Implementing a Platform-service based on Sharing Economy for Supply Chain Operations of Small and Medium Enterprises

Lisa-Marie Reitmaier[a,b,1], Ting-Chieh Ou [b], Cheng-Yu Tsai [b], Julio Sanchez[b]

[a] RWTH Aachen University, Germany
[b] National Tsing Hua University, Taiwan

Abstract. Nowadays, more and more people choose the possibility of sharing goods and services. This trend is on one hand utilized by the possibilities given through the digitalization and on the other hand forced by restricted resources and environmental issues. The great success of platform services as Airbnb and Uber shows the potential of a platform business model. This development already caused significant changes in many markets and businesses but has not yet been holistically established in the field of Supply Chain Management of SMEs. Especially Small and Medium Enterprises (SMEs) struggle with adapting to innovation progress. This paper aims to evolve a strategy to integrate the main idea of the sharing economy and its platform-based business model into the Supply Chain Management of SMEs. Therefore, the requirements of SMEs among their Supply Chains are classified and the idea of the sharing economy is implemented and evaluated concerning its applicability. The benefits are validated by implementing existing traditional Supply Chains and their performance in comparison to Supply Chains which adapted to the properties of the sharing economy. This research presents the applicability and contribution of the principals of the sharing economy to the sector of Supply Chain Management in SMEs. This will empower SMEs to save costs, be more flexible and therefore improve their current market value.

Keywords. Supply Chain Management, SMEs, Shared Economy

[1] Corresponding Author. [lisa-marie.reitmaier@rwth-aachen.de]

1. Introduction

Nowadays an enormous amount of data is transferred via the internet or other wireless services. People all over the world have the possibility to communicate and exchange data over thousands of kilometers. Together with the increasing influence of the digitalization, the sharing economy is developing in more and more sectors. The most popular and well-known examples are in the public sector like Uber and Airbnb. They provide services for transportation and accommodation without owning a single car or a hotel by themselves. The trend and the idea of sharing resources attract more and more industries. Environmental topics, sustainability and a change in mindset are some of the reasons. One of the latest examples for a shared economy that entered the market is Uber Rush. Uber Rush is a further development of Uber, which focuses on logistic services for small enterprises within big cities.

Also, the manufacturing industries are developing towards digitalization. Buzzwords like Industry 4.0, Cyber-Physical Systems or Cloud Computing are part of it. This means that more and more data is exchanged even throughout different companies. Especially in terms of procurement, inventory management, and logistics the exchange of data and transparency is already and will with further improvement be a big game change. It will improve efficiency, effectiveness, and quality in all kinds of services and products among the supply chain.

The possibility to communicate and shared data are the drivers for the shared economy. Both aspects are developing in the industrial sector and with further development, the potential for the shared economy for all kinds of industries can be imagined.

Never the less shared economy and supply chain management in the original sense haven't come together so far. Especially Small and Medium Enterprises (SME) are often fallen behind in terms of innovation and adapting to new technologies. Although these companies represent the major part in industries worldwide. In Taiwan, for example, more than 97% are SMEs [1].

The aim of this paper is to bring the mindset of a shared economy and the Supply Chain management with a focus on SME closer together to transfer the success of reducing the consumption of resources and gaining new resources to this sector.

Therefore, a comprehensive investigation of the problems and deficits of SMEs in current Supply Chains is made to discuss the relevance of the principals of a shared economy in this field.

Subsequently, inspired by the existing platform services in the public market, a model that implements the idea of a platform based logistic service in a supply chain network will be introduced the potential of improvement is shown through three different scenarios. The idea is to change the current business model of the Supply Chain Management in SMEs to a platform model by transferring the idea of existing platform services to this field.

The expected results will be a contribution to environmentally friendly, customer friendly and sustainable supply chains due to higher utilization of resources and the appearance of new resources in the current supply chain environment.

2. Literature Review

2.1. Sharing Economy

The sharing economy or shared economy is defined as an activity induced by humans to generate a public value. This new form of economy is based on a horizontal organization with a mindset of usage rather than ownership [2]. Peer-to-peer economy and the collaborative economy both refer to the sharing economy and all involve the sharing of physical ownership and services among people. Value is added to these systems or rather communities by participating in the enabling platforms, both by consuming or providing [3]

Botsman and Rogers present a set of guidelines in their book to make the sharing economy become a success. These guidelines named the four principles of collaborative consumption to include 1) trust between strangers, 2) idling capacity, 3) critical mass and 4) belief in the commons. They claim that each principle is weighted evenly but might be more or less critical depending on what is being shared and who part of the sharing is. Naturally many applications of the sharing economy require a certain degree of trust among the participants or members of the community [3].

The intermediation is therefore mainly achieved via internet platforms. These intermediation platforms connect people, services, and even things in ways that have been unthinkable until now. These platforms essentially rely on the same structure. In the beginning, they collect enormous amounts of data. This data is either gained from the outside world or through social networks hosted by the platform. An important remark is that this data is never produced by the platform itself but by the people, services and things around it [2].

The first perceived platform that changed a whole business is most likely Airbnb. Airbnb is present in 119 countries and lists over 500.000 properties. Which none of them they own. Airbnb has been valued over $10 billion after the last investment funding in 2014, this is more than most of the biggest hotel chains ever achieved [4].

The application of platforms can be mainly found in start-up companies like Airbnb or Uber or in large enterprises with a “modern” mindset like google, Apple or Microsoft, but not applied in the traditional Small and medium companies

2.2. Supply Chain Management of SMEs

The Supply Chain Management (SCM) has gotten more relevance in recent years, SCM has gradually emerged from the logistics into a comprehensive concept that covers all the business activities within and between partners in supply chains [5]

Supply Chain Management (SCM) is a systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular firm and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole [6]

SCM as a discipline has evolved rapidly. The early focus of SCM started when organizations began to improve their inventory management and production planning and control, fast forward through Material Production Management, Enterprise and

Resource Management, Process Flow and Waste, Agility and Resilience, Value network. Nowadays the trend of Supply Chain Management is devolved to Collaborative Supply Chain Clusters [7]. Additionally, the supply chain management is heading towards the sustainability in supply chain and the adoption of knowledge management [8, 9]. Clusters are small networks that can be managed easily in comparison with big networks. Making an examination of the Characteristics of supply networks in terms of formalization, centralization, and complexity. Formalization is related with standardization through rules and procedures as well as norms and values. Centralization focuses on the degree to which authority or power of decision making is concentrated or dispersed across the network. Complexity refers to the variety that exists in the network. These characteristics are a useful basis for highlighting the limitations of Goal-Directed Networked Supply Chains and the emergence of devolved, collaborative, supply chain clusters [7].

The supply Chain cluster is based on a series of self-governing clusters, each cluster encompasses a network of suppliers associated with type, product structure or flow. All non-core activities are outsourced by the firm (or lead organization) across the range of clusters. Collaboration within and across each cluster is based on goal consensus, whereby the goals for each cluster are aligned and managed in accordance with the goals of the firm. Operational coordination, planning, and governance across clusters are facilitated by the lead organization through an integrated collaboration and operations management and planning protocol supported by clear lines of responsibility and accountability and a visible performance management system. This operates in a network-wide culture where economy of scale and efficiency are subordinate to service, resilience, and effectiveness [7].

Supply Chain Management (SCM) is fundamental to operational efficiency of every company, it can be applied to customer satisfaction and company success, as well as within societal settings, such as attention to natural disasters, humanitarian aids, and other kinds of emergencies; cultural evolution; and it can help improve quality of life. Due of the crucial role, SCM plays within organizations, employers seek employees with an abundance of SCM skills and knowledge [10].

In all industrialized countries, small and medium enterprises (SMEs) contribute substantially to the total industrial output that is the reason why looking for new methods and technologies to enhance the efficiency of those is really important [11].

To find a general definition for Small and Medium Enterprises is difficult because every country has specific requirements to define this term. Since we are in Taiwan according to Small and Medium Enterprise Administration Ministry of Economic Affairs of Taiwan Small and Medium Enterprise is a company which conforms to the criteria that in the manufacturing, construction, mining and quarrying industries, a paid-in capital of NT$ 80 million (US$2.42 million) or less exists. In the agriculture, forestry and fisheries, water, electricity and gas, commercial, transportation, warehousing and communications, finance, insurance and real estate, industrial and commercial services or social and personal services industries, sales revenue of NT$100 million (US$3.03 million) or less in the last year must occur [1].

SMEs are distributed in all industrial and service sectors [11]. The main obstacles faced by SMEs can are mainly individual, relational and organizational [12]. The individual Level reflects obstacles corresponding to a lack competencies (knowledge, capacities,

skills, training, etc.) The relational level indicates the obstacles that refer to the relationships between the different components of the chain, as well as those that have to do with the actual structure of the organization; in short, it expresses the role played by the SME itself in the supply chain. Another important obstacle is trust. If trust is present, it can improve the chances of a successful supply chain relationship; if not, transaction costs can rise through poor performance. The organizational level includes obstacles that have to do with management's involvement in and commitment to SCM, as well as with the decisions concerning the management and control of the Supply Chain. The majority of companies all over the world can be assigned to the Small and Medium Enterprises. According to the International Finance Cooperation SMEs account for about 90% of businesses and more than 50% of employment worldwide. This represents the importance SMEs for all industries. [13] SMEs are key engines of job creation and economic growth in developing countries.

Although in this section was mentioned the trends of the SCM has been devolved into Collaborative Supply Chain Clusters [7] is more applicable to big enterprises that are creating a network of its suppliers and customers. The use of this concept in the SMEs integrating them as a collaborative network has not been established yet, furthermore, this paper center the effort in the development of a solution to fill this gap in terms of SCM of SMEs applying sharing economy principles.

3. Methodology

The aim of the research is to address the current requirements of SME concerning to SCM via the application of sharing economy. The methodology that approaches this problem can be divided into three phases. Phase I introduces current problems and difficulties in SME. Further on the reviewed problems are summarized and categorized regarding the Supply Chain Management context. Derived from the stated deficits phase II presents the main requirements to improve the SCM of SMEs. Phase III is dedicated to the approach of the requirements through the integration of the idea of the Sharing Economy presented across three scenarios of the use of a platform service as a solution for the requirements.

Phase I: Classification of difficulties of SCM in SME

According to several papers with a main focus on the performance and deficits in SMEs, most SMEs around the whole world face the same problems. These papers are mainly validated through surveys taken among a number of SMEs located in Latin America, Asia, and Europe and are utilized to identify the main difficulties SMEs have to face.
The most mentioned difficulties over the years refer to a lack of performance measurement in SME, the understanding of merits and demerits of alliances and in general to a poor Supply Chain Framework.

Different surveys that had been executed over the last decade found that a lot of problems for SMEs are centralized in the fields of SCM, Manufacturing and Information flow [14–16]. More detailed the problems in the SCM field are concentrated to a lack of transportation flexibility including on-time delivery, information accuracy between

supply chain participants, difficulties developing partnerships, poor administrative processes in SCM and problems in stock control and warehousing [14, 15]. SMEs also tend to face obstacles when it comes to competitive change over time and in general improving operating technologies [14]. Other difficulties SMEs need to face and which have a significant impact on all enterprise operations can be summarized as forecasting [14] and workforce ability [16]. Due to missing accuracy in forecasting market demands many problems arise among the value creation, with impact to the Supply Chain performance.

The problems and deficits in SMEs stated before are all directly or indirectly referable to SCM. According to the main sectors of a Supply Chain Network, the difficulties in SMEs are categorized into the fields of Distribution, Inventory and Warehousing, Management, Manufacturing, Forecasting, procurements and Information Flow [17]. The appearing difficulties are correspondingly clustered into this categories. The complete evaluation of the cited papers can be found in the appendix. Based on the number of difficulties named in each category the categories are sorted by relevance (the more the difficulty is mentioned the higher the percentage is) as shown in Figure 1.

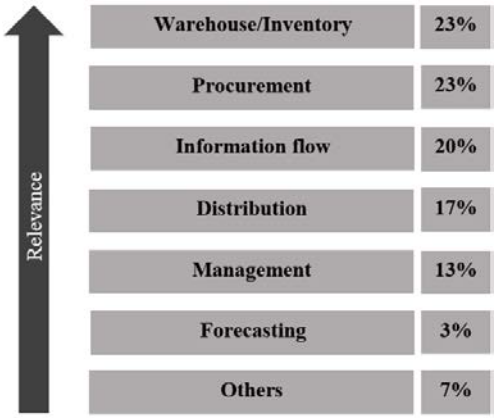

Figure 1: SME problem field classification in terms of SCM

Phase II: Derivation of requirements to Improve SCM of SMEs

The previous section points out the field of Supply Chain Management or rather Supply Chain performance where SMEs can find themselves having the most deficits. Before defining the requirements of SMEs to improve their performance, it seems to be important to look at the industrial environment SMEs are allocated in. SMEs are more and more involved in global business networks and can impact the whole supply chain performance significantly [9]. SMEs can serve the roles of suppliers, distributors, producers and customers within a Supply Chain [18]. Is important to mention the fact that SMEs are part of almost all Supply Chain networks, their Supply Chain strategy is mostly determined by their big customers within the Supply Chain. So instead of managing their own Supply Chain Strategy, they are controlled by the larger companies [19]. Hence as an outcome they merely just respond to changes within their Supply Chain network, then following a complete SCM strategy [20]. Overall this induces, that SME Supply Chain requirements are heavily based on their customer requirements [11]. Without specifying the customer requirements for a certain Supply Chain or industry six

requirements can be generally defined. These are receiving the right product, in the desired amount, at the right place and time, with the requested quality to the right price [21]. A study of SMEs in the UK has shown that their highest priorities are for quality, reliability, and price, topics as e-commerce and innovative elements are on the bottom of this list [19].
Thus, leads to a focus on operative SCM requirements rather than strategic. To address the field with the most deficits in the SCM of SMEs, the warehouse, and inventory sector in an operational way with respect to the customer requirements and SME priorities, more transparency among the partners and the reduction of uncertainty is required. Together with flexible warehouse options, the current deficits in warehousing and inventory could be improved. When focusing on the customer requests the distribution plays a significant role and works hand in hand with the warehouse and inventory sector. To face the deficits that occur and to improve the distribution performance more transportation options are essential. Transparency and a high-quality information flow together with a high reliability in transportation and manufacturing will obtain the requested performance.
The information flow is a crucial obstacle for SMEs and the improvements of the information flow is a requirement for itself. To achieve improvement in this sector it is necessary to enable new information technologies and provide the companies easy access. The same applies to the forecasting, with improving the forecasting the uncertainties will decrease and transparency will increase. So, improved forecasting also represents a requirement. The management is also claimed to be a problem factor in SME regarding Supply Chains. Because Management as shown in the categorization of phase one mostly refers to management operations in the strategic timeframe it is not discussed further in this paper.

Phase III Addressing the requirements via the Sharing Economy concept

The phase III of this methodology presents the requirements for SMEs to improve Supply Chain performance and also represents different scenarios of how to fulfill the requirements through a platform service. The requirements can be condensed to the aim for more transparency through good communication and information flow utilized through the introduction of Information technologies, additional resource availability in terms of warehousing and distribution to reach higher flexibility and the requirement of better and more reliable forecasting.
In recent years, more and more businesses are shifting to a platform structure to benefit from the interactions a platform can provide. Via the platform they connect with each other and utilize the provided resources [4]. This generates on the one hand missing or additional resources for one company and on the other hand extract extra value out of idling capacities [22]. This characteristic addresses the requirement of more available resources through the sharing aspect, by simultaneously generating value for both parties. Besides the Sharing aspect of services and resources, a platform also assists the SMEs to gain more transparency among the Supply Chain Network. But *Stephany* pointed out that sharing economy is not just about sharing resources and information, but that communities of users engage with each other beyond their transactional need. The platform users shift from a supply and demand motivated interaction to a community, which increases transparency and builds up trust [22]. Forecasting cannot be addressed through the platform, to increase forecasting, monitoring performance measurements and

derive results through better techniques is necessary. What the platform can provide is a decrease of uncertainties due to the community and trust aspect.
Because platforms are easily accessible tools their implementation is addressable for SMEs although their priority toward e-commerce and innovative elements is low[19]. Hence the requirements of SCM of SME addressed are the operational (warehouse and inventory, Distribution, and procurement) the overall idea of the approach of each of it in the platform are represented in the next three scenarios of interaction among the SMEs

Scenario 1: Transportation Sharing

Suppose that Company A and Company B represented in figure 2 are using the platform to share idling capacities in transportation, both are located in the same city and need to deliver their product to each of its specific customers. In order to enhance the utilization of the delivery, company A offers the availability of space in its truck through the platform, since company B needs to serve a customer in the same area, it sends a request to use that capacity. The companies utilize the platform to make a deal and use the transportation of company A to satisfy the necessities of the customers A and B.

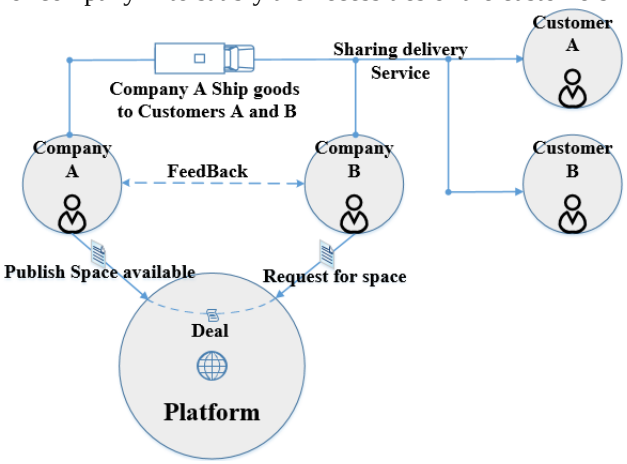

Figure 2: Schema of the information and service flow via an integrated platform for sharing transportation resources

Scenario 2: Warehouse Sharing

In the scenario 2 the Companies C and D represented in figure 3 has a similar business line, both companies are located in different cities. In this case, company C use the platform to offer free store in its warehouse. Company D that is expanding and growing has some clients in the city of company C, Once it company look in the platform the offer of the space (made by company C) it send a request to rent the space in the warehouse of company C. both companies make a deal on the platform and using the warehouse of company C to store the goods of both companies.

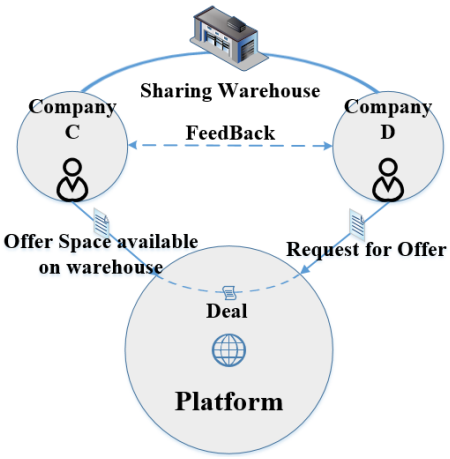

Figure 3: Schema of the information and service flow via an integrated platform for sharing warehouse resources

Scenario 3: Community benefits of a platform (Procurements)

As a third use of the platform, the companies represented in figure 4 can take a look at the other companies that are on the platform, this with the objective to look for new options of suppliers or by the simple fact of doing business with other SMEs and enhance the procurement problem of SMEs. Such is the case of the company E which is looking for new suppliers, so as it was mentioned, it reviews the profiles of each of the companies to which it is interested, thus obtaining new Alternative suppliers such as obtaining contact from the K company that specializes in selling the raw material of the company E. This scenario could also be applied to the reverse where the company k offers its services to other companies thus generating a new customer.

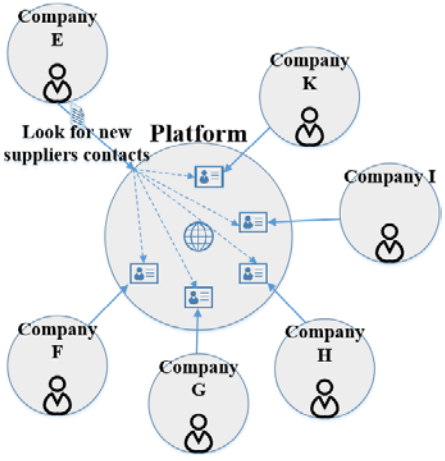

Figure 4: Schema for the community benefits of a platform

4. Case Study

In the following chapter a case study utilizing the Scenario 1 of the methodology (Figure 2 transportation sharing), thereby show the impact of a platform integration in the sense of the Sharing Economy in SME Supply Chains. Before to use the platform, the company has to send the main information to the platform manager in order to confirm the information of it, categorize properly the company business line especially avoid the creation of fake company's profile. In the platform, the companies are considered all users and according to the requirements, the company can be either demander or supplier. When the company is a demander it can take a look what the other companies are offering (sharing) and the location of it. On the other hand, when the company is a supplier it can offer their facilities or tools that are not using in the moment and get a profit of it when another company sends a request for need it. Finally, the platform can be used as company Seeker and promote that company know each other according to their requirements. This process in the platform can be seen schematically in Figure 5, some screenshot of the main process of the platform were attached.

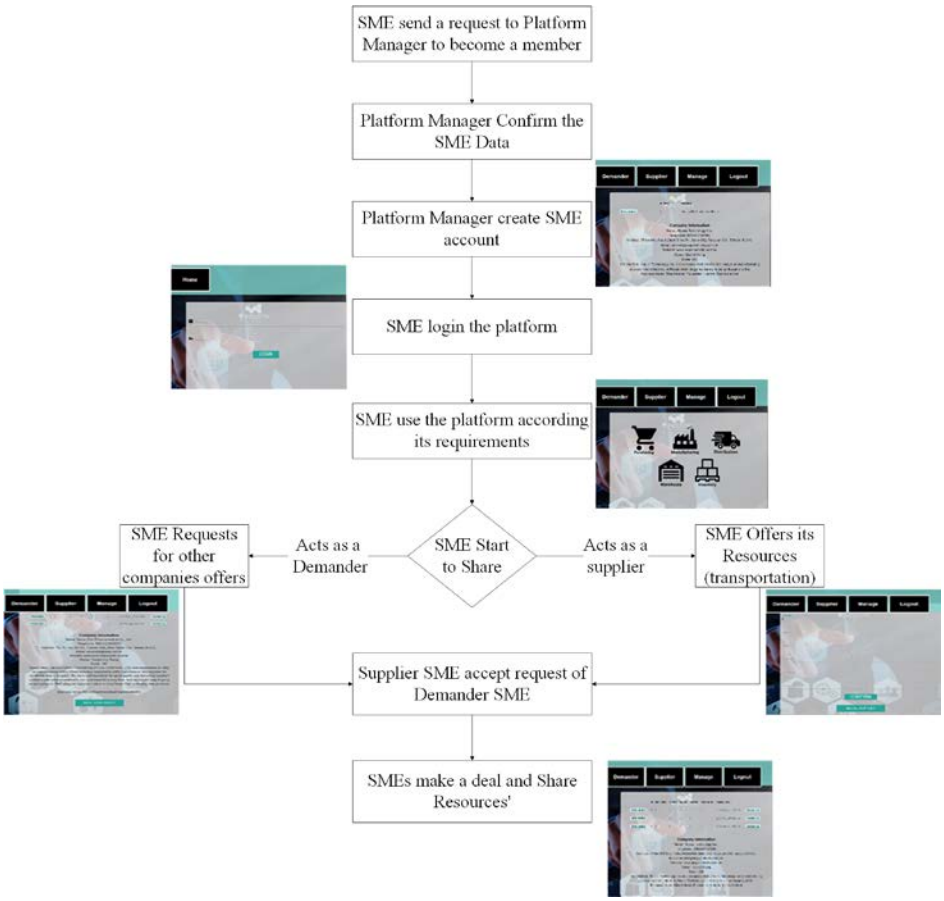

Figure 5: Flowchart of the usage of the platform

The use of the platform represented in Figure 5 is the development of the scenario 1 (Figure 2), this demonstrates the utility of the platform through the use of sharing economy principles in SCM of SMEs. To explain this case is assumed that Company A and Company B are using the platform to share idling capacities in transportation. In this case, each company has a different business line it is assumed that up to this point no business interaction between this two companies has occurred. Both companies are active in totally different industries and Supply Chains. Never the less they both exist in the same city. Company A produces beverage and pharmaceutical powder and company B sells helmets (bike, equestrian and sports helmet). Both companies have customers in city Y. Company A executes their distribution through company-owned trucks. Company B usually uses the option via a logistic provider. Both companies are part of the platform community. In order to enhance the utilization of the delivery, company A publishes an information in the platform about the availability of space for a delivery to city Y. Since company B needs to serve a customer in the same area, it sends a request to use that capacity. The companies utilize the platform to make a deal and use the transportation of company A to satisfy the necessities of the customers A and B. Is important to mention that the company that provide the service can be rated creating with this a good reference for future deals with other companies

This case study helps to understand the use and the value of the platform service in order to provide a benefit to SMEs that are on the platform, this kind of scenario in which one company is looking for another company that can provide a transportation services could take more than one day and this can affect the delivery service, meanwhile the proper use of the platform increment the benefits for both companies (supplier and demander) because help them to know each other and make a deal

5. Discussion

The development of platform applied to enterprises is not a new topic, the use of cloud computing, collaborative and interactive solutions, clusters and lifecycle assessment in SCM are some of the platforms that offer solution to this issue [7, 10, 23–25] during the research for this paper all was found that all these platform services mentioned before are focused on large enterprises due to all this solutions are based on an Enterprise Resource Planning (ERP) and most of them require significant up-front investment and considerable Maintenance expenses [10].

The platform proposed and developed in this paper is a solution for the SMEs in terms of supply chain offering an alternative way to solve the main requirements of the industry sector. The benefits of this platform is that is not required a big infrastructure in terms of ERP to operate, the SMEs just need to have an internet connection and the desire to grow as a company in a collaborative environment (Sharing Economy). With the development of the technology and the communications, the internet services are more common in the companies. This platform helps the SMEs to grow to solve the day to day problems reducing the seeking time of products suppliers, additionally help SMEs to offer the products or services as a community. The main limitations that this platform might have could be the fact that many small enterprises are not using internet in any of its processes, this limitation will be overcome just over time when more and more SMEs use technology to grow.

6. Conclusion

There is no doubt that the Sharing Economy and its platform services are a rising business model. The platform model is represented by some of the most powerfully disruptive companies, from Uber, Airbnb to Google and eBay. And now platforms are beginning to transform a range of other economic and social areas. Therefore, this paper is discussing the integration of a platform model in the SCM field of SMEs regarding former surveys discussing the deficits, needs, and priorities in SMEs. Through the approach of characterization of deficits in SMEs, derived from this their requirements to improve and the possible termination by applying the Sharing Economy idea, this paper shows the potential of the Sharing Economy idea for this industry. In fact according to *Parker* any industry in which information is an important ingredient is a candidate for the platform revolution. But reviewed surveys have also shown that the interest in e-commerce and innovation adoption does not play an important role for SMEs, never the less the scenario in the Case study chapter show the benefit of the platform model for SMEs in a Supply Chain Network with minimal effort. Besides addressing the concrete requirements stated in the methodology, SMEs solve their main problem of low resource access in all fields by implementing a simple tool in their business. Especially the practical contribution for the companies itself is very high and let them, on one hand, overcome their limitations due to their size and on the other hand create value out of idling capacities. The platform generates win-win relationships for all companies that are part of the platform community and will improve their position in the market.
Without integrating complete IT-Systems and communication systems all over the enterprise, SMEs have the chance to improve their market position with a negligible effort compared to other approaches to address their deficits. So overall the integration of a platform among SMEs is applicable and will contribute the SME performance in general and with a focus on SCM as shown in this paper. The main limitation of this paper is the fact that especially many small companies are not using the internet in any of its processes, this limitation will be overcome just over time when more and more SMEs use technology to grow.

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Appendix

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Warehouse/Inventory	Inventory Level	Paper Survey	2016
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Warehouse/Inventory	Uncertainty of market and customer demand	Paper Survey	2016
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Warehouse/Inventory	Stock control	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Warehouse/Inventory	Plant and warehouse position from marketplace and customer	Paper Survey	2016
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Warehouse/Inventory	Inventory handling and facility	Paper Survey	2016
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Warehouse/Inventory	Warehouse management	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2015	Warehouse/Inventory	Local warehousing infrastructure	Paper Survey	2013
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Procurement/acquisition	Raw material purchasing	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2014	Procurement/acquisition	supply-side problems	Paper Survey	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Supply Management in Small and Medium-Sized Enterprises: Role of SME Size	Paik (2011)	2011	Procurement/acquisition	Purchasing	Quayle (2003)	2003
Supply Chain Management for SMEs: A research Introduction	Thakkar (2009)	2009	Procurement/acquisition	Immature buyer-supplier relationships	Arend and Winser. (2005) Halley and Guilhon. (1997) Morrissey and Pittaway. (2004) Sardana. (2004) Singh. (2004) Quayle. (2002, 2003)	1997-2005
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Procurement/acquisition	Developing supplier relationship	Paper Survey	2016

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Procurement/acquisition	Order accuracy between supply chains	Paper Survey	2016
A Decision Framework for Supply Chain Planning in SMEs: A QFD-ISM-enabled ANP-GP Approach.	Thakkar (2011)	2011	Procurement/acquisition	Lack of closeness of the SME management to its customers and suppliers	Huin et al. (2002)	2002
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Information flow	Information accuracy between supply chains	Paper Survey	2016

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Information flow	Empowering decision making	Paper Survey	2016
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Information flow	Improving the technology used	Paper Survey	2016
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Information flow	Information management	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2014	Information flow	Market instability	Paper Survey	2013
Supply Chain Management for SMEs: A research Introduction	Thakkar (2009)	2009	Information flow	Poor use of IT	Arend and Winser. (2005) Halley and Guilhon. (1997) Morrissey and Pittaway. (2004) Sardana. (2004) Singh. (2004) Quayle. (2002, 2003)	1997-2005
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Distribution	Transportation flexibility	Paper Survey	2016

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Distribution	On-time delivery	Paper Survey	2016
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Distribution	Transport problems (expensive)	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2014	Distribution	Distribution-side problems	Paper Survey	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2014	Distribution	Ground transportation	Paper Survey	2013
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2015	Management	Administrative processes in SCM	Paper Survey	2013
Supply Chain Management for SMEs: A research Introduction	Thakkar (2009)	2009	Management	Absence of understanding on merits and demerits of alliances	Arend and Winser. (2005) Halley and Guilhon. (1997) Morrissey and Pittaway. (2004) Sardana. (2004) Singh. (2004) Quayle. (2002, 2003)	1997-2005

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Supply Chain Management for SMEs: A research Introduction	Thakkar (2009)	2009	Management	Poor Supply Chain Framework	Arend and Winser. (2005) Halley and Guilhon. (1997) Morrissey and Pittaway. (2004) Sardana. (2004) Singh. (2004) Quayle. (2002, 2003)	1997-2005
Supply Chain Management for SMEs: A research Introduction	Thakkar (2009)	2009	Management	Absence of performance measurement	Arend and Winser. (2005) Halley and Guilhon. (1997) Morrissey and Pittaway. (2004) Sardana. (2004) Singh. (2004) Quayle. (2002, 2003)	1997-2005

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
Factors related to supply chain network members in SMEs	A. Awheda (2016)	2016	Manufacturing	Employee training programme	Paper Survey	2016
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	Manufacturing	Order processing	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2015	Manufacturing	Workforce availability	Paper Survey	2013

Paper name	Author	Published year	Problem/Factor Classification	Explanation	Paper reference	paper reference year
A Decision Framework for Supply Chain Planning in SMEs: A QFD-ISM-enabled ANP-GP Approach.	Thakkar (2011)	2011	Forecasting	Production forecasts are not accurately	Huin et al. (2002)	2002
Small and Medium -Sized Enterprises in the European Union: Development Challenges in 2014-2020 perspective	Marek Matejun (2014)	2014	others	Customer Service	Logistics Management Problems of Small ans Medium-Sized Enterprises. Zowada 2013	2013
Main Difficulties Hidering Supply Chain Performance: An exploratory analysis at Uruguayan SMES	M. Tanco (2015)	2015	others	Government policies	Paper Survey	2013