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B2B Engagement within an Internet of Things Ecosystem

Abstract

Purpose: This study aims to investigate B2B engagement within an Internet of Things (IoT) ecosystem. A conceptual framework is proposed that can be used for building engagement strategies considering key actors within an IoT ecosystem.

Design/ methodology/ approach: The study used an integrative literature review as a research method and investigated engagement across several disciplines along with antecedents and outcomes of engagement to form an understanding of IoT engagement.

Findings: The findings in this study revealed IoT engagement antecedents as IoT readiness, commitment, communication, involvement, and support and, consequently, the outcomes of IoT engagement as trust, loyalty, better performance, and satisfaction. Furthermore, IoT engagement needs to be considered from three perspectives, namely from a multidimensional perspective, beyond a dyad perspective, and from the Service-dominant logic perspective, which suggests thinking of goods as services and highlights the importance of value co-creation.

Research limitations/ implications: As the study of B2B engagement within the IoT ecosystem is conceptual, empirical investigations are suggested for elaborating on the findings.

Practical implications: The conceptual framework provides managers within an IoT ecosystem with thorough recommendations on why to change their perspectives towards engagement; it points out drivers of engagement that need to be maintained and adds IoT readiness as a new antecedent to engagement literature.

Originality/ Value: This study contributes a coherent conceptualization of actors' engagement within IoT ecosystems and enhances both the theoretical and practical domain of B2B engagement.

Keywords:

Internet of Things, B2B engagement, value co-creation, multidimensional engagement, Service-dominant logic

1. Introduction

Today's companies within many industries are highly exposed to vigorous business environments driven by rapid developments and changes in digital technologies (Turber, et al., 2014). The Internet of Things (IoT) plays a significant part in this dynamic change and is an integrated part of current and future studies among several academics and practitioners (Chan, 2015; Fleisch et al., 2014; Westerlund et al., 2014). Oriwoh (2013) describes IoT as the digital interconnectivity of various objects for a number of purposes, including identification, communication, sensing, and data collection. This means that digital technology gets increasingly added in previously non- digital objects, e.g., household applications, bikes, garments etc. (Turber, et al., 2014). Within both business-to-consumer (B2C) and business-to-business (B2B), the IoT is having a major influence on the nature of products (Turber, et al., 2014), services, and consequently on the relationships between all involved actors within an IoT ecosystem. An ecosystem perspective is adapted in this study, as it sees a company as a part of an ecosystem crossing a variety of industries and not as part of a single industry (Anggraeni, et al., 2007). Combining digital technology with physical objects necessitates collaboration and cooperation among business partners and business clients from various industrial sectors and fields (Turber et al., 2014; Westerlund et al., 2014; Chan, 2015; Abdmeziem & Tandjaoui, 2014). Even though the IoT influences all markets, IoT related research on the B2B level is at its infancy.

Much attention has been given to IoT related marketing management, among others to the adoption of IoT in the organization (Tanga & Tat-KeiH, 2019; Mital et al., 2018; Brous et al., 2019; Hsu & Lin, 2018), its potential benefits and dark sides (De Cremera, et al., 2017) and new business model suggestions (Lai et al., 2018; Sun et al., 2012). As the IoT is now a commonly accepted technology innovation within organizations, the next step should be to ensure and foster long-term relationships and partnerships with all actors involved in the IoT innovation (Nguyen & Lyndon, 2017). Fostering relationships with internal and external actors such as employees, customers, partners, and other external actors is an underlying facet of modern research into IoT-driven organizations. This issue should be investigated from a marketing, organizational, and psychological perspective, as actors within the IoT ecosystem hail from various fields connected through business and technology.

Literature on enhancing relationships with internal and external business actors is broad. However, there are no studies on Relationship Management, particularly on engagement theories in the IoT ecosystem, where all the involved stakeholders are connected working towards value creation. The IoT requires more than just managing dyadic relationships (Vargo, 2009). Until now, traditional engagement theories and concepts have focused on an individual actor's basis, which becomes inadequate considering the multi-stakeholders' nature of B2B marketing within an IoT ecosystem (Kleinaltenkamp, et al., 2019). By adapting an ecosystem perspective, this study aims to build a conceptual framework for B2B engagement within an IoT ecosystem. Hence, this study contributes a coherent conceptualization of actors' engagement within the IoT ecosystem and enhances the theoretical and practical domain of engagement within the B2B markets.

Additionally, it discusses antecedents and outcomes of engagement, considering key actors within an IoT ecosystem. In doing so, the rest of this article continues with a literature review on the IoT from

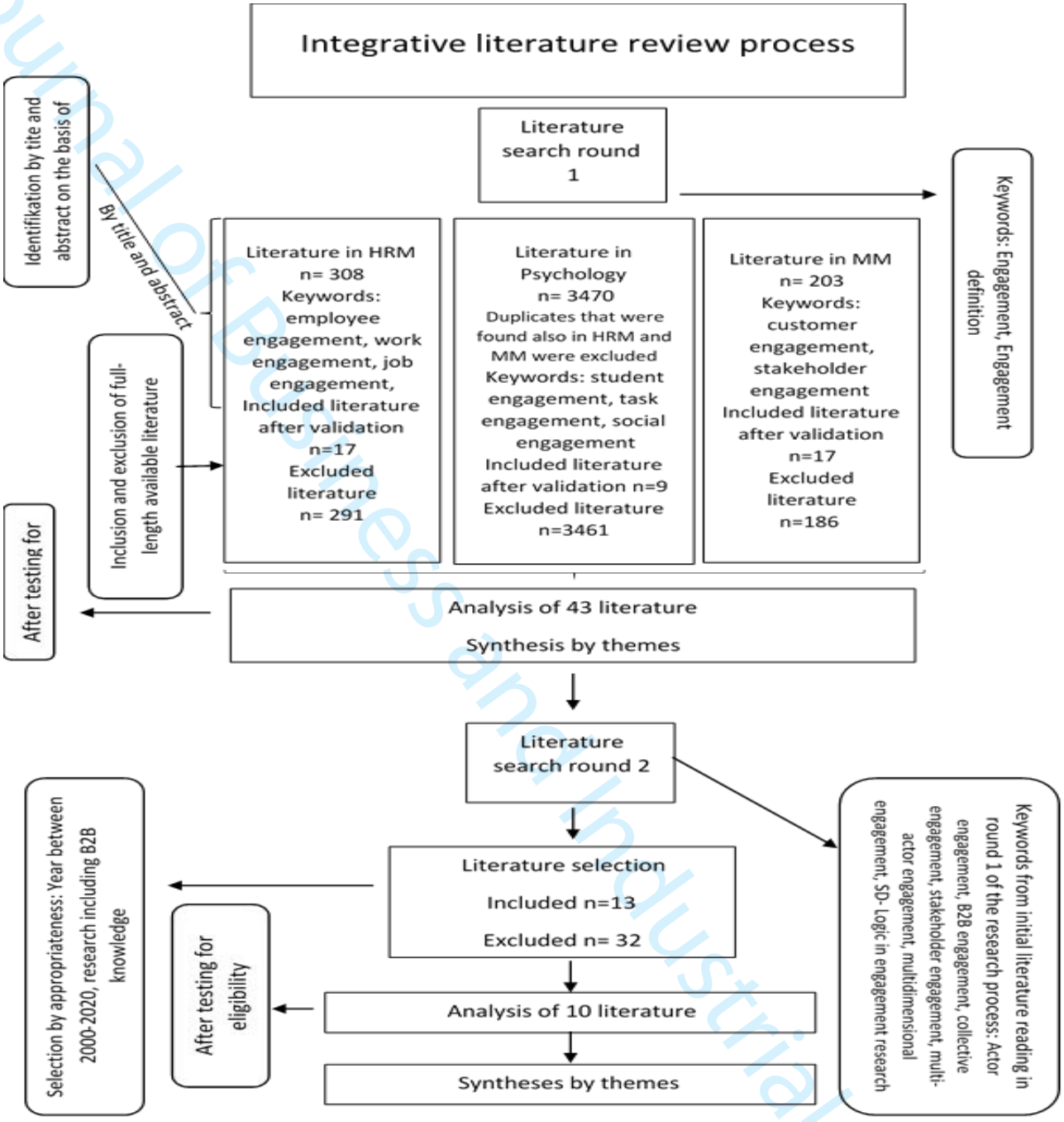
a business perspective followed by a literature review on engagement and current perspectives on engagement research within B2B markets. Subsequently, a conceptual framework for B2B engagement is presented along with antecedents and outcomes while considering B2B engagement from three perspectives. The article concludes by synthesizing all significant findings and suggests research and practical implications within the field of B2B engagement in IoT ecosystems.

2. Applied method

The study was conducted by applying an integrative literature review (Broome, 2000; Russell, 2005; Torraco, 2016; Snyder, 2019). An integrative literature review is a specific form of reviewing the literature, which allows the integration of literature from several disciplines. According to Snyder (2019), "*in some cases, a research question requires a more creative collection of data, in these cases; an integrative review approach can be useful… to combine perspectives to create new theoretical model*" (p.334). Furthermore, Snyder (2019, p. 333) states that new knowledge production in business research is "*fragmented and inter-disciplinary"*. As the study of B2B engagement within an IoT ecosystem is untouched so far, the integrative literature review allows for the inclusion of cross-disciplinary perspectives. Literature within the disciplines of Human Resource Management (HRM), Marketing Management (MM), and Psychology were chosen for ensuring a holistic perspective on engagement as these are the disciplines where the term engagement is broadly researched. A reason for that is the emergence of the term engagement in the past decades within the mentioned disciplines due to the rising importance of human resources and the growing scientific interest in positive psychological states of employees, customers, and other actors in business settings (Schaufeli, 2013).

For the purpose of this study, literature regarding the meaning of engagement and its specific attributes across disciplines were examined. The process of the integrative literature in this study consists of 5 stages (Russell, 2005), which are: 1) problem formulation, 2) literature search, 3) data evaluation, 4) data analysis, and 5) interpretation and presentation. The flow chart (Figure I) outlines the first and second round of review procedures. The first round of review included research with no time frame to build a holistic understanding of engagement from the past to present (Torraco, 2016). In the second round, only research within the past two decades was included for identifying the changes in engagement research caused by digital innovations. To ensure the highest trustworthiness, each selected literature for review has been tested for eligibility, and repeated literature has been deleted. A conceptual framework was built from engagement literature, including the B2B markets. The framework discusses antecedents and outcomes of engagement within the IoT ecosystem; the perspective that is necessary to adopt; and the dimensionality of engagement in the B2B markets.

Figure 1: Flow chart of the integrative literature review of this study



3. Literature Review

The first part of the literature review provides information concerning the IoT definition from a business perspective; how the IoT has changed market focus from a network view to an ecosystem view; and how actors in the IoT ecosystem are framed in literature. Furthermore, it discusses value co-creation in an IoT ecosystem. This is necessary, as the IoT enabled the co-creation of value with several actors in an IoT ecosystem rather than selling products and services through an arm's length

transactions. These insights will help the reader to build a comprehensive knowledge of how the IoT has changed several aspects of B2B markets.

3.1 The IoT state of art

Since its emergence, the IoT has been defined in literature in many ways. While for Patel & Patel (2016) the IoT is the Internet of three things, namely from people to people, from people to machine/things, and from Things/ machine to things/machine, Oriwoh & Epiphaniou (2013) give a general perspective and describe IoT as the digital interconnectivity of various objects for several purposes, including identification, communication, sensing, and data collection. In a similar vein, Want et al. (2015, p. 28) define the IoT as the "interconnectedness among devices—anytime, anywhere on the planet—providing the Internet's advantages in all aspects of daily life". The collected data from non-digital objects are used for optimizing, predicting, and controlling systems (Turber et al., 2014; Leminen et al., 2017). Additionally, the IoT is regarded as the foundation of the fourth industrial revolution (Balaji & Roy, 2017), while the first three revolutions being characterized as (1) mechanical production, (2) use of electrical energy, and (3) automated production (Boyes, 2018; Xu et al., 2018). Accordingly, within several industries and markets, both in the B2C and B2B the IoT is having a major influence on the nature of products (Turber, et al., 2014), services, and consequently on the relationships between involved actors within the IoT ecosystem. However, research on relationship management in the IoT domain is very restricted, particularly on the B2B level, where most of the IoT's potential lies (McKinsey, 2015). Adding digital, cyber and virtual technology to tangible objects requires partnerships with many actors from various industrial sectors and fields (Turber et al., 2014; Westerlund et al., 2014; Abdmeziem & Tandjaoui, 2014; Jekov et al., 2017). An extensive amount of research is concerned with investigating how companies can form the structure of their business environment (Vargo & Lusch, 2016), and how actors can build service ecosystems to build productive inter-dependencies in collaboration with other actors (Vargo and Lusch, 2011). Since the IoT increased complexity in markets, "*focusing on just one aspect risks missing the bigger picture"* (Holmqvist & Ruiz, 2017, p. 800). Adopting an ecosystem perspective when investigating relationships and mechanisms that are shaping networks of businesses will offer a holistic view while considering individual actors who are part of the network (Anggraeni, et al., 2007).

According to Mazheils et al. (2012), an ecosystem is built around a core representing some assets usually used by actors within the ecosystem. The cores are "*(i) connected devices and gateways, including the hardware platform; (ii) the connectivity between devices and the Internet; (iii) the application services built based on connectivity with the common software platform; (iv) the supporting services that are needed for provisioning, assurance and security standards"* (Lai, et al., 2018, p. 3). From a business perspective, a definition for the IoT ecosystem can be derived from Moor's (1996, p. 15) definition, who calls the interacting organizations and individuals in a business ecosystem (economic community) *"the organisms of the business world"*. Thus, IoT ecosystems are particular types of business ecosystems, where interacting organizations and individuals both compete but also cooperate with each other by using a common set of core assets. (Mazhelis, et al., 2012). The ecosystem perspective in this study is applied for the aim of understanding relationships and interconnectedness of actors both within and across their boundaries. This perspective expands the traditional views of core products and services and the network approach as an extended enterprise. The ecosystem view sees a company as part of an ecosystem crossing a variety of

industries and not as part of a single industry (Anggraeni, et al., 2007). Identifying and analyzing those involved actors and their roles is complex (Lai, et al., 2018). However, from a general perspective, examples of interacting organizations and individuals are IoT enablers (provide technologies, applications, and services that underlie the integrated IoT offerings), IoT engagers (provide products/ services that connect the IoT with customers), and IoT enhancers (value-added IoT services that augment and integrate the offerings of engagers) (Saarikko et al., 2016; Burkitt, 2014). Alternatively, Ikävalko et al. (2018) and Lusch and Nabisan (2015) suggest that an actor can take on the role of an ideator, a designer or an intermediary. An ideator integrates current market offerings, and a designer develops new service offerings by mixing and matching existing knowledge components. An intermediary enables multi-way communication in different IoT design layers (Ikävalko, et al., 2018, p. 5) and *cross-pollinates knowledge across many ecosystems* (Ikävalko, et al., 2018, p. 7). Ikävalko et al. (2018) had adopted this perspective for a better understanding of ecosystem business models.

Within the IoT ecosystem relationships are no longer about customer-supplier relationships (Iivari, et al., 2016) but all actors within the ecosystem are dependent on each other, which calls for rethinking beliefs around value creation and value capture (Hui, 2014; Dijkmana et al., 2015). Value co-creation is at the heart of this new IoT-driven era (Balaji & Roy, 2017; Vargo et al., 2008). Value co-creation is defined as the interactions between a firm and its customers as well as with other parties such as trading partners, suppliers, consumers, interest groups, etc. (Kohlbacher, 2008). Prahalad and Ramaswamy (2003) and Burkit (2014) state that customers' interactions with the firm/ product results in a co-creation experience which gives products and services its value. In B2B markets, those interacting customers may be defined as co-producers involved in the co-production of knowledge (Gummesson, 2002; Desouza & Awazu, 2005). However, the co-production of value has been distinguished by the Service-Dominant logic (S-D logic) from the co-creation of value, arguing that co-production is the customers' direct interaction in or participation in the development of a core offering (Marcos-Cuevas, et al., 2016). Furthermore, Vargo (2009) claims that value creation is not a production-consumption event but emerges overtime. Within an IoT ecosystem, value is co-created through the exchange of knowledge and processes with the help of data gathering technologies in real time (Hakanen & Rajala, 2018). Hein et al. (2019) identified three standardized value co-creation practices within the B2B context while acknowledging actors within the B2B IoT ecosystem as ideators, designers and intermediaries. Their study suggests the co-creation practice integration of complementary assets, the insurance of platform readiness and servitization through application enablement (Hein, et al., 2019). Furthermore, for successful co-creation practices, Desouza & Awazu (2004) point out the significance of seeking customers with open knowledge-sharing cultures and risk-taking attitudes. However, it could be argued that instead of seeking, the organization could take the initiative to engage the co-creator. This could be achieved with new engagement concepts appropriate for the complex IoT-driven era. Adequate concepts, theories and models need to be developed with contemporary cross-disciplinary perspectives on engagement, appropriate for a technology-driven environment. Therefore, the core outcome of B2B engagement in an IoT ecosystem is the co-creation of value.

The next section provides insights on engagement from different disciplines, followed by the most recent perspectives on B2B engagement. The changes that advances in technology, such as the IoT in B2B markets, have brought along are in the first place the co-creation of value, which is a complex process, and actors in an IoT ecosystem need to reflect this complexity. The changing perspective from value creation to value co-creation and from thinking of goods as services is described by the S-D logic. Also, engagement literature around B2B markets has shifted the dyadic perspective from firm-customer/firm-supplier relationships to collective views on actors.

3.2 Engagement

Although the term *engagement* was not used in the past in scientific management and human relations movement, the study of engagement can be traced back to the start of the twentieth century and has been in the research interest of several disciplines (Dagher et al., 2015; Saks, 2006). While in political science engagement of nation-state and in sociology civic engagement has been the focus, in organizational management employee engagement, work engagement and customer engagement have been subjects of investigation for decades and will continue to develop and take new forms due to market innovations. In addition, stakeholder engagement has been researched in corporate social responsibility, which is concerned with the relationship between firms and society (Greenwood, 2007). In marketing management, engagement became important because the point of customer purchase was no longer the only relevant customer action (Wilson, 2019; Kleinaltenkamp et al., 2019) and engagement became the focus of investigation with different aspects, e.g. attitudes, behavior, and measurement metrics for engagement (Pansari & Kumar, 2017).

The most critical issue in forming an engagement definition is what elements to include and exclude from the many definitions available. It can be argued that a definition of the word "engagement" in management disciplines is contingent on the use of the word in connection with the type of stakeholders being investigated. To form a meaning of the word "engagement" that is applicable within the B2B context in an IoT ecosystem, it is important to have a cross-disciplinary perspective. Just like all actors are connected to each other, the word "engagement" plays a crucial role for all the involved parties and connects all the disciplines, namely HRM, MM, and Psychology. Table I provides an overview of some of the many available definitions of engagement within the research scopes of MM, HRM and Psychology to be able to understand the evolution of engagement within the literature.

The review of the literature in different disciplines revealed first that past research into engagement adopts mainly a dyadic relationship perspective: whether it is the relationship of the customer with the firm, the relationship of the student with the education, employee-firm relationships, or the engagement of an individual in a social context. Second, engagement is a multidimensional concept, namely cognitive (thoughts), emotional (affective), and behavioral (action) (e.g., Youssef et al., 2018; Patterson et al., 2006; Hollebeek, 2011b). Third, engagement research knowledge within the disciplines of marketing management and psychology are often built from pioneers suggesting theories and knowledge around employee/work engagement.

Table I: Definition and dimensionality of engagement in cross-management disciplines

Insert table I here

Multidimensional perspective in B2B engagement research

The debate regarding the dimensionality of engagement exhibited in Table I is also apparent in the engagement research within the B2B domain (Hollebeek, 2011). In previous research, the focus was stronger on the cognitive and behavioral dimensions of engagement, while ignoring the emotional dimension, claiming that B2B interactions are somewhat rational (Vivek, et al., 2016). However, recent research within the B2B context recognizes the significance of multidimensionality of engagement (Wilson, 2019; Brodie et al., 2011; Youssef et al., 2018 and Kleinaltenkamp et al., 2019). That said, emotions might not have the same importance within the B2B context compared to the end-customers (Vivek, et al., 2016). Whether emotions can be included or not depends on the actor's situation (Brodie, et al., 2013). Whenever people are involved in activities, it will embrace a complex cadre of emotions and rationalization (Kemp, et al., 2017) that can emerge in multiple levels of relationships (Andersen & Kumar, 2006). Andersen and Kumar (2006) recognize emotions as a multifaced construct that *shape behavior*, *influence decision making* and *condition the negotiating strategies* of *actors*" (p.524). Table II provides an overview of research acknowledging the multidimensionality of engagement within the B2B marketing disciplines. Most current studies were chosen to ensure their relevance in this technology-driven era.

Table II: Dimensionality of current engagement research including the B2B domain

Insert Table II here

3.3 Changing perspectives on engagement research in the B2B context

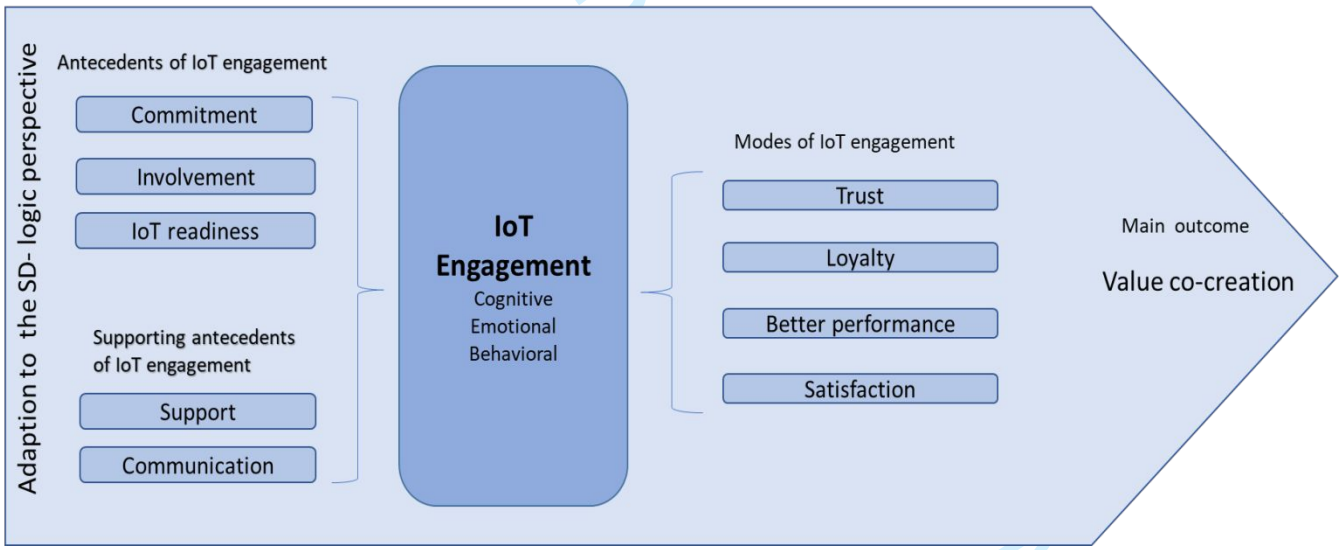
Current engagement research on the B2B level has shifted the dyad perspective from customer engagement to actor engagement (AE). An actor can be both an individual/ human or (a) collection/s of individuals/humans (Lush & Vargo, 2014; Storbacka, 2019; Alexander et al. 2017; Storbacka et al., 2016 and Brodie et al., 2019). This new definition was necessary to move beyond the dyad and focus on the collective nature of engagement. As markets are becoming progressively interconnected, resulting in an unclear role between the traditional roles of customers and providers (Alexander et al., 2017) it necessitates moving beyond the dyad and considering additional interactions such as service process, physical environment, technological advances, and other customers (Patrício et al., 2011). This resulted in additional changes in engagement research, moving from a unidimensional to multidimensional focus (Youssef et al., 2018) and from an individual level to a multi-level focus (Li, et al., 2017) and as well as to defining suggestions i.e., collective engagement (Kleinaltenkamp, et al., 2019) and multi-actor engagement (Li, et al., 2017). Further attention has been given to advancing knowledge about engagement in a service ecosystem, which has its theoretical roots within the S-D logic (Vargo & Lusch, 2017; Chandler & Vargo 2011).

Next in this study, the findings are discussed by proposing a conceptual framework, which is based on knowledge gained from literature and is developed for the B2B context in an IoT ecosystem.

4. Towards a conceptual framework for IoT engagement within the B2B markets

The value co-creation process in the B2B markets needs coordinated interactions among all involved actors. This can be reached by engaging actors in a coherent way. As traditional engagement concepts and theories cannot be applied in the complex IoT ecosystems, there is a demand for appropriate concepts that would meet the requirements of this technology-driven era. The literature review in this conceptual paper pointed out the main challenges of the IoT that B2B companies face when interacting with several actors in the IoT ecosystem. It also emphasized the urge for adequate engagement concepts for IoT-driven markets. Literature review on engagement revealed contemporary perspectives on several aspects of engagement research. It started by looking into cross-disciplinary definitions for engagement including its antecedents and outcomes, and acknowledged engagement as a multidimensional construct. This was followed by showcasing current perspectives of engagement within the B2B domain. Figure 1 sums up the findings (relevant for the B2B context in an IoT ecosystem) from the literature review and proposes a conceptual framework that could be used for setting B2B engagement strategies within an IoT ecosystem. The next step in this paper discusses why this new engagement framework is adequate for the B2B markets working with IoT technologies.

Figure 2: IoT engagement conceptual framework



4.1 Antecedents of engagement

The literature review identified several antecedents for engagement across disciplines. However, whether all antecedents could be included in the same way in the IoT B2B markets depends on the context. Furthermore, not all antecedents identified in literature are main drivers. The antecedents' support and communication are in an IoT ecosystem supporting activities that an actor needs to conduct to strengthen the primary drivers' commitment, involvement, and IoT readiness. Depending on the state of the relationship with an actor, it is also suggested that the antecedent support would be more relevant to include when considering new business partners or clients while, on the other hand

involvement is recommended for both new and existing actors. Commitment and communication play a key role in driving engagement across all stages, whether it be new actors or existing ones (Robbins & Judge, 2019; Brodie et al., 2011). Especially when the connectivity of devices and the automation of processes reduce human interactions, communication will tackle all dimensions of engagement of the participating actors within the IoT ecosystem. According to Robbins and Judge (2019), communication serves as the basis for managing the behavior of actors; the creation of feedback by expounding what actors must do. Communication enables the sharing of feelings and it encourages and facilitates decision-making due to the exchange of information. The next antecedent, commitment, is defined as the readiness to continue a course of action (Vance, 2006). Commitment is manifested in a distinct behavior, which consists of social and cost components. Commitment also has emotional components; that is, the positive expression and experience of feelings toward an entity, individual or a course of action (Vance, 2006). The experience of the positive feeling lies in the fact that people assume in exchange for their commitment they will receive something of value in return (Vance, 2006). In the case of the IoT, value would manifest itself as either monetary (e.g., cost savings due to predictive maintenance,) or non-monetary (e.g., security for the population in a smart city). Support in the IoT settings would mean training and development programs for either internal (employees, managers, etc. at the business and organizational level) or external actors (at the ecosystem level) of the IoT ecosystem. The programs could be, for instance, training employees in new skills, enabling a firm to become analytically rigorous and data-driven (Bughin, et al., 2015).

Involvement plays a major aspect in driving engagement. Involvement is an individual's perceived significance of an object based on intrinsic requirements, interests and values (Zaichkowsky, 1985). Depending on the role of actors within an IoT ecosystem, the degree of involvement could vary. Actors within the role category of ideators might feel a lower involvement compared to actors within the group of designers and intermediators in an IoT process. On an individual basis, employees of an IoT firm would need a higher degree of involvement than clients. This is because research has proven that highly engaged employees are any organization's critical assets (see, e.g. Macey & Schneider, 2008; Schneider et al., 2009). Furthermore, engaged employees have a positive effect on customer engagement (Schneider, et al., 2009).

Even though IoT readiness is not mentioned in the engagement literature, within the IoT ecosystem, this antecedent is one of the main drivers that is significant in all stages of relationships with actors. Research on IoT readiness has been conducted by several academics and practitioners (Zaidi, 2017; Parasuraman, 2000; Parasuraman & Colby, 2015) and a definition can be derived from technology readiness. Technology readiness is the propensity of people to accept new technologies (Parasuraman, 2000). In the first article, Parasuraman (2000) suggested the Technology Readiness Index (TRI), which was created from the literature of adopting new technology and the interaction among people and technology. The second article was an update of the TRI, attempting to match the model to recent technological changes and advances (Parasuraman & Colby, 2015). The authors suggested four dimensions of technology readiness, two of which were positive (seen as mental motivators) and two were negative, seen as inhibitors (Zaidi, 2017; Parasuraman & Colby, 2015). The dimensions are optimism, innovativeness, discomfort, and insecurity. Optimism refers to the positive attitude held by people regarding technology. Innovativeness was characterized as the *tendency to be a technology pioneer*. The inhibitor, discomfort, referred to a lack of control and being overpowered by technology,

and finally, insecurity, which was defined as being suspicious about technology and the fear of its possible harmful impact (Parasuraman & Colby, 2015) or perceived risk (Jayashankar, et al., 2018). Discomfort and insecurity regarding the IoT could have a negative effect on engagement, as one of the dark sides that IoT has brought about is the collection of personal sensitive data, which affects privacy and security (De Cremera, et al., 2017). Furthermore, in a study by Jayashankar et al. (2018, p. 810) they found out that there is "a direct, negative relationship between perceived risk and IoT adaption". This issue could be tackled with compatible information flows (Jayashankar, et al., 2018) and well-established but also well-communicated security procedures such as trust strategies stressing endpoint security, data privacy, and transparency (Yucesoy, 2019).

4.2 Modes/outcomes of engagement

The outcomes of engagement mentioned in literature within the B2B context are trust, satisfaction, loyalty, and improved performance. The outcomes are interdependent, as one outcome improves the level of another. Trust is the extent to which an actor believes that the other actors are honest and caring, and indicates a high level of confidence among the actors (Andersen & Kumar, 2006). Trust is shaped by emotions (Ze'Ev, 2001) and results in behavioral actions such as decision making (Carnevale & Isen, 1986) and satisfaction (Anderson & Narus, 1990). Within the IoT ecosystem, trust has a crucial role due to the intangibility of certain IoT services such as the absence of face-to-face interactions (Jayashankar, et al., 2018). An effective management of engagement, e.g. through support, involvement, and communication, increases the level of trust and will enhance the relationship among actors (Andersen & Kumar, 2006). As stated, Anderson & Narus (1990) found that trust will lead to satisfaction, which in turn will lead to loyalty (Lewin, 2009). Loyalty is described in the literature as the wish of retaining a relationship of value (Janita & Miranda, 2013). Engaged actors will be satisfied actors and will maintain the relationship of value, which will automatically lead to the actors performing better. With a braoder perspective, engagement in this study is investigated for the overall goal of value co-cration in B2B markets.Therefore, the main outcome of engagement is value co-cration.

Next the perspectives are discussed that are necessary to consider in IoT engagement. The three views are neither models nor theories/concepts. They are views that an actor needs to adopt, enabling the actor to better construct theories and concepts for IoT engagement.

4.3 Beyond the dyad engagement perspective in an IoT ecosystem

AE came into spotlight as authors saw the urge to reconsider definitions of engagement (among others) due to the acknowledgment that engagement can occur through all sorts of resource integration processes (Kleinaltenkamp, et al., 2019), the rise of collaborative economies (Brodie, et al., 2019), universal connectivity due to digitalization (Storbacka, 2019) and to recognizing the mutual, social and collective nature of engagement (Chandler & Lusch 2015, Jaakkola & Alexander 2014; Li et al., 2017 and Kleinaltenkamp et al., 2019). Thus, AE is defined an actor's propensity and activity of engagement in a resource integration process within a service ecosystem (Storbacka, et al., 2016). Alexander et al. (2017) has a similar view and adds to the definition of AE that the actor's recourse contribution is voluntary and goes beyond the fundamental interactions between actors or

the interactions with a focal object. Both definitions acknowledge the intricate domain of actors (including suppliers, employees, distributors, and other actors) in a service ecosystem (Kleinaltenkamp, et al., 2019). Investigating multiple actors as part of their research, Kleinaltenkamp et al. (2019) and Storbacka (2019) further propose the term *collective engagement*. Collective engagement builds upon the previously identified actor engagement (Alexander, et al., 2017), arguing that it is not enough to conceptualize and treat engagement "…*as an individual's property*" (Kleinaltenkamp, et al., 2019, p. 11). Likewise, Storbacka (2019) agrees that engagement can be both the collective's and individual's property and that engagement can even occur in the absence of a commercial exchange. Several researchers, e.g. Kleinaltenkamp et al. (2019), Storbacka (2019) and Li et al. (2017) emphasize that engagement is not limited to the buyer-supplier relationship or firm-employee relationship

The growing IoT domain represents fundamentals of evolving complex infrastructures. Moving beyond the dyad and adapting an ecosystem perspective will allow researchers and practitioners to capture the relations and interactions among several actors realistically by focusing on the bigger picture and not on dyadic relationships such as only on firm-customer interactions. Therefore, the term actor engagement is appropriate in this research, as it captures a wholistic perspective on engagement beyond the dyad. To expand the discussion on AE, it is crucial to specify the meaning of actors (Storbacka, 2019). As stated, in social science, an actor is an individual/human being or (a) collection/s of individuals/humans (Lusch & Vargo, 2014). However, considering actors as humans overlooks the impact of technologies, as actor-to-actor interactions can be reshaped due to advances in technologies (Storbacka & Cornell, 2016). Therefore, Storbacka (2019) states that actors should be defined both as single actors such as humans or machines and as a group of actors such as collectives or organizations. A challenge faced by the IoT ecosystem is the blurring roles of actors. This makes it difficult to categorize each actor as either a customer, employee, or business partner, or a combination of these. A role refers to expected behavior of involved individuals or groups in certain positions (Leminen et al., 2017). Defining actors' roles in the IoT ecosystems has been the focus of research by only a few academics and practitioners (see e.g. Alexander et al., 2017; Storbacka et al., 2016; Storbacka, 2019). However, a broad definition of actors' roles within the IoT ecosystem was adopted for the purpose of this paper from Ikävalko et al., (2018); namely the roles defined as ideators, designers and intermediaries. Engagement strategies within the B2B domain need to be designed with a collective perspective, including all actors, as they are all 'working' for the same purpose (i.e., value co-creation). Depending on the role of the actor in the IoT ecosystem, value can be both monetary and/or non-monetary (Ikävalko, et al., 2018). An ideator could be a municipality providing road safety for its citizens. This would be an example of a non-monetary value. The monetary value would be for the designer to receive money for its road security system provided to the municipality. Since the actors have distinctly different operant activities (Ikävalko, et al., 2018) in the IoT ecosystem, engagement strategies from several disciplines (HRM, MM, and psychology) need to be aligned in order to establish IoT engagement. This will enable several actors of the IoT ecosystem to be engaged in the same way to reach a focal goal. This necessitates a common overall engagement strategy by zooming out from the dyad perspective and looking at all the involved actors from a macro level (Alexander, et al., 2017). At the same time, an IoT company needs to understand the needs and motivations of different involved actors (Alexander, et al., 2017). For example, in

contrast to B2C within B2B markets, business clients account for "special requirements, like the need for stable services, compliance with security, regulations, or high-quality standards" (Hein, et al., 2019, p. 508).

4.4 The IoT engagement through the S-D logic lens

When reviewing contemporary engagement literature, the S-D logic has been subject to widespread implementation. Extensive research acknowledges the adaption of the S-D logic perspective by arguing, besides others, that looking at engagement from the S-D Logic standpoint emphasizes the inter-dependent role of different actors who might be involved in several co-existing processes (Vargo & Lusch, 2016). Also, Van Doorn (2011) emphasizes the importance of firm-customer interactivity in an engagement construct and states that the customer is always a value-co-creator. Therefore, looking at engagement from the S-D logic lens is fertile (Hollebeek, et al., 2016).

The IoT increases density, as network structures are changing from centralized structures to decentralized and distributed structures (Leminen, et al., 2017). Actors within the IoT ecosystem are connected and considered to be resource integrators and service providers working towards value co-creation (Vargo & Lusch 2017). This means that firm-centric activities need to be transformed to network-centric activities, which suggests a change towards the S-D logic (Turber et al., 2014; Ikävalko et al., 2018). IoT firms depend on activities with external partners (e.g., app developers, hardware providers, and analysis providers) (Dijkmana, et al., 2015). Looking at engagement through the S-D logic lens highlights the inter-dependent role of different actors who are involved in several co-existing processes within the IoT ecosystem (Vargo & Lusch, 2016). Furthermore, the S-D logic suggests an ecosystem perspective in order to fully understand and unlock the nature of complex value co-creation processes (Lusch and Vargo, 2014).

Under the S-D logic, products are considered as mechanisms for service provision, and their value is based on their value-in-use (Kowalkowski, 2010). One of the major changes that IoT has brought about is to offer goods as services. For example, within the B2B markets, tangible products (e.g. heating systems in a building) are equipped with sensors that collect data from the product and send it in real-time to the data analytics. These data are used for analyzing the performance of the heating system, maintenance predictions and possibly reduction of energy. For instance, the company Verdigris Technologies, which is a SaaS-based platform, develops artificial intelligence buildings with embedded wireless sensors to optimize energy consumption through real-time energy monitoring and delivers insight into the power usage per device when in critical condition (Verdigris, 2020). Another example is the railway operator SNCF, who can monitor trains not only to prevent breakdowns, but also to improve reliability (SNCF, 2020). Value is created while the client is using the service and several other actors are working towards realizing the value in this specific service.

4.5 Multidimensional engagement in B2B markets

The dimensions identified in Table II within the literature on B2B engagement are; cognitive (thoughts), emotional (affection) and behavioral (action) (Youssef, et al., 2018; Patterson, et al., 2006; Hollebeek, 2011b). Several conditions that enable engagement (antecedents) and as well as outcome of engagement have been acknowledged in literature as multidimensional. For example, the antecedent commitment has both within the research of employee engagement (internal actor) and

customer engagement (external actor e.g., business client) social, cost and emotional components (Vance, 2006; Sashi, 2012). Researchers distinguish between calculative commitment, which results from switching costs or lack of other suppliers to retain a customer (Sashi, 2012; Bowden, 2009) and affective commitment, which results in an emotional bond between the stakeholders (Gustafsson, et al., 2005).

The outcome of engagement trust is shaped by emotions and results in behavioral actions such as decision making and satisfaction. The objective of every engaged actor is to establish a long-term association and connectedness (Pansari & Kumar, 2017). Pansari & Kumar (2017) compare this with a marital relationship, where partners interact more often with each other and in favor of the other partner when there is an emotional bond. Within an IoT ecosystem, trust plays a significant role and deals on the technological basis with issues of network security, identity management, and data privacy (Jayashankar et al., 2018; Robert et al., 2017). Network security is concerned with confidentiality, integrity (Zarkout, et al., 2019) and authenticity (Robert, et al., 2017). Under identity management, matters of authentication, authorization, accountability and revocation are handled (Robert et al., 2017). Last, but not least, data privacy handles matters of anonymity (Alcaide et al., 2013; Robert et al., 2017), pseudonymity, unlinkability (Robert, et al., 2017). From a business relationship perspective, trust has three sources, which are familiarity, calculatedness, and value (Liu & Loper, 2018; Lee et al., 2018). Familiarity refers to repeated interaction (e.g. engagement with other actors within the IoT ecosystem), calculatedness is the assessment of costs and benefits (of engaging) and value refers to both instrumental (the way end goals are reached) and intrinsic value, e.g. norms, morals, or goodwill (Liu & Loper, 2018).

In summary, engagement within an IoT ecosystem has both cognitive and behavioral dimensions but also an emotional dimension. The behavioral manifestation of IoT engagement refers to the resulting engagement actions of actors within the IoT ecosystem. Cognitive IoT engagement is the thoughts held by actors within the IoT ecosystem and emotional engagement is the affection (feelings) that actors have towards objects (e.g., to IoT in general, to other actors within the ecosystem, or to machines).

5. Conclusion

As services in our current technology-driven era are not controlled and managed by a single actor in the B2B markets, the term value co-creation will most certainly add intensity in collaborative and collective business goals, objectives, and strategies, which in turn affect engagement strategies. Furthermore, IoT engagement needs to be considered from three perspectives, namely from a multidimensional perspective (cognitive, emotional, and behavioral), beyond a dyad perspective (a common overall engagement that involves looking at all the involved actors from a macro level), and from the S-D logic perspective, which suggests thinking of goods as service and highlights the importance of value co-creation which is at the heart of the IoT. In the past, B2B engagement was narrowed down to be rational, as the perception was that the emotional dimension would be rather relevant for end customers. However, research has shown that also within the B2B markets, not only cognitive and behavioral but also the emotional dimension is crucial to consider, since the B2B actors look for emotional connections to other actors, which in turn will lower the risk of causing

disengagement. Especially in reference to lower face-to-face interactions due to the IoT, emotional engagement would lower the risk of disengagement.

In general, the reason why all three new perspectives are crucial, lies particularly in the fact that the IoT has exposed individuals and organizations to highly complex, dynamic, and interconnected business environments. The IoT is an innovative technology that affects not only some markets; it is already affecting the majority of industries and sectors and will stay impacting them even more in the future, since connected objects, but also connectivity between people, are increasing every day. And not only when it comes to engagement, but also towards any other strategies, tactics, and the way companies conduct business contemporary perspectives are needed, matching the requirements of the digitalized economy. Stephen Vargo (2009) gave an excellent example during the discussion of why markets need the S-D logic. He mentioned the hundreds of years of failing attempts to fly with the "Arm Flapping Logic" until they succeeded with the "Airfoil Logic". In terms of engagement, B2B actors need to change their perspectives first before jumping into forming strategies and tactics on how to engage with their co-actors.

6. Limitations and future research

As this paper is conceptual, the research opportunities for future research are extensive. The presented conceptual framework for IoT engagement opens a new platform for research on engagement. It provides academics with a firm ground on how to look at engagement when a company is operating within an IoT ecosystem. In addition, this study will provide researchers with inspiration for advanced and relevant engagement theories suitable for B2B markets working with IoT. As this conceptual contribution is the first one to look into IoT engagement, the limitation is first and foremost its empirical evidence. Research should be conducted to test the suggested framework empirically on actors within an IoT ecosystem. The framework can be tested both qualitatively and quantitatively. More precisely, future research needs to include the following emphases.

1. As the focus of engagement has been shifted from dyadic settings to zooming out on a macro-level (Alexander, et al., 2017), there is a need for a better understanding of the roles of actors in an IoT ecosystem.
2. Further research is needed on the antecedents of IoT engagement when considering the different stages of a relationship among actors; for instance, whether the relationship is new or long-standing. This would make it clear whether an antecedent such as commitment should be considered a driver for engagement or an outcome within the IoT engagement research.
3. Another suggestion is to investigate the engagement process of actors such as among people and machines. As the study of how actors interact to build relationships has been largely covered by the IMP group (Industrial Marketing and Purchasing), the current research could be used as a platform for opening a discussion on interactions among human actors and non-human actors for forming engagement strategies.
4. IoT readiness, which has been identified as a B2B engagement driver in IoT markets, could be researched further by investigating newcomers in an IoT ecosystem.
5. In an IoT ecosystem, actors affect and are affected by other actors. Research could be focused on how disengagement of one actor might affect other actors' engagement in the value co-creation process.

7. Managerial implications

The findings in this research contain crucial suggestions for practitioners in an IoT ecosystem. In general, the research provides new insights on recent changes within complex and dynamic B2B markets concerning engagement. Also, managers need to acknowledge that all actors are involved in developing services. This can be reached by following the S-D logic's perceptions concerning the meaning of relationships in IoT settings and the view on goods as mechanisms. More specifically, the results in this study suggest that practitioners need to change their perspective from a dyadic relationship marketing to adapting an ecosystem perspective. Defining and understanding the roles of actors as ideators, designers and intermediaries will help managers to plan and execute better engagement strategies. This means that practitioners need to change their view on actors as customers, competitors, and suppliers and rather develop an understanding of how the ecosystem functions and how value is co-created with the help of IoT technologies. In doing so, engagement will be an integrated part of the continued value co-creation process.

Furthermore, the identified drivers of engagement in B2B markets offer managers in IoT settings insights to engage actors over the long term. New in this study is IoT readiness as a driver for B2B engagement in IoT markets. This driver is crucial for managers to integrate into their engagement strategies. IoT managers need consistent information flows (Jayashankar et al., 2018) and well-established but also well-communicated security procedures such as trust strategies stressing endpoint security, data privacy, and transparency (Yucesoy, 2019). In addition, Hakanen and Rajala (2018, p.863) state that *existing IoT research has focused on how* to use IoT technology over *why*. Relating to IoT readiness, actors also need to ask themselves the question of "why" they should use IoT technologies and not only "how". This is a common mistake concerning new IoT actors, as the success of gathering real-time data depends on both why and how those data are crucial for mutual value co-creation. Engagement strategies that communicate this issue better will maintain long-term relationships with new actors in an IoT ecosystem.

I would suggest that managers in IoT B2B should adopt a multidimensional perspective on engagement. So far, B2B markets were classified as being rather rational. In some cases, emotional engagement is crucial. For example, the absence of trust in terms of data security will harm the health of the entire ecosystem, as the actors in an IoT ecosystem affect and are affected by the ecosystem.

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Table I: Definition and dimensionality of engagement in cross-management disciplines

Definitions	**Dimensions of engagement**
Human Resource Management	
Employee engagement	
The cognitive, emotional and physical connectedness of *organization members' selves* with their work role. (Kahn, 1990, p. 694)	Physical Cognitive Emotional
Employee engagement is a diverse, exclusive multidimensional concept related to individual the role performance of an individuum. (Saks, 2006)	Cognitive Emotional Behavioral
Engagement is referred to a psychological state, performance construct, disposition and organizational citizenship behavior. (Macey & Schneider, 2008)	Cognitive Emotional Behavioral
Employee engagement has three dimensions which are referred to emotional involvement, high focus at work and willing to perform extra work. (Bedarkar & Pandita, 2014)	Emotional Cognitive Physical
Marketing Management	
Customer engagement/ Consumer engagement	
Customer engagement refers to the state of a customer's involvement, occupation, absorption and continued attention. (Higgins & Scholer, 2009)	Cognitive Emotional
The degree of a *customer's presence* (cognitive, emotional and physical) in a relationship with a company or an organization. (Patterson et al. 2006)	Physical Cognitive Emotional
The extent to which a customer cognitively, emotionally and behaviorally invests in an interaction with a brand. (Hollebeek, 2011b)	Cognitive Emotional Behavioral
Customer engagement is a multidimensional concept. The dimensions are cognitive, emotional and behavioral. (Youssef, et al., 2018)	Cognitive Emotional Behavioral
Psychology	
Student engagement	
The four dimensions of student engagement are academic, cognitive, behavioral and psychological. (Appleton, et al., 2006)	Academic Cognitive Behavioral Psychological
Social engagement	
A high sense of initiative, involvement and adequate response to social stimuli, participation in social activities and interaction with others. (Achterberg, et al., 2003)	Behavioral

Table II: Dimensionality of current engagement research including the B2B domain

Author (s)	Concept	Definition	Dimensionality
(Youssef, et al., 2018)	Customer engagement	*"… customer engagement is a multidimensional construct with three dimensions: cognitive, emotional or behavior engagement."* ***(p.145)***	**Multidimensional** C, E, B*
(Vivek, et al., 2016)	Partner engagement	*"… B2B partner engagement, an episodic social and resource exchange process, is focused on a specific outcome, which influences future collaboration between two independent but interdependent parties and the achievement of the specific outcomes"* ***(p. 57)***.	**Multidimensional** C, B, C
(Jonas, et al., 2018)	Stakeholder engagement	*"Stakeholder engagement in …is thereby linked to the cognitive, emotional, and behavioral dimensions of engagement…"* ***(p.403)***.	**Multidimensional** C, E, B
(Brodie, et al., 2019)	Actor engagement	*"AE is viewed as a multidimensional concept emphasizing emotional, cognitive and behavioral dimensions and further including connectedness"* ***(p.184)***.	**Multidimensional** C, E, B
(Li, et al., 2018)	Actor engagement	*"The antecedents of actor engagement valence comprise individual factors such as cognitive evaluations and hedonic feelings, as well as network-related factors such as social norms and shared beliefs, and the network structure"* ***(p.491)***.	**Multidimensional** C, E, B
(Alexander, et al., 2017)	Actor engagement	*"… an actor's voluntary resource contributions that focus on the engagement object, go beyond what is elementary to the exchange, and occur in interactions with a focal object and/ or other actors" (p.336).*	**Multidimensional** C, E, B
(Storbacka, et al., 2016)	Actor engagement	*"Actor engagement is defined as both the actor's disposition to engage, and the activity of engaging in an interactive process of resource integration within a service ecosystem" (p. 3008).*	**Multidimensional** C, E, B
(Kleinaltenkamp, et al., 2019)	Collective engagement	*"collective engagement refers to multiple actors' shared cognitive, emotional, and behavioral dispositions, as manifested in their interactive efforts devoted to a focal object" (p.12).*	**Multidimensional** C, E, B
(Wilson, 2019)	Collective engagement	*"Similarly, the relationship between cognitions and emotions is deeply intertwined … A three-dimensional view on engagement, with interactions between the dimensions therefore makes sense (p.25).*	**Multidimensional** C, E, B
(Marcos-Cuevasa, et al., 2016)	engagement	*"Engagement in this research manifested as the individual actors' interest in the co-creation enterprise, and this was demonstrated by their contribution to practices such as co-ideation, co-*	**Multidimensional** C, E, B

		valuation, co-diagnosing, through to co-launching. Engagement was also evidenced by a party's openness to consider possibilities and an uncompromising quest to push the 'possible', so it became 'feasible' within complex technologies and highly interconnected B2B systems (p. 105).	

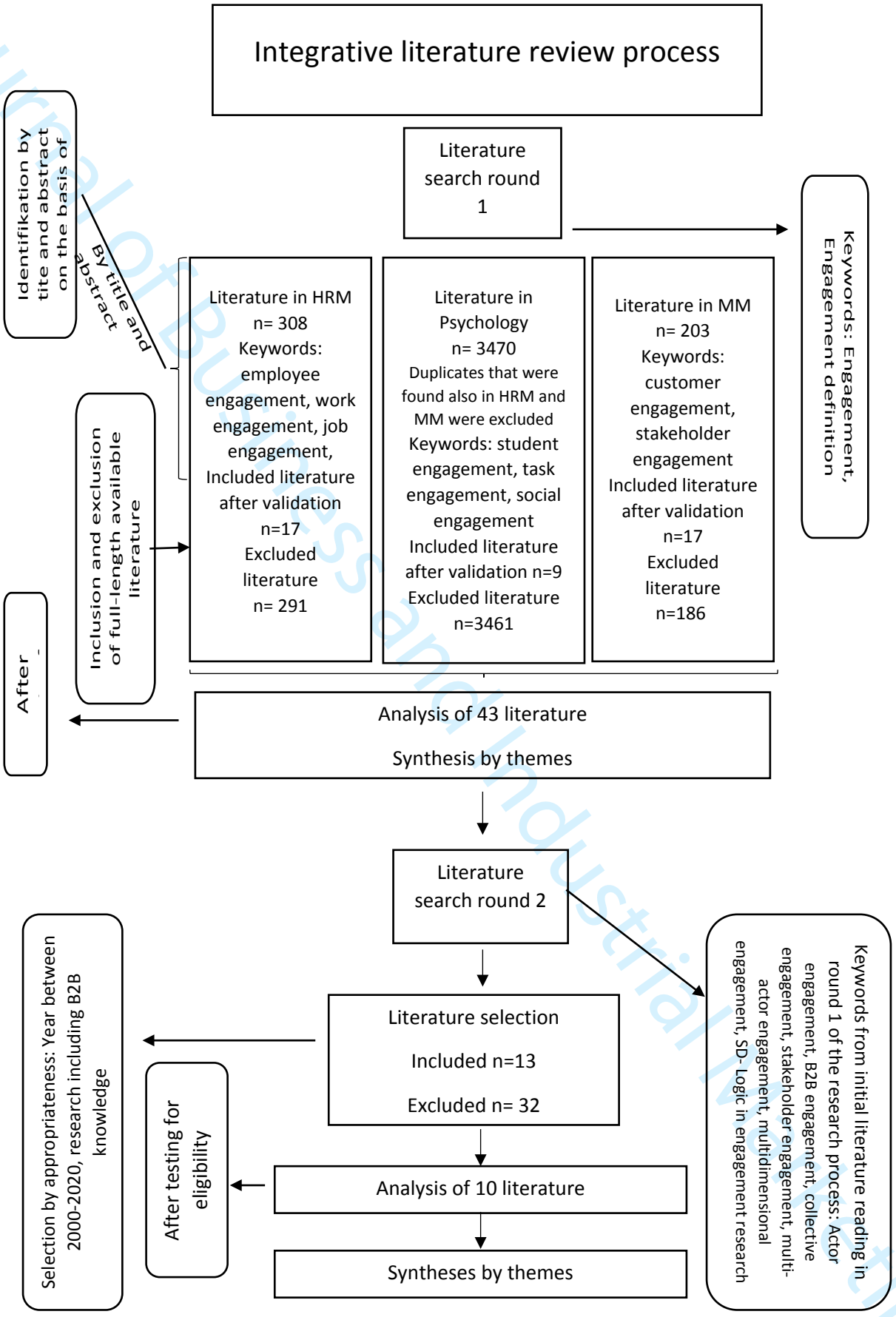
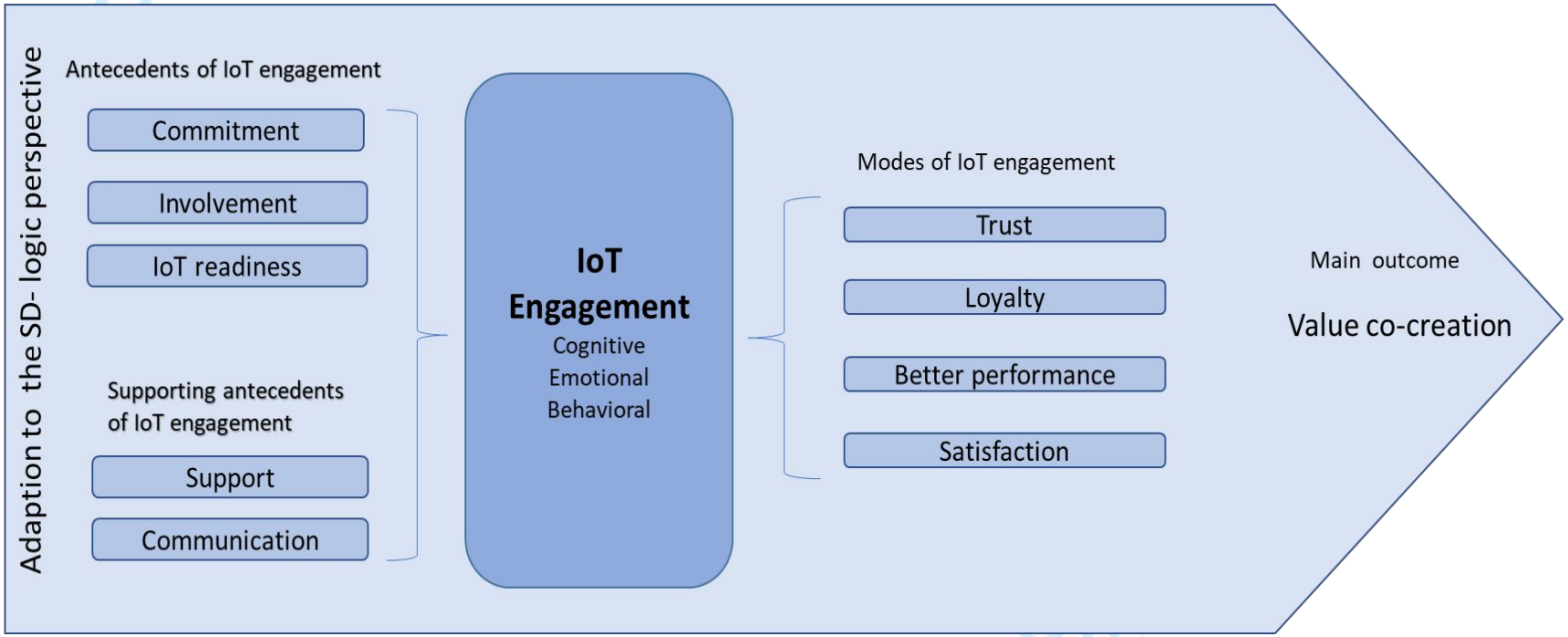


Figure 2: IoT engagement conceptual framework



For Reviewer 1

Dear Reviewer

I would like to thank you so much for taking your time to reading my manuscript and for providing me with valuable feedback. I appreciate your comments and your thorough guidance through the process of improving it. I have adjusted my manuscript according to most of your recommendations and in the followings, I will provide you with information on where in particular I have made the changes. Furthermore, the changes in the article are emphasized with the color red.

Your comments: **1. Originality:** This manuscript centers around 'B2B engagement within the IoT context'. The internet of things is a relatively recent phenomena, and thus the topic is relevant. The stated goal of the manuscript is to develop a conceptual framework that can be used for building engagement strategies in an IoT ecosystem. If successful, I could see this being a useful advancement of knowledge in this area that other scholars could build on. One issue that I think permeates the manuscript is the framing of the conceptual model. The author states on several occasions the idea of 'B2B engagement in an IoT context.' I fail to see how IoT is a context – isn't B2B the context in which you are studying the IoT? My understanding would be that IoT is a technological advancement, or a tool to be used, not a context itself. The opening sentence of the conclusion then states the opposite – "The aim of this paper was to develop a conceptual framework for IoT engagement for the B2B context." This was very confusing as a reader, and because it underpins the conceptual framework, it weakens the contribution greatly.
Thank you for pointing out the issue of inconsistency throughout the manuscript. B2B is the context where IoT engagement is investigated. This has been clarified now throughout the text. The study adopted an ecosystem perspective while looking at actors and their relationships and IoT is an element of that ecosystem. Since companies work with IoT technologies for co-creating value in the ecosystem, IoT ecosystem is the better fitted term for describing this kind of ecosystem. The sentences on page 1 and page 16 has been made consistent. Furthermore, several changes regarding the structure of the paper has been made and sections 3.3.1, 3.3.2 has been shortened and discussed later in the findings part and can be found in the sections 4.3 and 4.4. on the pages 11-13.
2. Relationship to Literature: I commend the author for including an array of different literature in the manuscript. Given the chosen methodology of this paper, the literature review is necessarily complex. However, one way to improve this section is to craft a narrative and explain to the reader the progression of each concept that is explored. For example, this section begins with a definition and history of IoT, but then introduces concepts and definitions including IoT ecosystems, IoT actors, and IoT value creation. Perhaps a paragraph at the beginning of this section that explains the flow of ideas would be helpful and prevent the reader from feeling lost. A similar 'map' or 'guide' would be useful for the Engagement section as well. In fact, this clarity is required even more in this section, as the engagement literature spans multiple areas (e.g. S-D logic, actor engagement, co-creation, etc.) and disciplines.
For providing a better flow for the reader, I have followed your suggestions and included a paragraph at the beginning of the literature review part (IoT state of art) on page 4 and an introducing paragraph to engagement on page 6. Furthermore, based on the recommendation of Reviewer 2, the applied method part in the manuscript has been edited and extended. This will help the reader to have an overview about the literature review applied in this study. However, it would be possible to add the new figure 1 as an appendix.
3. Methodology: The method described in this manuscript is an integrated literature review, which as the author argues 'allows for cross-disciplinary perspectives.' The author touches on Human Resource Management, Marketing Management, and Psychology, but it is unclear why these domains were chosen and others were omitted. If these are the only relevant lenses in which to better understand the IoT and engagement, the author should make this argument explicit. Otherwise it reads as if these disciplines were chosen for convenience.

Given the state of research on IoT and the conceptual goals of this manuscript, the chosen methodology is appropriate.
Thank you for referring to this issue and I agree with you. The methodology section has been modified according to your recommendations on pages 3-4. A reason for why these disciplines are chosen is now included in the manuscript on page 3 with the following rational: Literature within the disciplines of Human Resource Management (HRM), Marketing Management (MM), and Psychology were chosen for ensuring a holistic perspective on engagement as these are the disciplines where the term engagement is broadly researched. A reason for that is the emergence of the term engagement in the past decades within the mentioned disciplines due to the rising importance of human recourses and the growing scientific interest in positive psychological states of employees, customers, and other actors in business settings (Schaufeli, 2013).
4. Results: I was hoping that the visual aid provided would add clarity to the arguments presented in the results section. Unfortunately, I find this figure adds to my confusion, especially since the author states that it is not relevant for all actors. While I no doubt believe that the conceptualization is clear in the author's mind, this clarity does not come through in this figure. Given the extensive research on engagement, perhaps there is a framework or model that could be borrowed/adapted to fit with IoT engagement? An added benefit to this approach would be additional grounding in engagement literature. After discussing the antecedents and outcomes of IoT engagement, the author provides 'perspectives' IoT actors need to consider. I found these paragraphs to be particularly insightful and think that they should be discussed earlier if possible. My interpretation is that these factors/considerations are unique to IoT engagement. As such, is there a way to factor these into the conceptual framework? Right now, this section reads as an after-thought, even though these seem to be the distinguishing features of IoT engagement.
Your comment concerning the sentence, that the framework is not relevant for all actors has been explained on page 15 under section 6 (suggestion 2) while discussing the limitations of the model. But I can see why it has let to confusion. The sentence has been deleted on page 12. What I meant earlier by claiming this, was that the model is not in the same order relevant for all actors because some antecedents might be an outcome of engagement depending on the stage of relationships. The following sentences on page 16 discusses the limitation of the model and explains why the framework needs adjustments depending on the stage of relationships. *Further research is needed on the antecedents of IoT engagement when considering the different stages of a relationship among actors, for instance, whether the relationship is new or long existing. This would make it clear whether an antecedent such as commitment should be considered as a driver for engagement or an outcome within the IoT engagement research.* Furthermore, The IoT engagement framework has been improved and can been found on page 9.
5. Implications for research, practice and/or society: It appears that the author has revised the manuscript to include a section on managerial implications, which is much needed. To improve the contribution, a section on specific research opportunities is also required. If possible, the author could suggest specific propositions that stem from the conceptual framework and could be tested empirically. A set of high-level propositions might also help to solidify the link between the framework and practical situations. Does the author envision any case studies that could illuminate IoT engagement in a B2B context? How else could the distinction between 'actors' be analyzed using this framework? Currently, the future research section is too vague.
In accordance to your above suggestions regarding further research I thank you for your suggestions. I have added some additional suggestions for further research, however no specific propositions are

provided. As I am aiming to keep future research broad, only research areas that could be further investigated are suggested. By providing future researchers with specific propositions, would limit the opportunities for further research.
Even though this section is discussed rather broadly, it provides specific discussion areas that could be further developed. For example, the suggestions concerning the investigation of actors, can be researched by applying case studies.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Perhaps my biggest concern with this manuscript is that I found it to be difficult to read. There are many instances of run-on sentences, unclear arguments, and awkward phrasing. For example, the sentences below are challenging to comprehend:

1.Even though technology and standards for the IoT will soon reach maturity, on a common definition for the IoT has not been agreed yet and definitions differ due to the study's focus, purpose and philosophical views of scholars.

2.Service ecosystem, which is an evolution inspired metaphor, was suggested in which actors may shape the interaction between companies and technology for producing novel engagements.

3. Even though engagement in management disciplines is widely recognized, on a common definition was not agreed and possibly, the most critical issue in forming an engagement definition is what elements to include and exclude from the many definitions available.

4. For example, under morals was mentioned the positive relationship between engagement and turnover as an outcome

5. Within the B2B context of the IoT, creating feasible IoT solution needs coordinated interaction among all involved actors which will lead to positive outcomes in the value co-creation process.

These sentences negatively impact the readability of this paper. There are also several spelling errors or incorrect words in the manuscript. For example:

facet in modem research
extend research

My suggestion is that the manuscript undergoes a significant copy-edit to remedy these issues.

Thank you for pointing to the above issues. The manuscript has undergone professional editing, and errors of spelling, grammar and as well as phrasings have been modified. In addition, the manuscript has been shortened, so that it meets the requirements of the journal.

Sincerely yours

The author

For Reviewer 2

Dear Reviewer

Thank you so much again, for seeing value in my manuscript and for providing me with valuable feedback. Your recommendations have been given full attention as they were very helpful for improving my manuscript. In the followings I will provide you with information on how and where in the manuscript the changes have been made. I have marked the changes in the manuscript with the color red.

Your comments: I am satisfied you added a methodology section. I still should ask for a completion there. Why not using a figure (image) to show the structure of the research? That should make it easier for the reader to understand how you have been working. I want to ask you how many articles did you found in the different disciplines, thousands or only one?. I see the criteria you used to search for the literature and that is good but how many articles were used at the end of the selection process? On the same part, page seven, the second paragraph, lines 0-4: it is difficult to understand what you write about the comparison between systematic and integrative literature review, What do you mean that in the systematic literature review conclutions are made about the literature! The literature does not include knowledge? I think you have to reformulate what you write there. Even if this section is new and rather good, I suggest you reflect once more on the section and revise and complete it. I asked and ask about the trustworthiness of your study. If you make the changes I discuss maybe you can cover this issue. I beleive it is not dificult to write about. Thank you!
Thank you so much for referring to the above issues. Your suggestion regarding showcasing the methodology section of the article visually has been followed on page 4. The figure is a flow chart visualizing the different phases of the integrative literature review process. Furthermore, it indicates the inclusion and exclusion number of articles. Since the manuscript is very long, the description of the process however is kept short so that it meets the requirements of the journal by not exceeding the maximum word number account. Information regarding the trustworthiness of the study has been added on page 3. The sentence concerning the comparison of a systematic literature review with an integrative literature review has been deleted as I could see that it needed further explanation and would take too much space in the article. In addition, the manuscript has undergone professional editing, and errors of spelling, grammar and as well as phrasings have been modified and the whole manuscript has been shortened, so that it meets the requirements of the journal.

Sincerely yours

The author