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# **Industrial clusters in the developing economies: insights from the Iranian carpet industry<sup>1</sup>**

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## **ABSTRACT**

Industrial clusters are perceived as potential drivers of SMEs development and efficient policy instruments to lead national and regional innovation and growth. However, these clusters in developing economies are typically placed in complex environments that impose a mix of serious challenges which adversely affect their overall performance. Therefore, this study aims to analyze the nature of these challenges and understand their dynamics using a case study of a carpet industry cluster in Iran. Using multiple sources of evidence, the study reveals two distinct, yet interrelated, levels of challenges: micro and macro. Under each level, a number of key dimensions were identified and theoretically linked which helped to conceptualize the structure of these challenges and model their dynamics.

Keywords: Industrial cluster; Carpet industry; Geographical agglomeration, Beneficiaries, Obstacles-Constraints, Sistan and Baluchestan province.

## **INTRODUCTION**

For the last decades, industrial agglomerations have played a leading role in the development of cities and regions and have formed a new industrial organizational basis for economic development. A prominent example of this activity is the business concentration in specific geographic locations often referred to as clusters (Pe'er and Keil, 2013). It is claimed that clustered firms can achieve benefits as a result of geographical proximity and the continuous interaction between their agents (Tan, 2006; Villaverde, 2017). In fact, clusters are considered to be core entities of economic growth and innovation in the modern world (Njos and Jakobsen, 2016). Examples of these clusters include the Silicon Valley cluster in California; the information technology cluster of Bangalore in India; and the Australian and Chilean wine clusters (Porter, 2000; Tan, 2006; Pe'er and Keil, 2013; Oliver et al, 2017). According to aforementioned considerable effects and achievements, clusters have risen to prominence in the academic community and policymakers (Chen et al, 2017; Morales et al, 2015; Tsang et al, 2016; Vanzetti et al, 2017; Wasiluk, 2017).

However, the review of the industrial cluster literature in recent decades shows that, while numerous studies have examined industrial clusters in developed countries (Ghauri & Santangelo, 2012; Kamran et al, 2017; Vanzetti et al, 2017), we still lack research that systematically addresses the dynamic and nature of cluster implementation in developing economies. In fact, the discrepancies in institutional conditions between the two economies (Park & Luo 2001; Lin et al., 2009) indicate that the full picture of the idiosyncrasy of how these clusters operate in the developing setting is still largely incomplete. Therefore, researchers have called for more research to investigate the transferability of current theories of clusters to emerging markets and developing countries (see Ghauri & Santangelo, 2012, Vanzettine et al.,

2017). This, in turn, emphasizes the role of *localization* and *context* factors in driving cluster performance. As such, focusing on the context can help to diagnose a region's social, political and economic conditions (Sultan, 2014) that can facilitate or complicate the progress of cluster-based industrial development in developing countries (Hashino and Otsuka, 2013).

Against this backdrop, we aim to address this gap by identifying and analyzing contingencies and constraining factors that can influence industrial cluster success in a developing country. More specifically, we seek to understand why the clustering approaches developed in the *West* are less successful when applied in the *East*; setting our main research question as: what are the factors that affect the success of the carpet industrial cluster in Iran as an example of a large developing economy?

To address this question, we performed a qualitative study focusing on the Sistan and Baluchestan (S&B) carpet cluster in Iran. We contribute to the literature by demonstrating the importance of localization and considering contextual factors which effect on cluster performance. While the S&B carpet industry cluster is located in an unusual and harsh operating environment that comprises a complex set of challenges, we untangle this complexity by distinguishing between micro (i.e., the cluster) and macro (i.e., the state) levels of challenges, where a number of key dimensions underpinning each level were identified. Moreover, we draw on our data to offer fine-grained explorations into how these levels and dimension interact which limits the cluster from reaching its full potential.

## **THEORETICAL BACKGROUND**

### ***Industrial cluster as a value creation approach***

Economic activities in recent decades tend to concentrate in specific geographic locations often referred to as clusters (Pe'er and Keil, 2013). Regional developers and scholars have

indiscriminately accepted the establishment of these clusters as an attractive strategy for sustaining and developing various industrial sectors (Tsang and Siu, 2016). Marshall (1919) is arguably the first to mention the concept of cluster, which can be defined as a group of production activities that are spatially concentrated and mostly specialized on one or two main industries only. Later, Marshall (1920) theorized that three primary benefits occur for firms locating in clusters: access to a pool of specialized labor, access to a pool of specialized input providers, and technology spillovers among competitors. Following these claims, studies focusing on geographical agglomeration indicate that spatial organizational agglomeration (i.e., location) can be the factor that shapes the evolution of organizations and influences the nature of competition among them (e.g., Hill and Naroff, 1984; Porter, 2000; Sorenson and Bauom, 2003). In the same vein, other studies suggest that, if location provides an evolutionary advantage, organizational populations would not be homogeneous as geographical proximity would play a role in competitive behavior; birth and death rates of firms would vary systematically across locations (Baum and Mezias, 1992; Lomi, 1995). Similarly, the organizational ecology literature supports the notion that geographically clustered firms may differ from firms outside the cluster regarding cost structures, competitive behavior, and performance over time (Tan, 2006).

Research on this topic has also addressed the cluster effect on performance, whereby the empirical evidence suggests that firms that belong to regional clusters are likely to achieve superior innovation and economic performance (Scott, 1998; Capello and Faggian, 2005; Villaverde et al, 2017). However, within these studies, there is no consensus about how industrial clusters can generate value. Interestingly, a central point of contemporary studies on regional clusters was that geography per se does not guarantee firm success (Porter, 2000; Tallman and Phene, 2007). Rather, a wealth of empirical literature shows that one fundamental role of

regional clusters is to facilitate the formation of local inter-organizational networks, which act as conduits of knowledge and innovation (Balland et al, 2012; Harvey et al., 2012; Villaverde et al., 2017).

Hence, more scholarly attention has been paid to explore the advantages and characteristics of networks formed in clusters. Specifically, researchers have investigated how networks in clusters may evolve and create value (Giuliani, 2013). For instance, Inkpen and Tsang (2005) state that the cohesion effect in industrial clusters (they also labeled as industrial district) can promote greater density in the cluster knowledge network, which in turn, reinforce innovation capacity in firms. Another research direction has examined the co-opetition situation in cluster social network, where firms of similar business activities simultaneously cooperate and compete with each other. Considering to nature and characteristics of cluster, it seems the co-opetition status in and clusters can have positive interaction on each other (Dana et al, 2013), as through co-opetition, clusters can help firms leverage economic advantage from shared access to information and knowledge networks, markets and marketing intelligence, and supplier and distribution chains (Enright and Roberts, 2001). Research on cluster effectiveness has also zoomed out on knowledge management and innovation subjects, aiming to understand the knowledge transfer process in networks and clusters (Tan, 2006; Hoffman et al, 2014; Lai et al, 2014). In fact, knowledge management emerged as a mediator between industry clusters and innovation performance and inter-organizational learning (McLennan et al, 2016). More specifically, we can identify three reasons that can explain how and why geographic concentration can drive knowledge transfer and facilitate the exploitation of knowledge spillovers. First, firms located in sporadic geographical regions are likely to maintain fewer formal ties and interact less frequently with similar firms than with those in close proximity

(Saxenian, 1990; 1994). Second, firms within clusters have easier access to informal information networks (Oliver et al, 2017). Finally, geographic proximity to other similar firms facilitates job mobility and consequently information transfer across organizational boundaries (Tan, 2006).

From another perspective, the importance of social capital in the network within clusters has been emphasized as a success factor for releasing positive potentials in a cluster (Wasiluk, 2017).

Here, relational trust is regarded as an essential element, without which, the cluster becomes dysfunctional and fail to fulfill its tasks (Kong, 2005; Villaverde et al, 2017, Oliver et al, 2017).

In conclusion, the previous discussion shows that the mere creation of a cluster (i.e., the geographical proximity) does not release its potential to create value. Rather, the effectiveness of industrial cluster is connected with many factors that emphasize the openness to establish cooperation and continuous interaction with all actors involved, including those that might be in direct competition.

### ***Industrial cluster in developing countries***

Similar to developed economies, there is increasing agreement that clustering can help enterprises to overcome growth constraints and compete in developing markets (Covalheivo and Brandao, 2016). In this respect, Ghauri et al. (2003) observed that cluster could be effective in solving export-marketing problems for manufacturing firms in developing countries, where the authors discussed conditions under which learning and capabilities exploitation can occur in Brazilian clusters. However, many of these studies have focused on the supportive role of government and public agencies on clusters performance (e.g., Richardson, 2013; Kamran et al, 2017), indicating that when the social bonding in a given cluster is weak, government interventions are of greater significance. Another stream of literature has investigated other aspects of clustering in developing countries, including trust and inter-firm relationships (e.g.,



Sarach, 2015; Chen et al, 2017, Vanzetti et al, 2017), value creation and competitive advantage (e.g., Lei and Huang, 2014), knowledge systems and innovation (e.g., Richardson, 2013; Hashino and Otsuko, 2013), and social capital and responsibility (e.g., Lund-Thomsen and Pillay, 2012; Kamath, 2013).

Despite the richness of this literature, theoretical and empirical research that fully explains the effectiveness of clusters in the developing and emerging economies is still scarce (Rocha, 2015). Therefore, calls have been made to investigate the applicability of extant theories of clusters to emerging markets and developing countries (Ghauri & Santangelo, 2012; Vanzettine et al, 2017). In fact, a number of studies undertaken from the early 1990s demonstrate that industrial clusters have become indeed widespread in Latin America, Africa, and Asia and it inspires by successful experiences of industrial clusters in developed countries (Lund-Thomsen and Pillay, 2012). However, it is well known that the institutional environments and business situations of emerging economies and developing countries are fundamentally different from those of the developed countries (Park and Luo 2001; Lin et al., 2009). As such, Chen et al (2016) explain that, in emerging economies, rules are often uncertain, because the formal institutions are still evolving. Also, Rocha (2015) asserts that poverty and income inequality surrounding Latin America clusters are rarely considered in mainstream cluster-related studies. Further, the author discusses that decentralized cluster strategies take neither national impacts nor inter-regional disparities into account, and are especially harmful when they are based on regional competition to increase economic growth without considering the development of local social and economic capabilities. This suggests that successful development and implementation of regional development strategies demands careful consideration of several local-specific conditions (Porter, 1998). In line with the above discussion, Kamran et al (2017) investigated the industrial

clusters in Pakistan and claimed that for a high growth trajectory, the domestic investment environment, political instability, and regulations must be improved. Specifically, the authors analyzed the role of classical factors of production (including land, labor and capital), and found that a better infrastructure, availability of utility services, and the accessibility to inexpensive bank loans and commercial finance (Dumon, 2015) helped businesses in the developing economies to flourish in geographic proximities (Ahmed and Jhandir, 2012).

In sum, while the nature and attributes of the industrial cluster in developing economies have received good attention, we have a limited understanding of the conditions and constraints that control the evolution and development of these clusters. As Richardson (2013) mentions, it would be great if the policymakers foresee the problems prior to developing the cluster and can take the necessary steps to overcome. Therefore, in this study, we focus on the evolution of the industrial clusters by examining the factors that can facilitate or complicate their progress.

## **METHODS**

### ***Study context: Sistan and Baluchestan Carpet Cluster***

The context of this study is the carpet cluster in Sistan and Baluchestan (S&B) province, located in the eastern south part of Iran. This province comprises two main races, Baluchian and Sistani. The carpet weaving industry in this region is an old craft; it traces back to about 5000 years ago. The average annual amount of the production of hand-woven carpets in this region is over 5000 square meters, which are produced in two different types: 1) rustic and nomadic carpet models, which are the original carpet of the S&B, and 2) urban carpet models which are made according to the design of other provinces. Carpets produced in this area are made with organic materials and colors. While the S&B's carpet is one of the most original and noble carpets in the world, the demand for this carpet started to decline due to exporting difficulties and economic

hardship caused by the sanction imposed on the country (Moghadam et al, 2015). Accordingly, the carpet cluster was launched in 2016 by the government to revive this industry. The cluster is managed by a semi-private organization, Small and Medium Industries Town (SMIT). It was planned that the central government will support the cluster financially for five years, and then the cluster should be self-sustained. Overall, the S&B carpet cluster integrates several organizations including tens of private and public factories, local suppliers, and other entities (such as universities, research institutions, government agencies and charities) all in which employ thousands in different professions.

The overarching aim of the S&B cluster is to boost carpet production and sale. It also seeks to improve the position of the S&B carpet brand by 2020. Currently, the production of the S&B carpet is mostly sold among other provinces in Iran, and a small part is exported abroad. Therefore, one of the strategic objectives of the cluster is to create new international markets and global network to enhance production and sale.

### ***Data collection***

We mainly collected the data using phenomenographic interviews, which are similar to other interpretive interviews, in that they elicit individual respondent's meaning; however, they differ, in that they are specifically designed to capture variation in how respondents understand aspects of their realities, which maximized variation (Dasborough et al, 2015). Accordingly, we interviewed different stakeholders in the S&B cluster including managers of private and public carpet factories, sales managers, carpet designers, government agencies, carpet experts, managers of training workshops, and cluster development agent (CDA). Table 1 provides demographic information on our sample. In total, 19 interviews were required to reach the saturation level (Lincoln and Guba, 1985; Sandberg, 2000), which is consistent with saturation in

phenomenography that usually requires 15-20 participants. The interviews lasted between 60-90 minutes. In phenomenographic studies, interview guide questions need to be designed to provide data which will help establish critical variation in a group of participants' ways of experiencing a phenomenon because the variation will eventually be described as an outcome space of categories of description (Cope, 2002). Before embarking on data collection, we tested and adjusted the questions through three pilot interviews.

The logic of the interview questions was primarily to understand how the different stakeholders perceived the effectiveness of the cluster. Therefore, we asked questions on perceived cluster performance; the role of cluster development agent (CDA) and carpet cluster; the relationships between the cluster stakeholder groups; the effect of existing economic and political conditions; and the government effect on cluster development. During the interview process, participants were encouraged to describe and explain their experience and ideas as fully as possible. All interviews were recorded with the permission of interviewees. After each interview, the recorded audio was transcribed verbatim.

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Beside qualitative interviews, we collected additional data using observation method. As such, the first author participated in key meetings between the cluster stakeholders. These meetings involved many of the S&B carpet cluster's beneficiaries, and authorities of S&B province (the managers of S&B Commerce Chamber, agriculture organization, SMIT, Industries Ministry deputies, and other related entities which are related to carpet industry at S&B province), and also universities' carpet professors. The meetings mostly were arranged to attract the

collaboration of these mentioned entities to support the S&B carpet cluster. All meetings were recorded and transcribed by the researchers of this study. In addition to the observations, relevant secondary data were collected from reliable sources like data archived of related public organizations, websites, and newsletters. These data sources contained all announced statistics and reports of S&B carpet industry's authorities (such as Parliament reports, media interviews of carpet industrialists, and province's officials). All data collected from the observation and documents review were used to validate (i.e., via triangulation) and expand the insights emerged from the analysis of the interviews (as explained next).

### ***Data analysis***

The analysis of the collected data involved an on-going iterative process alternating between what the interviewees conceived of obstacles and constraints in carpet cluster and how they represented them (Marton and Booth, 1997). As such, throughout the iterative process, transcripts were reviewed with focusing not on statements themselves, but on the meaning of statements in relation to their context and the transcript as a whole. More specifically, in our analysis we followed largely Marton's (1996) advice, and structured the analysis process in four key steps.

First, the research team read each transcript several times to be familiar with the transcript and identify relevant utterances. This step involved immersing ourselves in data to find phrased and sentences which were inline of study purpose. Through this step, the relevant utterances were highlighted to be used in the next step. The second step involved identifying, interpreting and extracting those conceptions from the highlighted utterances (as emerged from the previous step). In fact, at this step, data were coded using an inductively-developed coding scheme based on interview notes and basic knowledge of the data gained during the transcription process. The

output of the second step is plenty of extracted conceptions and codes from transcripts that need to be organized in the next steps. Therefore, at the third step, the research group sought to grasp each interviewee's general conception and the similarities and differences between their viewpoints. In fact, at this step, organizing of results was taken place and categories of descriptions emerged which are really "Expressions of understanding" (Barnard et al, 1999). During this step, the research team held a group discussion to arrive at a uniform set of categories. During the discussion, tentative categories formed by individual researchers were compared and any differences in terms of individual categorical allocations were reviewed through a re-analysis of relevant texts until achieving a mutual agreement. This cross-checking was performed until reaching a common point. Group analysis resulted in three categories of beneficiaries expressing qualitatively different understandings about the constraints of the S&B carpet cluster success. The final step involved detecting and making a relationship between the identified categories. It should be mentioned that during data collection and analysis the research team adopted several measures to ensure research validity and reliability, which we summarize in Table 2.

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## **FINDINGS**

This study aims to investigate the dynamics of the S&B carpet cluster, and understand the various issues affecting its effectiveness in delivering the planned outcomes. In principle, we found that the S&B carpet industry is facing a complex set of challenges and obstacles that are structured as two distinct, yet overlapping, levels: micro (local) and macro (national).

### ***Micro-level: Cluster-related challenges***

The analysis revealed various local constraining factors and their underpinning challenges that negatively affect the cluster's stakeholders potential, and thus its overall performance. Analytically, we categorized these factors across three key dimensions: contextual, technical, and social.

#### *The contextual dimension*

This dimension comprises factors related to the idiosyncratic contextual conditions of S&B province. Specifically, it explains how the characteristics of S&B ecology, economy, policy, and culture have collectively affected the carpet cluster performance. In specific, we identified three factors under this dimension, as explained in Table 3. For example, the poverty and weak economic structure of the S&B region, in comparison to other provinces, acted as a repulsive force that deterred investors and industrialists from investing in this cluster. This situation is getting worse with the tough climate of S&B region, such as drought and constant severe storms, which drove even native people to immigrate and leave the cluster and nearby areas.

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#### *The technical dimension*

This dimension addresses issues in the planning approach followed by the public authorities to design and develop the S&B carpet cluster. The dimension also captures fundamental flaws in managing the cluster, which we mapped in Table 4.

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Overall, there are some fundamental inadequacies which are categorized under planning related challenges. The items such as faults in basic antecedents have created a vicious cycle in cluster

performance. The lack of comprehensive and rigorous study before cluster implementation has led to the lack of true cognition of the region's needs and the lack of localization. In fact, the interviewees explained that the authorities have neglected the idiosyncrasy of the location, and thus the cluster strategy only was copied from other advanced countries without adaptation to consider the special needs of the region.

Another issue that was stressed by almost all the interviewees was a structural problem of this cluster. Based on the primary principals of clustering, the members of a cluster should be private small and medium-sized enterprises (similar entities with compatible governance and management approaches), which would encourage them to collaborate and compete with larger and more established corporations. However, half of the enterprises in the S&B carpet cluster are governmental firms which supported by government, or they are a kind of charity entities. This heterogeneous structure created a collaboration problem among the cluster stakeholders, which in turn, has limited the full potential of the clustering approach to be realized. As such, the interviewees explained that public or charity enterprises do not have any motivation to cooperate with the SMEs in the cluster because they feel no need to cluster strategy, as they are always supported by their extended institutions. Moreover, some informants explained that assigning the implementation plan of the cluster to the Small and Medium Industries Town (SMIT) company has exaggerated the problem as this organization had no experience in carpet Industry, which led to much reworks and inefficiency.

On the other hand, the traditional production that is not in accordance with the demands of existing markets has made an inappropriate quality which is not compatible with market standards. It can be seen at unusual designs and sizes of this local carpet. All these matters affect the selling and marketing ability of the S&B carpet industry. Whereas the basis of production is



not on the market demands, therefore, the marketing problems will rise up. Eventually, the lack of domestic market in S&B province and the inability of enterprises in marketing skills besides the carpets which have not been produced based on the target market altogether has led to improper selling situation of this industry cluster in S&B province.

### *The social dimension*

In addition to context and technical, the analysis provided interesting insights into the relational issues that have affected negatively the performance of the cluster. In effect, this dimension relates to the social interaction of the S&B cluster actors. Table 5 provides an overview of these challenges and explains their impact. This dimension includes three influencing factors: relational distrust and weak communication channels.

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Overall, the challenges grouped under this dimension are related to attitude, personal values, assumptions and beliefs of all key people who involve in this cluster. These include an existing feeling of distrust between entities and cluster authorities, along with poor communication and common understanding within the cluster actors. The issues captured under this dimension have had a detrimental effect on the cluster performance as the cluster various stakeholders were unable to participate and cooperate effectivity in the cluster activities. For example, several interviewees stated that they do not feel any trust and believe in this cluster as a value creation mechanism (due to contextual and technical challenges discussed previously). In turn, this attitude has resulted in reducing their motivation and interest to collaborate with the SMIT company (which is responsible to handle the cluster in this province). Moreover, this negative atmosphere has lessened the communication between cluster management and other key actors.

For example, cluster stakeholders stressed that they do not see any clarity in the performance of the cluster, and believe that the cluster has weak cooperation with other stakeholders. Meanwhile, cluster officials like the CDA and cluster experts who contribute to cluster activities said that they did not trust the relevant government agencies. Overall, the weak performance of cluster officials in building trust and creating a good atmosphere for good communication with all actors in this cluster has been strongly emphasized by almost all the interviewees.

***Macro-level: National-related challenges***

In addition to the challenges at the micro-level, the analysis revealed a different stream of issues which affect the functionality of the S&B carpet cluster. However, these issues emerged due to the national conditions of Iran, thus they were categorized as the macro-level. These are critical limiters which affect, not only the S&B carpet cluster, but also all industries and clusters in the country. As summarized in Table 6, we specified two dimensions that explain these challenges at this level: political instability and global competition.

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***Political instability***

This dimension discusses the political instability in Iran and its effect on the carpet industry in general. During the past 30 years, the governments and the parliament have transferred the management authority of the national carpet sector to different institutions. They are responsible for regulating the industry that involves both handmade and machine woven carpets. However, these institutions remained controlled by the government authority.

Due to the country political instability, the responsibility of the country's carpet industry for several times has been transferred from one institution to another. At first, the responsibility of carpet industry over two decades ago was on the Agriculture Ministry, Then, based on the parliament decision an organization was formed named "Iran National Carpet Center" which was working under supervisory of "Chamber of Commerce" and all authority of hand- made carpet industry was assigned on this Institution. However, after several years the Cultural Heritage Ministry tried to acquire this responsibility, and in 2011 this responsibility was transferred to the hand-made industries sector of the Cultural Heritage Ministry. The dissatisfaction of the Cultural Heritage Ministry's performance in carpet industry caused this responsibility completely transferred again to Industry and Mining Ministry. Over the years, this instability has created a complicated and improper situation for all stakeholders (mainly the producers) involved in this industry.

Therefore, the majority of interviewees emphasized this political instability has created a negative impact on the cluster's performance. In fact, they emphasized that iterative transferring of carpet industry responsibility is one of the key issues facing this cluster. In specific, the iterative institutional change has made problems with regard to cluster performance. Importantly, it has led to confusion in duties and overlap in tasks between the former and current authorities, which created a short-term and ineffective planning for the cluster and carpet industry overall due to the constant change of leadership.

#### *Global competition*

Finally, issues reported under this dimension relate to the competitive situation of the Iranian carpet industry in comparison at the international level. In specific, these issues concern the macro situations which not only affect carpet industrial clusters but also have a considerable

effect on all industries in this country. For example, the role of international sanctions on this country that subsequently leads to less communication with the global community. Since these sanctions forbid commerce interactions many international companies with Iran country therefore in this county, the cost of import and export has raised due to international limited partners. Also, the effect of the tense economic situation and low currency cannot be neglected as influential factors that make worse competitiveness of all industries including carpet industry.

## **DISCUSSION**

While research on industrial clusters has evolved in the last 20 years, this research can be criticized of adopting narrow economic, business, or inter-firm perspectives, thus neglecting the wider range of social, community, regulatory and local governance aspects (Lund-Thomson and Pillay, 2012). Engaging with these aspects is necessary to understand what would constitute truly enabling environments for industrial cluster performance (Richardson, 2013; Pyke and Lund-Thomson, 2016). In the current paper, we address this gap, and complement the literature by providing a comprehensive view of the nature and dynamics of challenges that can impede the development of enabling environment for industrial cluster. Focusing on a developing economy setting, the study makes two key contributions.

First, our findings confirmed that clusters do not exist in isolation but they are rooted in communities (Pyke and Lund-Thomsen, 2016). As such, the analysis revealed two different levels of challenges, which are imposed by the context, and have affected the performance of the S&B carpet cluster. Under the micro-level, the challenges were associated with local issues in S&B province which constrained the cluster growth. Specifically, the identified contextual, managerial, and social dimensions of this province have collectively created various forms of obstacles. On the other hand, the cluster suffered from other contextual challenges (mainly the

inefficient competitiveness of the overall Iranian industry in the global market and the country political instability) that are rooted in the national specific situation of Iran, thus grouped under the macro-level. Considering these complex challenges, it seems that, in spite of excessive interest by the developing countries to apply industrial clusters, the effectiveness of the clustering concept remains questionable (Tan, 2006). For the micro-level challenges, the effect of context attributes to implement a cluster was revealed, which highlighted the role of the domestic environment as a success factor industrial cluster (Kamran et al, 2017). Our analysis unpacks how the contextual factors, such as poverty level, investment charming, people attitude, and labor and financial situations can adversely affect the cluster performance. This implies that careful consideration of these conditions can help businesses affiliated with a cluster to leverage the potential advantages of their geographic proximity.

Furthermore, the analysis addressed some issues which are placed under social capital's flag. The weak communication between cluster and beneficiaries besides the shortage of trust indicate that the social capital is a necessary condition for releasing potentials in a cluster. Sharing information, ideas and collaboration requires trust (Borkowska, 2015) and without this element, the cluster becomes dysfunctional. The literature affirms that trust and proper communication facilitate co-operation even amongst competitors within a cluster (Oliver et al, 2017). Yet, our study has not only focused on the intra-cluster communications (within the cluster), but also stressed the relevance of the inter-cluster communication (i.e., beyond the cluster boundaries).

Moreover, the challenges categorized under the technical dimension highlight an important concern regarding the effect of planning and management aspects on the effectiveness of the clustering approach. In specific, our findings emphasize the importance of pre-study and localization before cluster implementation. However, the vast volume of faults and challenges

detected by this study testifies that the developing countries are likely to adopt a rapid ‘copy and paste’ approach for building industrial clusters without recognizing the idiosyncrasy context it’s embedded within. In turn, this conclusion affirms that the one-size-fits-all strategy could not be fit-for-purpose to drive the cluster sustainable development (Tsang and Siu, 2016).

On the other hand, the macro-level demonstrates how the inconsistency between the public policies (in regard to the cluster) with the current national conditions of Iran. In this regard, Rocha (2015) discusses that decentralized cluster strategies take neither national impacts nor inter-regional disparities into account and are especially harmful when they are based on regional competition to increase economic growth without considering the development of local social and economic capabilities.

As the second contribution, the study provides a better understanding of the complex environment of the industrial cluster by conceptualizing the relationship between the various dimensions of challenges, as illustrated in Figure 1. As discussed in the findings, the micro-level challenges have individual negative effect on the carpet cluster performance. However, the socio-centric challenges are not in isolation; they are influenced by the contextual and technical challenges. For example, lack of vision (as a technical-centric challenge) was exaggerating the problem of weak communication channels (a socio-centric challenge), because different cluster stakeholders were struggling in intra communication (social challenge) as they lacked a shared vision (technical challenge) on the strategic direction of the cluster. At the same time, the disparities in the regional culture and governmental discrimination due to religion variety (as part of the contextual challenges) have created extra barriers for communication within the cluster, and also deepened the status of distrust between the cluster beneficiaries and its public institutions (as part of the socio-centric challenges). These micro challenges are also affected by

the national (macro political and economic) conditions of Iran. For example, the effect of the improper political situation of the country that has caused international sanctions and limited economic communications with other countries, has an overall limiting effect on the development trajectory of the manufacturing affiliated with the clusters. Therefore, as explained in Figure 1, macro challenges have a negative effect on all dimensions in the S&B carpet cluster.

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Insert Figure 1 here

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### ***Implications***

The study has important implications for policymakers. First, oversimplification of clusters development without considering the real context of each given region will have huge undesirable outputs. Thus, more focus should be placed on reinforcing capabilities and removing hinders and constraints before applying clusters that allow them to leverage the benefits and spillovers provided by their specific location and clusters. Second, the findings stress the need for building trust and reinforcing social capital among the cluster stakeholder groups. This study showed that one of the most important mentioned challenges in the investigated cluster relates to coordination and cooperation among actors within this cluster. Third, our findings support the intervention of government to help the cluster that recommended by previous research (e.g., Cooke, 2001; Pyke and Lund-Thomsen, 2016; Scheel, 2002; Su and Hung, 2009) which believed local government can be helpful in developing clusters. In particular, policies should be introduced by governments that stimulate the growth of private investment to motivate investment institutions to step into the development of industrial clusters.

### **CONCLUSION**

So far, little research has been carried out on the nature and dynamics of challenges and identification of industrial clusters in developing countries. We address this issue by analyzing

the barriers to cluster performance in developing economies. The study integrates micro and macro conditions that act as obstacles. One of the most important conclusions in this study is that addressing the macro and micro challenges, which are derived predominantly from the lack of localization, is a fundamental success factor in industrial cluster development. As our analysis shows, neglecting the effect of context in planning and implement the S&B carpet cluster has led to numerous difficulties which impede the proper performance of this cluster. Finally, we think that our attempt to outline the challenges associated with industrial cluster development would bridge partially an existing gap in the literature. We also hope that the issues we addressed in this paper will offer much-needed guidance for policymakers and practitioners, while inspiring more research in this field.



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Table 1: Informants involved in the interviews

No.	Informant code	Job title/position
1	M.1	Producer
2	M.P	Authority
3	M.S	Designer
4	P.S	Producer
5	K.M	Researcher and Expert of cluster
6	D.2	Designer and carpet professor
7	K.1	Producer
8	M.B	Producer
9	M.N	Producer
10	K.K	Expert of Cluster
11	K.J	CDA
12	M.G	Authority
13	M.2	Sale manager
14	M.A	Authority
15	M.3	Expert of Cluster
16	M.K	Sale manager
17	G.R	Authority
18	A.F	Expert of Public Organization
19	K.S	Producer

Table 2: Validity and reliability measures

Research quality criteria*	Measures applied*
<p>Construct validity: to ensure that the conclusions are derived from the data and not the researcher’s assumptions or beliefs.</p>	<ul style="list-style-type: none"> <li>– The data collection instrument included both open-ended and structured questions.</li> <li>– The interviewees checked the transcripts of their interviews and confirmed their contents.</li> <li>– Data triangulation by using multiple sources of evidence (observation, interview, library sources).</li> <li>– Group discussion by the research team to reconcile any inconsistencies emerged from the analysis</li> <li>– Feedback from related professors and researchers by sending some direct quotes to aid transparency.</li> </ul>
<p>External validity: The extent to which the results obtained from the analysis are generalizable beyond the setting of the current study.</p>	<ul style="list-style-type: none"> <li>– Interview from multiple beneficiaries allowed for achieving theoretical generalizability through acquiring different perspectives.</li> <li>– A detailed account of the study setting was provided. This is necessary as the judgment of the degree of transferability is influenced by the information available on the context under consideration.</li> </ul>
<p>Reliability: Emphasizes the replication logic of the findings</p>	<ul style="list-style-type: none"> <li>– A specific research protocol was designed and applied during data collection.</li> <li>– All interviews were recorded and transcribed verbatim to control bias in interpretation.</li> </ul>

\*Adapted from Sandberg (2000), Cope (2002), and Al-Tabbaa and Ankrah (2018)

Table 3: Analyzing contextual-centric challenges (the micro-level)

Constraining factors	Key challenges	How the challenge affects the cluster performance	Supporting quotes
<p>Weak economic condition: The level of poverty at the province compared with other areas in Iran.</p>	<p>The province suffers from poor urban and technological infrastructures</p>	<p>It becomes difficult to attract expertise and other experienced Cluster Development Agent (CDA)</p>	<p><i>In this province you must fight for every basic aspect of your business because the people of this province have neither knowledge nor resources. For example, finding an experienced CDA ... was too difficult for the SMIT company (A.F)</i></p>
		<p>The cluster became unattractive for new investors and entrepreneurs.</p>	<p><i>In the S&amp;B province, we do not have the charm of investing, because it is a poor province where there are no initial facilities... In other regions around us, you may find someone to invest because those regions have at least a good weather conditions and infrastructures.... But at this province, there is nothing... these things make the capitalists to run away (M.2)</i></p>
<p>Disparities in the regional culture: The existence of various races and religions</p>	<p>Cultural conflicts</p>	<p>The cultural conflicts within the cluster stakeholders are limiting collaboration across the cluster. In turn, this decreases the level of social capital and minimizes participation within cluster activities.</p>	<p><i>This province has been formed from two regions [Baluchestan and Sistan]. The people of these regions have different religions and races. The financial level of Baluchian people is better than the Sistani's. But it cannot be expected from a Baluchian investor to invest the Sistan area, because they have different religions and races, and Baluchian won't invest their money for Sistani people (M.3)</i></p>
	<p>Governmental discrimination due to religion variety</p>	<p>Discourage investors and entrepreneurs to migrate or stay in the cluster. This also has weakened the inclusion within the cluster social environment.</p>	<p><i>Baluchian capitalists are very wealthy and they could to invest in this province ... However, they have left this province because the government harassed them just because of their religion... They felt the government treat with them differently and discriminately...now, Dubai has attracted these Baluchi capitalists (M.B)</i></p>
<p>Climate and Environmental conditions</p>	<p>Drought and severe storms</p>	<p>Such severe conditions make the cluster unattractive to potential entrepreneurs and investors.</p>	<p><i>Sistan region always suffers from drought... In the past the government always intervened and offered many opportunities to save people from drought and poverty but now, in recent decades the governments have not done anything for this region. Therefore, the situation has worsened rather than before. So people try to migrate from here and investors look for investing in better situations (K.1)</i></p>
			<p><i>Here are just the drought and high storms. I think it is not a conducive place for investors. Bojnurd city and the Khorasan province is a deprived province too. But since it has a good weather and a good nature, in 2016, it attracted the most foreign investment, without government support (M.3)</i></p>

Table 4: Analyzing technical–centric challenges (the micro-level)

Constraining factors	challenges	How the challenge affects the cluster performance	Supporting quotes
Planning-related: challenges due to planning flaws	Inappropriate feasibility study	Fail to recognize the advantages and disadvantages embedded in the cluster location.	<i>No study has been done until now... We never pay attention to the context and we always use any new knowledge without real localization. Authorities have not considered to localization and context too. These new methods and strategies [referring to clustering strategies which the government in Iran has copied from other countries] are heterogenetic ideas that are applied by the government without taking into account our context (K.M)</i>
	Lack of vision	The cluster stakeholders have no shared vision and strategic objectives which led to confusion and conflict of interest.	<i>[At this cluster] we are confused about its goals. For example, in any clustering strategy, the main objective should be the regional development. But the CDA and other responsible people in our cluster sometimes prefer the cultural targets [than the economic one] and they only want to support the native carpet design of this province, which has a small market. This deprives us from manufacturing the designs of other provisions that have a bigger market...the CDA and other authorities should just focus on the economic side and not only the cultural goals. Cultural work has its own ministry and is not related to our cluster (M.3)</i>
	Inappropriate recruitment systems	Fail to mobilize adequate key management agents.	<i>The authorities decided that ‘to be native’ is a necessary condition for CDA selection. They believe that if the CDA is not an indigenous person, the people of this province will not support him and comply with his directions. ...however, being a native is not enough... a CDA must have proper industry-related knowledge. If among the native population we cannot find the right person for CDA role, then we should recruit from outside the region, but we cannot (K.M).</i>
Management-related: challenges due to managerial flaws	Inadequate production systems and limited marketing strategy	Incompatibility with existing industry standards and inability to develop has led to decreasing the market share of the cluster output.	<i>The companies in the cluster still produce the carpet in a very traditional format ...the traditional dimensions of this native carpet are completely untouched. But this is not compatible with the current universal dimensions that are demanded in the market (K.M)</i>  <i>TV shows and advertises any commodity, but you never see any advertising about handmade carpet? In Iran, we do not advertise handmade carpet. If the problem is the cost, why government does not help? (K.S)</i>

Table 5: Analyzing socio-centric challenges (micro-level)

Constraining factor	Challenge	How the challenge affects the cluster performance	Supporting quotes
Relational distrust	Lack of transparency between cluster stakeholders	Lack of trust and transparency have reduced collaboration and interaction between the cluster management team and other stakeholders entities	<i>CDA and SMIT organization that are responsible for this cluster do not work for helping the people in the cluster. They just to chase their benefits...They must announce their budget and their costs and announce how they spend this budget for the goals of cluster; we want it because there is no transparency in their work (M.A)</i>
		Corruption and weak monitoring on the practice of related government agencies have reduced the faith in cluster potentials	<i>In our region, there is no culture of duty and responsibility in our authorities. There is a selective and biased view of this responsibility. We knew that the public organizations would not allow the cluster and its CDA to progress and go ahead because if this cluster be successful, the position of some authorities in related public organization will be questioned...for many years they spent plenty of budgets for carpet industry development but had not any significant output (M.1)</i>
Weak communication channels	Weak intra-communication (within the cluster)	Lack of coordination between the cluster companies (i.e., the beneficiaries) and the cluster managing institutions	<i>They have some problems in their company [i.e., the SMIT] and even at previous meeting they had a bad conflict between themselves. They even do not have coordination among their colleagues (M.P)</i>
		Lack of coordination and cooperation among cluster beneficiaries	<i>The cluster has good credit but there is a lot of lack of coordination between the beneficiaries [i.e., the companies] and the problem is individualism...their connection was very bad. Some beneficiaries do not even want to see each other (K.J)</i>
	Weak inter-communication (beyond the cluster boundaries)	Becoming isolated from competitors. Decreasing learning and competitiveness	<i>They do not look at the outside and so they think that they are the best! Because they are isolated. Our producers [i.e., the companies] have not gone out of this province for many years...the exhibition in Tehran was the first exhibition that they were going to outside of the province (M.3)</i>

Table 6: Analyzing macro-level challenges

<b>Challenge dimensions</b>	<b>Subsets</b>	<b>Effects on cluster</b>	<b>Supporting quotes</b>
The political instability	Transferring the responsibility of carpet industry for several times over the last decades	Ambiguity in carpet industry situation. Lack of exact and long-term planning for carpet industry	<i>Why our carpet condition is not good and China is going to get our share in the market? This is because nobody here [in Iran] care about the carpet industry. Always responsibility of carpet industry is transferred to that organization or another organization (M.1)</i>
	Authorities' improper perspective towards carpet industry	The lack of commitment and effective long-term planning to improve the carpet industry position	<i>One of carpet authorities told me that the ... "total global carpet sales are only four billion dollars, while tourism economy is over tens of billions dollar, so why we should support the carpet industry?". The authority representative also explained "it is not logical to use all these people for weaving while the whole world's economy of this carpet is only four billion dollars" (M.G)</i>
The global competition	<p>The country has disadvantage in regard to internalization:</p> <ol style="list-style-type: none"> <li>1. Shortage of constant state support for production/export</li> <li>2. Limited communication with other countries (closed boundaries) due to sanction</li> <li>3. No national strategy for exporting the Iranian carpet</li> </ol>	These disadvantages render exporting of cluster products more difficult as these products become less competitive (i.e., more expensive) in comparison to regional rivals	<p><i>For the success of the cluster, the country's support and supportive laws can have the greatest impact, but we don't have none of them (M.K)</i></p> <p><i>If you want your country be a developed country in terms of economy, you should open your country to foreign investment. But now we have closed our boundaries to other countries (G.R)</i></p>

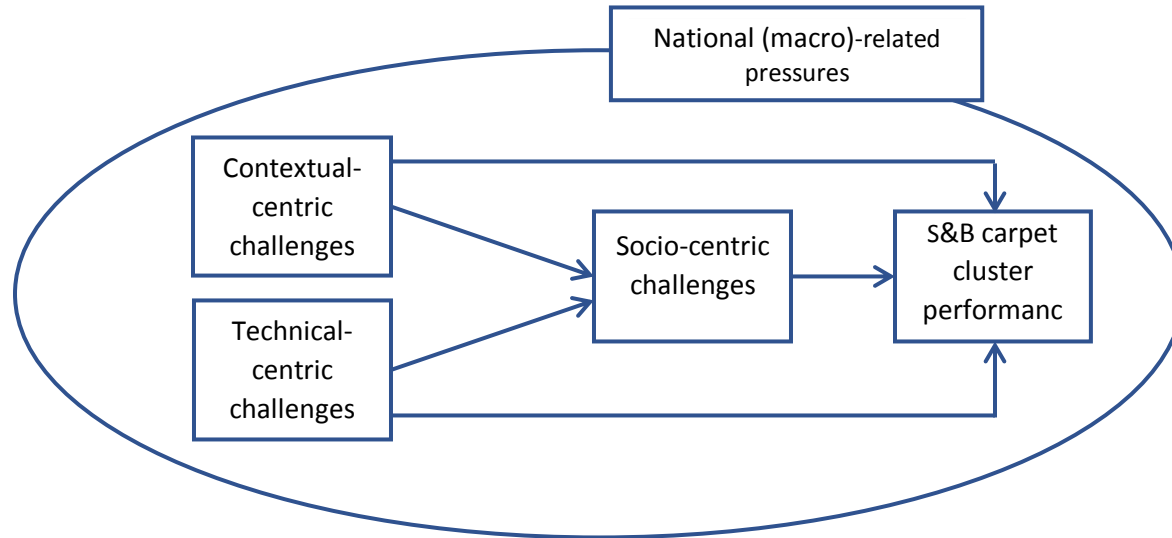


Figure 1: Modelling the effect of micro and macro challenges on industrial cluster performance