG (Facebook, Amazon, Apple, Netflix and Google) pioneering a radical disruptive, digitally enabled BM (Kersten 2018), which is less asset heavy, and digital platform based. Incumbent firms in, for example, the manufacturing industry wish to learn from this how to improve their own business models, but find many challenges. *"Incumbent firms have challenges in crossing the abyss created by a radical technological innovation and, thus, go into a decline trajectory"* (Hill and Rothaermel 2003). Aiming not to lose their competitive edge, incumbent firms are looking to incorporate macro trends such as *servitization* into their BM. The innovation trajectory of this trend is of a "demand-pull" type (Frank et al. 2019)), i.e. focused on adding value to a digitally savvy customer.

This article will outline a proposal for research intended to support the incumbent firms in this transition, while making contributions to the theory in multiple fields of research. First, we will briefly summarize the background in section 2, before we present the purpose of our research in section 3. Section 4 will present the literature review in more depth, along with discussion to support the formulation of the purpose and the research design. Section 5 presents the challenges that we foresee in adoption of the research, and brief discussion of to overcome them. Section 6 concludes the main literature review part of the article by presenting the main knowledge gaps towards our stated purpose that we have identified from literature.

We then proceed to present the details of the research project. The initial *research questions* to guide research design are presented in section 7. Section 8 presents our choice of research methodology and briefly motivates the choices of implementation details.

Finally, we describe the contributions that are expected to result from the research in section 9, and conclude the article with a brief summary of the main points, in section 10.

2 Background

According to Tukker and Tischner (2017), value propositions in which the term product has a material character can be seen on a scale between being exclusively about products, to being exclusively about services. The spectrum in between is referred to as product service systems (PSS). A PSS can be product-oriented, meaning the product comprises most of the value, result-oriented, meaning services comprise most of the value, or use-oriented, in which the value is more balanced between products and services. The BMs of manufacturing firms have traditionally made use of value propositions ranging from pure product to product-oriented PSS. However, since such value propositions do not facilitate capitalizing on value-added digital services, the manufacturing industry has been adapting by incorporating a greater degree of services into their value propositions.

Digitalization has been emerging as a promising enabler for business model innovation (BMI), assisting incumbent firms to make this shift (Parida, Sjödin, and Reim 2019). Digital platforms are being implemented that allow manufacturing firms to tap data from product use to better understand customer interactions with their product and hence customer needs. The

firms are on a move towards a modular platform approach to offer a continuum of value-added advanced solutions apart from pure products and services (Cenamor, Rönnberg Sjödin, and Parida 2017). This opens a web of opportunities, but also complicates analysis of their own position in the value chain.

"Sustainability and Circular Economy (CE) are of growing interest for governments, investors, companies and the civil society" (Pieroni, McAloone, and Pigosso 2019). Compliance to UN *"Sustainable Development Goals"* serves as an additional challenge for incumbent firms. Enhanced sustainability and circularity in a BM requires fundamental changes in the way companies create, deliver and capture value. Firms are now compelled to interact within an ecosystem of actors, moving from a very hierarchical firm-centric operational logic to a decentralised self-aligning network-centric operational logic (Pieroni, McAloone, and Pigosso 2019).

There is a need for the whole organisation to shift from an assembly line *"value chain"* perspective to the more *"fluid structure of the value networks"* (Allee 2000).

"*Virtually any organisation can be understood as a value network"* (Allee 2000). This requires a shift in perspective, in the way we think about business and the way to integrate new technology. According to Allee (2000), *"new technologies are only pipelines for knowledge and value exchange"* and the *"value exchanges lie at the heart of a value network."* (Parida, Sjödin, and Reim 2019) call for evaluating traditional businesses from an ecosystem perspective. They further state that the business ecosystem external to the company will become much more important and affect value delivery significantly. *"There is a need to shift from transactional business models towards relation based business models"* (Reim, Sjödin, and Parida 2019).

3 Statement of Purpose

This article will outline a proposal to conduct exploratory studies applying stakeholder and network theory to develop a framework for transition of traditional firms' business models from static vertically integrated networks towards network orchestration in order to achieve sustainability- and CE-oriented BMI in a co-creative global multi-actor ecosystem.

In the following chapter we will further present literature review and discussion to support the need for this research, as well as frameworks to support the design choices of our research methodology.

4 Problematization

"The servitization research has been criticized for being too phenomenon driven and for lacking applications of theoretical frameworks to generate novel understanding" (Sjödin, Parida, and Kohtamäki 2019). To understand the current situation, we shall therefore discuss the literature on servitization from a perspective of theoretical frameworks. We will then find that the literature on servitization is lacking in quantitative data to support objective analysis, as well as in tying the discussion of phenomena to the theoretical frameworks which exist in other fields of business research, such as stakeholder and network theory, which could facilitate development of new theoretical frameworks to model the servitization domain.

Geissdoerfer, Vladimirova, and Evans (2018) categorizes the approaches to sustainable BMI. Servitization of the type described by Parida et al. (multiple studies) is categorized as a *sustainable business model transformation*, implementing *product-service systems* in order to *deliver functionality rather than ownership*. Parida et al. have an emphasis on the phenomenon of servitization, and the focus is on how incumbent firms can capitalize on implementing it successfully. Success is viewed as a purely financial analysis, with severe delimitations, which may not accurately reflect all the consequences of the transformation, especially viewed in a life-cycle perspective (LCA). They venture briefly and shallowly into service actor networks, relational governance strategies, and customer relationships, establishing roles for subdivisions of the firm. However, theoretical frameworks are not applied to provide clear motivations. Further Parida et al. distinguish between the categories of *Network management* and *Service delivery network management*, but do not clearly motivate why there needs to be a distinction, as they appear to have similar properties (Parida, Sjödin, Wincent, et al. 2014).

Pieroni, McAloone, and Pigosso (2019) reviewed 94 studies and found 92 approaches to support sustainability- or CE-oriented BMI. Out of these, only 20% addressed *transformation* of the Business Model, and only 7% attempted to make use of *quantitative data*. Clearly, studies applying quantitative data, attempting to take an objective approach to the transformation of BMI are in the minority. Pieroni, McAloone, and Pigosso (2019) categorizes according to a model of *"asset 'orchestration' processes"* inspired by Teece (2007), in which the BMI process is divided into three stages, namely *Sensing* the threats and opportunities, *Seizing* the opportunities, i.e. testing new BM concepts or configurations, and *Transforming* the business, i.e. managing threats and reconfiguration of the BM.

4.1 Towards a network perspective

The current literature tends to adopt a *firm-centric* perspective (Parida, Sjödin, and Reim 2019), where closed hierarchical firms serve as actors on a market consisting of the exclusive categories of customers, partners and competitors. This does not accurately describe real-world interactions, as the relations between firms are often more complex than that. As an example, in the semiconductor industry, a company can be both a customer, competitor, service provider and a technology exchange partner, with intellectual property being licensed under royalties, as well as a manufacturer of some of the firm's products. According to The Economist, the manufacture of integrated circuits now requires a *"close partnership between manufacturers and designers."* The designing firm works within the manufacturer's, such as TSMC's, "ecosystem" for years before chips are manufactured, investing research & development into the manufacturer's technology. This investment would be wasted when switching manufacturing partner (The Economist 2018). TSMC's previous greatest competitor, Intel, has persisted with a more hierarchical business model, owning semiconductor foundries to produce the chips they design. In recent years, Intel has been losing the technological lead in manufacturing and appears to be moving towards a less asset-heavy business model (Moore 2019).

"The evolution of interaction can been described as a social exchange process between two firms conceptualized as collective actor" (Holm, Eriksson, and Johanson 1996). As markets mature, complex relationships develop between the actors which cannot be described by the traditional simplified dyadic model of the firm's relationships, but could potentially be described by applying network theory. *"Dyadic relations in business markets do not occur in isolation, but are connected to one another and can fruitfully be considered within a context of connected network relations"* (Holm, Eriksson, and Johanson 1996). For example, the value a customer has to the firm may be quite dependent on the firm's relationship and information exchange with the customer, who themselves have information exchange through other network nodes. *"By understanding the customer's practices and how the customer combines resources, processes, and outcomes in interactions, the service provider shifts from a mere facilitator to a co-creator of value"* (Grönroos and Voima 2013; Parida and Wincent 2019). The exchange that the customer can have with the firm highly depends on the customer's own network of exchanges. *"It is essential in macro exchange theory that simple exchange also be analyzed beyond the dyad"* (Emerson 1976). When this is taken into consideration, the case for modelling business using network theory becomes even stronger.

According to Teece (2007), *"Decision frameworks that recognize the importance of network effects"* must *"be factored into decisions."* Teece also recognizes some of the beforementioned complicated relationships in the semiconductor industry, which might be explained in terms of value networks. Pagani writes about the situation in the broadcast industry, and how *"incremental innovations may shift value networks from static, vertically integrated networks to more loosely coupled networks, and how cross-boundary industry disruptions may then, in turn, shift those to two-sided markets"* (Pagani 2013).

Furthermore, there is a network within the company, in which information and other forms of implicit value is transferred. This network was originally described as *Community of Practice* (CoP) by Lave and Wenger (1991). Network connections occur within the organization between departments, but also directly between employees, bypassing organizational structure. Expanding on the CoP concept, the term *Network of Practice* (NoP) was introduced by Seely Brown and Duguid (2000) to factor in the connections from nodes in the CoP toward other nodes not directly part of the CoP. There is little network mapping and analysis done to understand the internal ecosystem which underlies the company's ability to function. *"The central position of information modules in advanced service offerings facilitates information-related value co-creation activities between manufacturing firms and their customers, which can be leveraged by a platform approach through revised organizational roles"* (Cenamor, Rönnberg Sjödin, and Parida 2017). In order to understand how to revise roles within the organization for better use of information, understanding the network through which information naturally flows through the organization is important.

Literature in servitization describes the NoP mostly between front-end and back-end of the company, but this view is overly simplified. As demonstrated by Cenamor, Rönnberg Sjödin, and Parida (2017), digitalization enables a higher level of connectedness between distant parts of the internal company network, as well as higher connectivity from firm-internal nodes to nodes within other organizations. Inherent in the concept of NoP is that there will be many such connections between the firm-internal nodes, with nodes not under the firm's direct control. Not all of these connections will be obvious, as demonstrated by Teigland (2003), who views the firm both as *"a social community"* as well as *"a community of communities"*. According to Easterby-Smith, Lyles, and Tsang (2008), regardless of whether people are members of the same organization, and regardless of the structure of the inter-organizational relationship, for knowledge flow between geographically distant locations, informal social ties are superior conduits for the knowledge flow. When one considers that each employee is also connected to a personal value network, which extends beyond the firm's established bound-

aries, whether intra- or inter-organizational, such as family, friends, former colleagues, classmates, teachers and other connections which may provide value in the form of knowledge and other implicit value, analysis of the entire network is not trivial. Sjödin, Parida, and Kohtamäki (2019) claims that *"excessive efforts to lock in customers may backfire and, consequently, may negatively affect performance."* Jarillo (1988) identifies *"lack of trust [as] the quintessential cause of transactional costs"* in strategic networks between firms, and proposes to view the firm as a hub in a network for joint value creation, where *"the success of the supplier may be linked to the success of the buyer."* Dhanasai and Parkhe (2006) define a *hub firm* as *"one that possesses prominence and power gained through individual attributes and a central position in the network structure, and that uses its prominence and power to perform a leadership role in pulling together the dispersed resources and capabilities of network members."* It may be very detrimental in some situations for the company to attempt to lock in a customer, especially when one does not have full knowledge of how the network connected to that customer looks.

Further, when we discuss implementing an advanced service offering within a multi-actor ecosystem, we are talking in similar terms to the concept of a conglomerate, if we set the ownership structure aside. Teece (2007) points out that tension within a conglomerate *"can be managed through a collaborative non hierarchical management style assisted by establishing councils and other integration forums."* This amounts to connecting nodes of the internal network of the firm directly to internal nodes of other actors within the ecosystem. This facilitates communication, i.e. information exchange, which might lead to knowledge transfer. Dhanasai and Parkhe (2006) discusses how a firm can benefit from its position in such a network, and define *"network orchestration"* as *"the set of deliberate, purposeful actions undertaken by the hub firm as it seeks to create value (expand the pie) and extract value (gain a larger slice of the pie) from the network."*

There is a call for a definition of digitalization from a business model perspective, and it has been defined as *"use of digital technologies to innovate a business model and provide new revenue streams and value-producing opportunities in industrial ecosystems"* (Parida, Sjödin, and Reim 2019). Hence, digitalization could be seen as an enabler for the firm to head towards a value-network perspective, which would allow value-producing opportunities that did not exist with the firm-centric perspective. This can be achieved through skillful network orchestration, which again emphasises the need for understanding of the network.

Advanced service business model literature recognises the need to revise value creation, delivery and capture activities (Parida, Sjödin, and Reim 2019). There are recurrent themes about ecosystem orchestration (Parida and Wincent 2019) and value co-creation with ecosystem partners (Parida and Wincent 2019) but there is no literature to shed light on the interface between the individual nodes of the ecosystem of network that supports advanced service offerings, with respect to organizational boundaries. Companies are required to operate in joint sphere, which requires alignment of interests and incentives across ecosystem actors, but exactly how to do this is unclear. There are research gaps in the analysis of how industrial companies can leverage digitalization to transform their business models to achieve sustainability benefits (Parida, Sjödin, and Reim 2019), but there appears to be little progress in the fundamental theory that would enable such an analysis.

5 Practical Challenges

As we have supported in the previous section, there will be a great challenge in changing the fundamental perspective of the organizations taking part in the project, from the traditional view of the firm, to a network-centric perspective.

According to Fulk (2001), *"the network [is] the most important emergent organization structure"*, and a major concern in its implementation is *"the tension between maintaining community shared resources and pressures toward privatization of resources by subsets of the networks."* For example, according to Isaksson, Hallstedt, and Rönnbäck (2018), *"other challenges related to digitalisation is intellectual property rights and how to collaborate around data, revolving questions [sic] such as – who owns the data?"*

According to Jagers et al. (2019), *"A collective action problem is typically described as a situation in which actors are motivated to take a course of action that is more beneficial than costly to them individually but is more costly than beneficial to society. This generates a substantial risk that collective benefit will not be produced. In the social science literature, a collective action problem is typically understood as a social dilemma."*

Collective action problems are likely to manifest in networks when they are being governed solely from the perspective of the firm's direct benefit. As mentioned by Dhanaraj et al. (2004), Teece (2007), and Easterby-Smith, Lyles, and Tsang (2008), the theme of trust is very important to avoid these dilemmas, and facilitate knowledge transfer between actors.

We have little influence over the relationships of trust between the actors in the ecosystem, but mapping the networks between actors, as well as enabling communication through forums, we may enable greater trust to be built between the actors themselves.

6 Research Gaps

Some of the interesting knowledge gaps that can be explored, which were also verified by literature review, are:

Gap 1: How should a firm position itself, and its relations with other actors, into a network of an evolving ecosystem? (Parida and Wincent 2019)

Gap 2: How to establish, organise and maintain networks, such that they form a co-creative ecosystem which does not cannibalize on the firm's offerings? (Parida and Wincent 2019)

Gap 3: What are the mechanisms of knowledge transfer in these networks?

Furthermore, the fundamental theory for analysing the multi-actor ecosystems in multiple aspects appears to be research gaps in their own right, such as:

Gap 4: Multi-actor ecosystem perspective lacks fundamental theory (Tsujimoto et al. 2018).

Gap 5: How are networks governed? (Parida and Wincent 2019)

Gap 6: How does one maintain global networks while the control mechanisms weaken (Fulk 2001; Parida and Wincent 2019)

For this proposal, the focus will be on Gap 1, but contributions may also occur towards filling other gaps, in particular Gap 2, Gap 3 & Gap 4.

7 Research Question Formulation

The following are the research questions developed to address research Gap 1 presented in section 6, to guide the implementation of a research project under the DRM framework (see section 8):

- RQ1: What are the barriers towards achieving sustainable- and CE-oriented BMI in a multi-actor ecosystem perspective?
- RQ2: How can these barriers be overcome by applying network theory?
- RQ3: What can be learnt from applying network theory?

8 Research Design

The Design Research Methodology (DRM) framework proposed by Blessing and Chakrabarti (2009) will be adopted in structuring this research. Since the primary aim is to develop frameworks or models, this project is of a type to develop what DRM terms as *design support*. The design support may consist of theoretical frameworks, models, software, check-sheets, *"knowledge, guidelines, checklist, methods, tools, etc."* (Blessing and Chakrabarti 2009) Our literature review suggests that there is a lack of theoretical support to develop such frameworks. Particularly, according to Tsujimoto et al. (2018) there is a lack of fundamental theory in the field. Hence we propose a DRM research project of type 5, i.e. development of support based on a comprehensive study of the existing situation. Of this type of project, Blessing and Chakrabarti (2009) states, "The aim is to develop support, but the level of understanding of the existing situation is poor."

The four stages of a type 5 DRM project are: Research Clarification (RC), Descriptive study 1 (DS 1), Prescriptive Study 1 (PS 1) and Descriptive study 2 (DS 2).

8.1 Applied Research Methodology

In the Appendix, figure 1 presents an overview of the stages in which DRM will be applied.
In Stage 1, efforts will be put forth in the development of Initial Reference Model, Initial Impact Model and Preliminary Success Criterion for the research to progress.

A literature review will be performed first, in order to establish an initial reference model of the network ecosystem constituents.

A workshop will be conducted with the major manufacturing firm partner, e.g. Sandvik Mining, their digitalization partner, Trimble, as well as their delivery partners or distributors. The primary aim of this workshop will be to understand the stakeholder needs, but also it forms an opportunity to perform initial stakeholder mapping and territory mapping. The rationale of having this workshop is to form a common co-creative vision between the ecosystem partners. In order to map the network, it is important to understand where to start from, and this could also result in collaboration with the industry partners to map the challenges and themes.

Based on the workshop outcomes, we will apply the method StakeNet using the tool StakeSource, proposed by Lim, Quercia, and Finkelstein (2010), which is an approach for the formalization and automatization of stakeholder analysis. The method will visualize Sandvik as a hub in a network of stakeholders, wherein the stakeholders themselves describe the ecosystem of the network. This approach and tool supports the calculation of multiple metrics that are difficult to produce through traditional means, such as Stakeholder Analysis Matrix, Stakeholder Circle, and Stakeholder Checklists.

Based on the network map established, we can proceed to a Thematic Network analysis, in which we can establish the most important network flows, as they proceed through the network.

An initial impact model will be designed based on the results of the network maps, and the reference model will be updated accordingly.

Case studies, such as those proposed by Yin (2018), may be carried out to analyse how the network works in domains such as add-on services, maintenance and product support services, R&D-oriented services, and Functional and operational services (Parida, Sjödin, Wincent, et al. 2014).

Based on either the case studies or results from the thematic network analysis, criteria for further research will be established.

We have delimited ourselves to describe the work only in stage 1, but the abstract deliverables in the following stages will be provided below.

In Stage 2, Complete Reference Model, Success Criterion, Measurable Success Criterion and Key Factors will be established.

In Stage 3, an Impact Model will be developed based on our understanding obtained from stage 1 and stage 2. This impact model will describe the desired, improved situation that is expected of addressing as a consequence of selected key factors. Efforts will be put forth in developing a support.

In Stage 4, Efforts will be put to try to outline an evaluation plan for the support developed.

Some of the methods that can be used in each stage have been provided below:

Stage 1: RC

- Literature Review
- Stakeholder Map (Martin and Hanington 2012)
- Territory Map (Martin and Hanington 2012)
- Thematic Network (Martin and Hanington 2012)

Stage 2: DS1

- Focused Literature Review
- Empirical Studies
- User Journey Maps (Martin and Hanington 2012)

Stage 3: PS1

- Focused Literature Review
- Empirical Studies
- Triangulation

Stage 4: DS2

- Empirical Studies

9 Significance

In the pursuit of fulfilling the needs of this proposal, we may make a contribution towards the fundamental theory underlying the multi-actor network ecosystem perspective, but we will make a significant contribution toward applied network theory, organizational theory, and we will add to the literature of Product Service Systems (PSS) and servitization. We also assist incumbent firms to gain competence in advanced service offerings by exploring new modes or mechanisms of operation in the value creation.

Furthermore, from a data science perspective analysis is facilitated, by building on the theory in structuring the organizations into a framework, where the relations become more accurate than in traditional dyadic relation market analysis. It may facilitate implementation of an AI in the near future, to conduct multi-variate optimization on a network level on a global scale, in order to present more modular business model offerings in real time.

Sensitivity analysis on a global scale will be facilitated, to identify factors which are detrimental to particular types of advanced service offerings in a particular area.

Life-cycle assessment (LCA), which has become an indispensible part of a firm's commitments, requires understanding of the product in the context of its value chain. It is a problem in current LCA studies to obtain transparency in the way virgin materials are being turned into secondary products. Mapping the networks between actors may facilitate transparency and traceability, facilitating creation of more rigorous models that capture the carbon footprint and contributes to firms achieving their sustainability targets. For example, Kim and Holme (2015) apply network analysis to LCA, and propose this as *"a way of extracting information from a very complex life cycle or production system."*

According to Allee (2000), value networks have three *"currencies of value"*, which serve as mediums of exchange, namely: Goods, Services and Revenues, Knowledge, and Intangible benefits. In the information and knowledge literature, the Data–Information–Knowledge–Wisdom hierarchy is widely recognized to the point of being taken for granted (Rowley 2007). For knowledge to be used a tangible currency, it must be actionable. There is still no clear definition for what makes knowledge actionable, and recent studies have only started to scrape the surface of how to evaluate whether knowledge is actionable. Salelkar (2018) proposes methodology for such evaluation, which is currently in the process of being implemented for further research within the field of AI-enabled knowledge management systems.

Tacit knowledge is not easily codified, and is deeply embedded into the network. For tacit knowledge to be

elicited in the domain specific context of the business relations, the network must be well understood. Harnessing tacit knowledge and codifying it as explicit actionable knowledge enables the use of said knowledge as a valuable currency.

10 Conclusion

We aim to provide the scientific community in the long term with fundamental theory for the understanding of multi-actor network ecosystems. We will be contributing towards the literature in the network theory fields, as well as more specific implementation in fields such as servitization.

For the companies, we aim to provide a sustainable and CE-enabled framework for transformation of their business model in the multi-actor network ecosystem perspective.

We hope to facilitate closer ties between industrial partners, improve exchange of knowledge, understand firm boundaries and accommodate for more openness and transparency in business, whilst enabling technological innovation based on our findings.

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Appendix

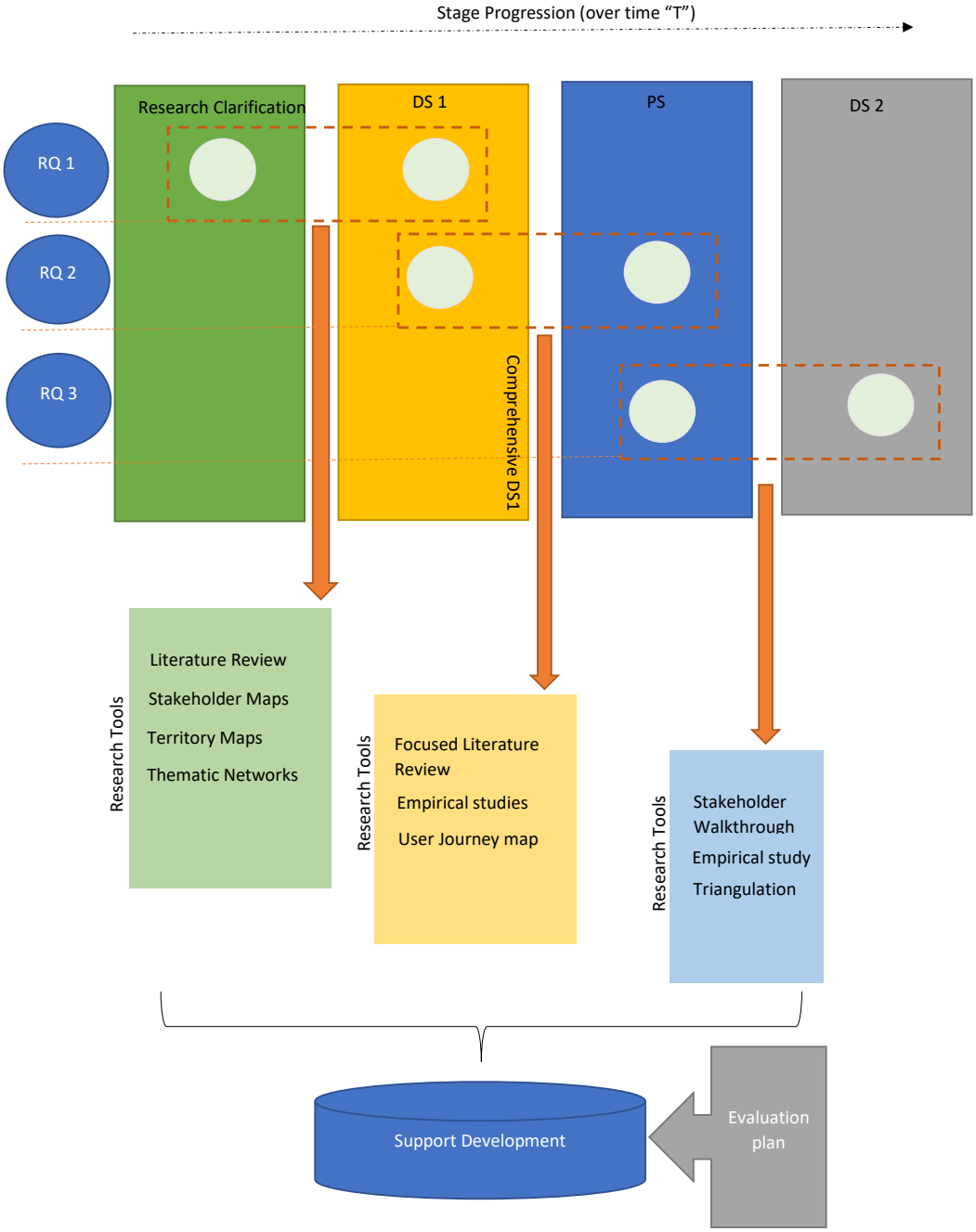

Figure 1: Visual representation of the stages of a DRM type 5 project