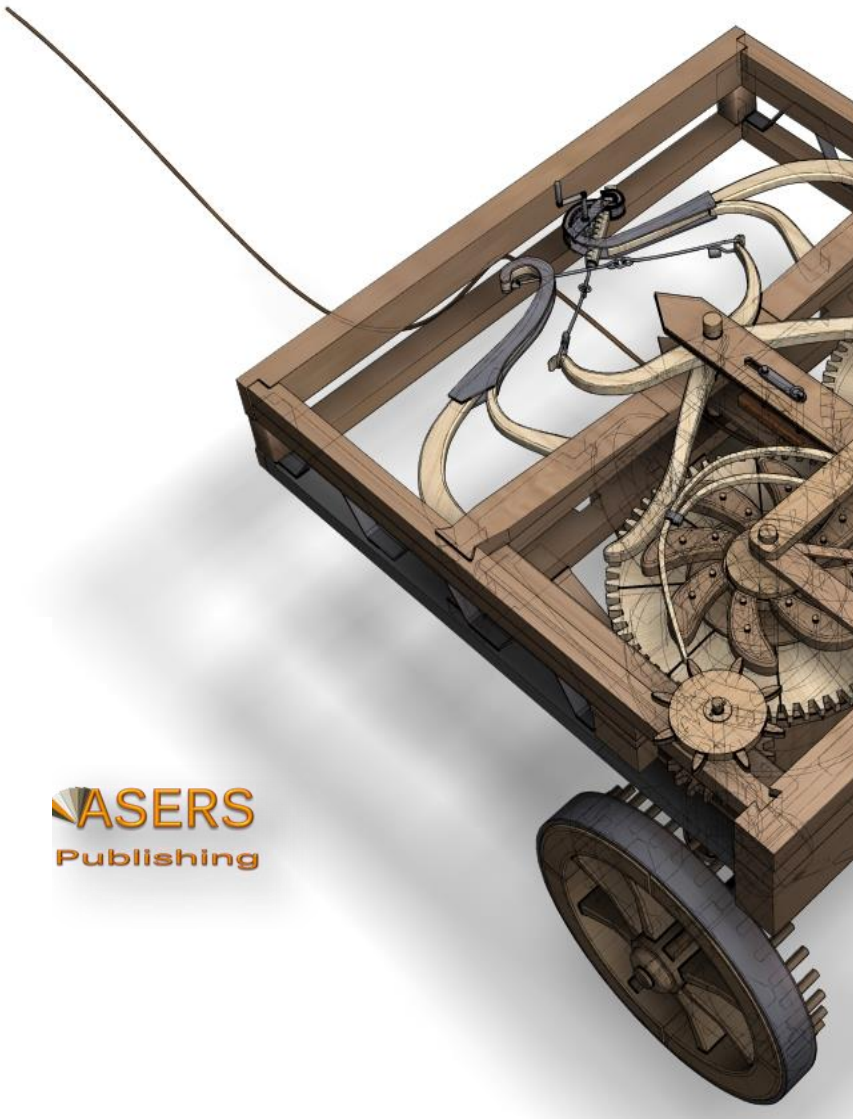
Theoretical and Practical Research in Economic Fields



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Using Markunsen's Typology as a Starting Point to Examine the Case of the Center for Defense Space and Security Cluster: The State-Anchor Type of Cluster

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Abstract: *Defense is a strategic sector that is closely tied to national security and sovereignty. As such, governments tend to have a strong interest in supporting and developing the defense industry in their countries. This paper aims to investigate and identify to which of the four types of industrial clusters described by Markusen, the Danish Defence Space and Security (CenSec) cluster belongs to. Our initial argument is that CenSec has the characteristics of a state-anchor cluster, because in the defense cluster, the role of government is typically decisive due to the nature of the industry. The analysis will also explore the implications of the type of cluster for policymakers and industry stakeholders in terms of promoting innovation, competitiveness, and economic growth in a broader correlation with the European business and institutional ecosystem.*

Keywords: E.U.; defense clusters; defense industry; CenSec Denmark.

JEL Classification: L24; L93.

Introduction. Clusters as Ambiguous, Multidimensional Phenomena. Main Theoretical Approaches

It is common practice to preface any discussion or study of economic clusters with a disclaimer that there is no universally accepted definition of the phenomenon, as definitions and analytical frameworks can conflict. Martin and Sunley (2003) note that constructing a thorough and critical review of clusters is challenging due to the numerous varieties and types of clusters, and the persistent feeling that there must be more to the concept than what is currently understood. This creates a perception of a disordered or ambiguous concept.

Indeed, cluster definitions can vary depending on the discipline or perspective from which they are being viewed. For example, the Preliminary Report "Industry Clusters - An Economic Development Strategy for Minnesota", identify "Industry Clusters" as *geographic concentrations of competing, complementary, or interdependent firms and industries that do business with each other and/or have common needs for talent, technology, and infrastructure. The firms included in the cluster may be both competitive and cooperative* (Munnich *et al.* 1999).

Several scholars have also developed and refined the cluster concept, including Michael Porter, Paul Krugman, Philip Cooke, and others. Porter (1990), in his influential book "The Competitive Advantage of Nations", argued that clusters provide a source of competitive advantage for firms by increasing their productivity, innovation, and competitiveness. He identified several key factors that contribute to the success of clusters, including the presence of specialized suppliers, a skilled labor force, and local institutions that support innovation and entrepreneurship. On the other hand, Krugman, in his paper "Increasing Returns and Economic Geography" (1991), provided a theoretical framework for understanding the emergence and persistence of clusters. Krugman argues that clusters result from economies of scale and increasing returns to specialization, which lead to a

concentration of economic activity in specific regions. In their book "Regional Innovation Systems: The Role of Governances in a Globalized World", Hans-Joachim *et al.* (1998), emphasized the importance of local institutions and governance structures in fostering the development of clusters. Cooke argues that in order to promote innovation and economic growth, it is crucial to establish effective collaboration between firms, universities, and other institutions. In their paper "Clusters, Networks, and Innovation in Small and Medium-Sized Enterprises", Breschi and Malerba (2000), examined the role of clusters in promoting innovation in small and medium-sized enterprises (SMEs). They found that SMEs in clusters were more innovative and successful than those outside of clusters, due to the benefits of knowledge spillovers, access to specialized inputs, and opportunities for collaboration. Finally, Gordon and McCann (2000), Guerrieri and Pietrobelli (2000), and Markusen (1996) all contributed to the understanding of clusters by exploring the relationship between clusters and globalization, industrial restructuring, and economic development.

As exemplified above, different scholars and experts have developed various definitions and analytical frameworks, each highlighting other aspects of the cluster phenomenon. The lack of a universally accepted definition reflects the complexity and diversity of clusters and the different contexts in which they emerge (Martin and Sunley 2003). Nevertheless, industrial clusters are characterized by a set of distinct features such as shared use of local resources, similar technologies, and the formation of linkages and alliances among companies. These linkages can take various forms, including buyer-supplier relationships, shared human resources, machinery, infrastructure, joint marketing, training, research initiatives, associations, and lobbying (Porter 1998). Businesses and institutions engage with one another at various levels within the ecosystem of a cluster, which allows individual companies to increase their competitive advantage (Karaev *et al.* 2007; and Singh *et al.* 2008; and Singh *et al.* 2010) by creating synergies (Jankowska *et al.* 2017) and pooling resources, knowledge, and innovation (Keeble and Wilkinson 1999; Cumbers *et al.* 2003). Industrial clusters can be seen as an initiative to organize participating members in a coordinated manner, utilizing local competition creatively to generate innovation and increase competitiveness through co-operation between companies, RandD agencies/institutions, and local, regional, and/or national government (Morgan and Hunt 1994).

Deviating from this traditional approach, other scholars provide a new perspective on clusters, that considers various factors, including spatial contexts and geographical factors, in analyzing economic and technological changes. For example, Kudrina, Klius, and Ivchenko, (2023) sourcing their case studies from Ukraine, they emphasize the importance of considering the spatial contexts within which economic evolution occurs, including processes such as path creation, innovation, adaptation, and resilience, as well as integration with the rest of the world. Last but not least new papers assess the effect of the digital economy on manufacturing agglomeration and explore the mechanisms through which this effect occurs. They discuss factors such as reducing transaction costs, increasing market potential, enhancing knowledge spillover, and the role of globalization, localization, and human capital in moderating these processes, emphasizing that the spatial layout of economic activities has gradually shifted from "transportation cost + labor force" to "information + technology" (Wang, Zhang, Chen, Yu, 2023).

In this paper, we will dive deeply into the theoretical approaches described above and try to revisit the definition of a cluster by expanding beyond the conventional understanding of a cluster as a geographically concentrated group of firms and institutions. The definition of a cluster is not restricted to the mere physical co-location of firms and institutions but also encompasses the quality and degree of their interactions and relationships and the unique characteristics of their industry. As such, this definition expands beyond the conventional understanding of a cluster as a geographically concentrated group of firms and institutions. While physical proximity is an essential factor, this study will also try to emphasize the significance of the nature and intensity of firms' interactions and relationships in driving the cluster's growth and competitiveness and will delineate the state's role in the "business ecosystem" created by the cluster. Moreover, the article will try to understand the role and importance of E.U. policies and initiatives in promoting the development of industrial clusters and innovation ecosystems.

As a result, this definition presents a complex and multi-faceted concept. It considers not only the quality and degree of interactions and relationships between firms and institutions but also the distinctive features of the defense industry, as well as the institutional and policy framework provided by the E.U. to promote and shape their development. This multi-dimensional understanding of a cluster enables a more thorough examination of the factors that enhance the success and competitiveness of industrial clusters. It gives policymakers and industry leaders a more nuanced perspective on the strategies and policies required to facilitate their growth and innovation.

The scope of this paper is to investigate and identify to which of the four types of industrial clusters described by Markusen (1996), the Danish Defence Space and Security (CenSec) cluster belongs to. Our initial argument is that in the defense cluster, the role of government is typically decisive due to the nature of the industry. Defense is a strategic sector that is closely tied to national security and sovereignty. As such, governments tend to have a strong interest in supporting and developing the defense industry in their countries (Eliassen and Sitter 2006). The analysis will also explore the implications of the type of cluster for policymakers and industry stakeholders in terms of promoting innovation, competitiveness, and economic growth in a broader correlation with the European business and institutional ecosystem.

The study's novelty lies in its holistic approach. It encompasses diverse theoretical perspectives, expanding the definition of clusters, and emphasizing how EU policies facilitate and shapes the enhancement of knowledge between clusters. Last but not least, the study provides practical implications as it delivers a potential roadmap for policy makers for fostering innovation, competitiveness, and economic growth within industrial clusters.

By bridging theoretical insights with practical applications, the study contributes significantly to the understanding of industrial clusters, making it a valuable addition to the existing body of knowledge in this field. It moves beyond the traditional understanding of clusters as geographically concentrated entities, emphasizing the multifaceted nature of clusters, stressing the quality and intensity of interactions and relationships among firms and institutions. This expanded definition provides a more nuanced understanding of how clusters function and grow. Given this novel approach this article goes beyond the traditional definitions of clusters highlighting that clusters are dynamic ecosystems where the quality and intensity of interactions among firms and institutions play a pivotal role and are not “confined” by traditional factors and dynamics. Finally, the paper has a distinctive EU “flavor” that analyses and elaborates on the integration of national clusters into a larger European context. This integration aligns with the EU's initiatives, indicating a harmonious collaboration between local clusters and pan-European strategies.

1. Using Markusen’s Cluster Categorization as a Starting Point and a Methodological Tool

Markusen differentiates industrial clusters on the role of large firms, the state (Clark, Huang, and Walsh 2009) and different inter-organizational patterns and arrangements (Bell *et al.* 2009). Markusen identifies four distinct types of clusters:

Marshallian clusters, also known as localized clusters or industrial districts, were first identified by the economist Alfred Marshall in the late 19th century. These clusters are named after him because he was the first economist to identify the positive externalities that arise when firms are in close proximity to one another (Belussi and Caldari 2009). Marshallian clusters are typically characterized by a concentration of small and medium-sized enterprises (SMEs) that are often family-owned and operated (Markusen 1996; Bell *et al.* 2009). These firms are typically specialized in a specific industry or product and are deeply embedded in the local community. They often have close relationships with suppliers, customers, and competitors, creating a network of interdependent firms that cooperate and compete with one another (Clark *et al.* 2009).

One of the critical features of Marshallian clusters is the presence of what Marshall called an “industrial atmosphere” (Markusen 1996). This refers to the intangible benefits that firms receive from being in close proximity to one another. These benefits include access to skilled labor, specialized suppliers, and a culture of innovation and entrepreneurship. Firms in Marshallian clusters often engage in knowledge-sharing and collaborative activities, which can create new products and processes (Hervas-Oliver *et al.* 2019). In Marshallian clusters the member companies become part of a “technological circle” the success of which is further reinforced by the interpersonal relationships developed between the innovation/RandD managers of the cluster’s companies. These good interpersonal relationships and face-to-face interactions facilitate the circulation of “tacit knowledge” (Seeley 2007; Seeley 2011; Pietrobelli 2002), in other words knowledge which is difficult to circulate, mainly due to the nature of the message it conveys. In contrast to “explicit” knowledge that can be easily transmitted, thereafter perceived, and re-used, “tacit” knowledge usually requires an in-depth explanation of “how something is done”. Knowledge transfer is both intended and unintended and is often the result of proximity and employee’s mobility between companies (Ferreira *et al.* 2009). Marshallian clusters are often found in regions with well-developed infrastructure and high levels of human capital. Examples of Marshallian clusters include the clusters of the Italian area usually known as “Third Italy” (Boschma 2000; Bianchini 1991).

Overall, Marshallian clusters are seen as a model of economic development that promotes local economic growth, innovation, and entrepreneurship. They provide an environment where firms can benefit from close

proximity to other firms in their industry, creating a network of interdependent firms that cooperate and compete with one another to create economic value.

Hub-and-spoke clusters are characterized by a central hub, typically a large, dominant firm or institution, and a number of smaller, specialized firms or suppliers connected to the hub (Gray *et al.* 1996). In a hub-and-spoke cluster, the hub serves as the anchor that attracts and supports the smaller firms in the cluster, creating a hierarchical cluster structure (Lan and Kai 2009; Randelli and Lombardi 2014; Carbonara 2002). The hub often has a significant market share and the resources to invest in research and development, marketing, and other activities that benefit the entire cluster (Malipiero *et al.* 2005). The smaller firms in the cluster often specialize in providing goods or services to the hub, such as specialized components or support services.

Hub-and-spoke clusters can be found in a variety of industries, including aerospace, software, and automotive. A well-known example of a district with hub-and-spoke clusters is Seattle, in where Boeing acts as the hub for the aerospace industry, Microsoft for the software industry, while the Fred Hutchinson Cancer Center and the University of Washington "shaped" the faith and structure of the local biotechnology industry (Gray *et al.* 1996). Another example of a hub-and-spoke cluster is that of the East Midlands Aerospace cluster in the U.K. The cluster's hub firm is the British engine manufacturer Rolls-Royce, and the spokes are its many second and third-tier suppliers and other SMEs (Smith and Ibrahim 2006). One of the benefits of hub-and-spoke clusters is that they provide opportunities for smaller firms to benefit from the resources and expertise of the larger hub firm. The hub firm can provide mentoring, access to capital, and other forms of support that can help the smaller firms grow and become more competitive, playing the role of "gatekeepers" (Randelli and Lombardi 2014) for the clusters, enabling them to connect with global networks and affecting their sustainability. In addition, the close relationships between the hub and the spokes can lead to knowledge sharing and innovation, which can benefit the entire cluster. However, hub-and-spoke clusters also have some potential drawbacks. The dominance of the hub firm can limit competition and innovation in the cluster (Ferreira *et al.* 2009), and smaller firms may become too dependent on the hub for their survival. In addition, if the hub firm were to leave the cluster, it could have a significant impact on the smaller firms that rely on it.

Satellite platform clusters are characterized by a number of smaller firms or institutions connected to a larger platform firm or institution, rather than a central hub (He and Fallah 2011; Boja 2011). In a satellite platform cluster, the platform firm or institution provides a range of services and resources that support the smaller firms in the cluster. These services may include access to markets, expertise in marketing and branding, and support for research and development. The smaller firms in the cluster may specialize in a particular aspect of the platform's operations, such as manufacturing components or providing support services (Rugman and Verbeke 2003).

When it comes to innovation, the multi-national "parent" companies are simultaneously a knowledge generator and a knowledge seeker, as Rugman and Verbeke (2003) conclude, also playing the role of "global pipelines" diffusing knowledge (Morrison *et al.* 2012). Such pipelines are beneficial for the accumulation of knowledge only if the "local aspects/ firms" of the cluster are either characterised by a "high-quality local buzz" or are weakly endowed in terms of knowledge as Morrison *et al.* (2012) concluded.

One of the benefits of satellite platform clusters is that they provide opportunities for smaller firms to access resources and expertise that would otherwise be unavailable to them. The platform firm or institution can provide access to markets and customers, as well as expertise in areas such as marketing, branding, and research and development. In addition, the close relationships between the platform and the satellites can lead to knowledge sharing and innovation, which can benefit the entire cluster. One of the satellite platform clusters that is frequently mentioned in the literature is that of the aerospace clusters in Baja California, Mexico (Gomis and Carrillo 2016; Romero 2011). However, satellite platform clusters also have some potential drawbacks. The platform firm or institution may have a significant amount of control over the smaller firms in the cluster, which could limit their independence and ability to innovate (He and Fallah 2011). In addition, if the platform were to leave the cluster or change its operations, it could have a significant impact on the smaller firms that rely on it.

State anchored clusters are characterized by the state or government's vital and supportive role in supporting and developing the cluster (Markusen 1996). In a state-anchored cluster, the state or government provides a range of services and resources that support the firms in the cluster (Ghent 2004). These services may include infrastructure development, financial incentives, workforce training, and support for research and development (Zhong and Tang 2018; Barbieri *et al.* 2010; Ahedo 2003). The cluster's firms may be from various industries, but they all share a common reliance on the state or government for support (Markusen 1996).

State-anchored clusters can be found in various industries, including aerospace, biotechnology, and renewable energy. Examples of state anchored clusters include the biotechnology cluster in Massachusetts, which is supported by state-funded research institutions like Harvard and MIT (Nelsen 2005), and the aerospace

cluster in Washington state, which is supported by state funding for infrastructure and workforce development (McKenzie *et al.* 2017).

One of the benefits of state-anchored clusters is that they can provide a stable and supportive environment for firms to grow and develop. The state or government can provide financial incentives and support for research and development, which can help firms become more competitive and innovative. In addition, the close relationships between the state or government and the firms in the cluster can lead to knowledge sharing and innovation, which can benefit the entire cluster.

We should not fail to notice that governmental help is provided to all types of clusters. The difference in the state-anchored cluster is, as Markusen and Park (1993) concluded in their research on the case of Changwon cluster, South Korea, the state's role as the lead agent, a factor that lessens the importance of traditional locational aspects. In the case of Changwon, the cluster was built due to the commitment of the state to build a military supply sector. In the state-anchored clusters, innovation is centrally coordinated, putting any activity in line with public objectives (the objectives of the anchor institution) (Jankowiak 2012), while the members of the cluster are relatively unimportant to the creation of innovation (Ferreira *et al.* 2009) as well as in the development of the cluster. Another limitation is that state-anchored clusters can lack responsiveness to market demands Lundvall and Sørensen (2004). More particularly Markusen's typology of clusters is presented on Table 1.

Table 1. Markusen's typology of clusters: A synopsis

Markusen's typology of clusters: A synopsis				
	Marshallian	**Hub-and-Spoke**	**Satellite Platform**	**State anchored**
Characteristics of the Cluster's Members	Locally owned SMEs	One, or a few, Hub firm/s – surrounded by multiple smaller suppliers	Assemblage/ concertation of branch facilities of externally based multi-national firms	A government-owned or supported entity surrounded by related suppliers (cluster members)
Innovation	Members of the cluster create and share innovation	Hub firms "regulating" and shaping the innovation process of the cluster, having the rule of knowledge "gatekeepers"	Multi-national "parent" companies are simultaneously a knowledge generator and a knowledge seeker / "global pipelines" and "agents" of knowledge diffusion	Innovation is centrally coordinated, putting any activity in line with the objectives of the "anchor" institution
Governmental Institutions	Government-sponsored industry organisations	Hub companies have stronger ties to national trade associations than local	Local and/or national government provide infrastructure, tax breaks, and other generic business inducements	Anchor institution/state is the lead agent
Co-operation with companies and/ or other entities not part of the cluster	Low degrees of linkage with firms external to the district / high level of "embeddedness" to the district, unique local cultural identity	Defined by the Hub firm/s	Defined by the "parent" multi-national firm/s	Extended with the institution, the cluster is "anchored" to

Source: Author's estimations and evaluation

The analytical framework mentioned above is limited in that it only provides a static snapshot of a cluster, according to Belussi (2015). Therefore, a cluster may transition from one type to another over time. For example, Markusen (1996) uses Detroit as an illustration of a cluster that was transformed from a Marshallian district to a hub-and-spoke district. In reality, clusters may have characteristics of different types as identified by Markusen. In Italy, for instance, Marshallian clusters are changing as a result of the consolidation of several leading firms, leading to a modification in their configuration and structure to a hub-and-spoke district (Carbonara 2002; Belussi 2015).

To investigate our propositions, we will use Markusen's distinction of industrial districts as a framework for analysis following the lead of numerous other studies on industrial clusters' dynamics. We will proceed with studying the Danish Center for Defence Space and Security (CenSec). Case study analysis can be an effective way of analyzing academic subjects, particularly when it comes to examining complex or context-dependent phenomena. One of the strengths of case study analysis is that it allows researchers to investigate complex, multifaceted phenomena that may be difficult to study using other research methods. By examining a single case in detail, researchers can gain a rich and nuanced understanding of the factors that influenced the phenomenon under study (Yin 2013; Stake 1995). Case study analysis has been widely used in the study of industrial clusters, particularly in the fields of economic geography and regional development. One example is the study by Cooke and Morgan (1998) of the automotive components cluster in the West Midlands region of the U.K. Through a combination of interviews and statistical analysis, Cooke and Morgan identified a range of factors that influenced the competitiveness of the cluster, including the availability of skilled labor, the presence of research and development capabilities, and the existence of strong networks between firms. More recently, a study by Duranton and Puga (2004) used case study analysis to investigate the factors contributing to industrial clusters' formation and evolution. Through a review of the literature and the examination of case studies from a range of industries and locations, Duranton and Puga (2004) identified several key factors, including the importance of agglomeration economies, the role of knowledge spillovers, and the influence of institutional factors such as government policies.

One limitation of case study analysis is that it can be time-consuming and resource-intensive, as researchers must collect and analyze detailed data from a single case. Additionally, it can be difficult to generalize findings from a single case to a larger population or to other contexts.

As already mentioned this paper main scope is to investigate and identify to which of the four types of industrial clusters described by Markusen (1996), the Danish Defence Space and Security (CenSec) cluster belongs to. Our initial argument is that CenSec will have the characteristics of a state-anchor clustrer, because the defense cluster, the role of government is typically decisive due to the nature of the industry. Defense is a strategic sector that is closely tied to national security and sovereignty. The analysis will also explore the implications of the type of cluster for policymakers and industry stakeholders in terms of promoting innovation, competitiveness, and economic growth in a broader correlation with the European business and institutional ecosystem.

Even though as part of her findings, Markusen provides in-depth analysis of her proposed typology, for this paper, only a summary of the aspects is described/ used, and they can be summarised as follows:

1.the number and size of companies participating in the cluster as well as their structure and configuration,

2.the internal or external orientation or integration of the companies within the geographical / institutional entity of the cluster, as well as the intraregional and interregional linkages they have developed,

3.The management of innovation created by the cluster,

4.The existence (or not) of a public entity around which the cluster is "anchored".

Markusen's (1996) methodology/typology was selected because there is a concrete connection between a cluster and the role a government and/or a governmental institution could play in forming and managing the cluster.

2. The Role of the State in the Triangle: Defense Industry, Economic Patriotism, and E.U. Institutions

It has been more than 30 years since Andrew Moravcsik challenged what many considered common sense, arguing that large Western European countries will prefer to procure defense equipment from local firms. In his article "Arms and Autarky in European History," he argues that throughout history, states have pursued autarkic policies (*i.e.*, policies aimed at achieving self-sufficiency) to enhance their military power and strategic position. Moravcsik (1991) concludes that while a solid historical link exists between arms production and autarkic policies, the relationship between military power and economic self-sufficiency is not always straightforward. He argues that economic interdependence and co-operation can often enhance military power and strategic position.

On the other hand, several academics believe that the defense industry is "shaped" by what Clift and Woll (2012) call "Economic patriotism." Clift and Woll argue that economic patriotism is a response to globalization and the perceived loss of control over domestic financial affairs. They define economic patriotism as the desire to protect and promote a country's economic interests. The authors argue that economic patriotism is not necessarily incompatible with open markets but rather is a way to maintain some control over financial affairs in a globalized world. Other academics (Keohane and Valasek 2008) argue that E.U. countries opt to buy defense equipment from foreign companies if domestic companies cannot produce the equipment under procurement.

The truth is that European governments have shown a preference (regardless of how big or conditional it is) for their national defense industries when procuring defense equipment, a fact that is directly linked to the state's role as the main actor in the international system (Krause 1992). This is primarily correlated to Waltz's (1979) structural realist theory of international politics that emphasizes the importance of the international system, rather than individual states or leaders, in shaping global outcomes. Waltz argues that the international system is characterized by anarchy, meaning no overarching authority exists to govern and prevent conflict. In this context, states are driven by the need to ensure their survival, often leading to competition and conflict.

Thus, a close relationship exists between developing a national defense industry and a government's ability to ensure security. The government, as a customer, sponsor, and regulator (Heidenkamp *et al.* 2013), plays a critical role in shaping the industry, as it is the primary source of funding and sets the rules and regulations that "shapes" the industry. As a customer, the government's primary goal, is to ensure that it gets the best value for money and that the equipment meets its operational requirements. As a sponsor, the government is responsible for investing in research and development and providing long-term funding to support the industry. Finally, as a regulator, the government sets the rules and regulations that govern the industry, including procurement and export controls.

The complex relationship between the government and the defense industry creates obstacles to activating foreign capital (Belin and Guille 2008, Belin *et al.* 2017). As a result, while other industries in the E.U. have been liberalized and opened up to the competition as part of the E.U.'s broader push towards a single market, the defense sector has remained largely protected from international competition. This has implications for the broader E.U. project, as it creates tensions between the push for greater economic integration and the desire of individual member states to maintain control over their defense industries (Eliassen and Sitter 2006).

However, globalization creates and/or accelerates the emergence of international defense markets and corporate structures, creating a new status quo. The globalization of defense industries is being driven by a combination of factors, including changes in the global security environment, technological advances, and the desire of defense firms to expand their markets (Hayward 2001). Acknowledging this trend, E.U. institutions are trying to use several "tools" to promote international business co-operation among European defense industries, and clusters can be a powerful tool for European countries to enhance their competitiveness and promote economic growth (Müller *et al.* 2012).

This trend is not only a E.U. phenomenon. A paper provided by Balakrishnan and Johar (2023) studies the level of defense industrial innovation success in Malaysia providing valuable insights into the challenges and solutions related to defense industrial innovation, offering relevant perspectives for understanding the dynamics of industrial clusters, particularly those in the defense sector. The collaborative approaches discussed in the paper can be applied and adapted to the context of industrial clusters, contributing to the overall discourse on cluster development and innovation ecosystems, exemplifying that the E.U. ecosystem under discussion is not a unique phenomenon.

3. Case Study: CenSec Denmark

The Center for Defence Space and Security (CenSec) is a Danish membership-based organization that focuses on promoting the defense, space, and security industries in Denmark. CenSec provides a platform for networking, knowledge-sharing, and collaboration between private companies, knowledge institutions, and public authorities in these sectors. The organization aims to strengthen the competitiveness and innovation capabilities of the Danish defense, space, and security industries. (CENSEC, 2023; Medlemsfolder Online Vinter, 2023)

According to the official website of CenSec, it is a membership-based organization with 188 members, including private companies, knowledge institutions, and public authorities (CENSEC. Vores medlemmer)

Additionally, CenSec works with prime contractors, system integrators, Ministry of Defense procurement, logistic and repair agencies etc. to identify, develop and recommend appropriate supplier and sub-contractor capability (CENSEC, 2023; Medlemsfolder Online Vinter, 2023). CenSec was founded in 2004 and established in 2007 as an industrial cluster. In 2018, CenSec was approved by the Danish Ministry of Higher Education and Science to also become a national Innovation Network for Security (Inno-Sec) (European Cluster Collaboration Platform, March 17, 2023)

The Innovation Network for Security (Inno-Sec) is a Danish national innovation network that focuses on promoting innovation and collaboration within the security industry in Denmark. The network is part of a larger initiative by the Danish government to establish innovation networks in various industries to promote research, innovation, and commercialization of new ideas and technologies. The network is funded by the Danish Ministry of Higher Education and Science.

In October 2020, CenSec was appointed by the Danish Ministry of Higher Education and Science and the Danish Board of Business Development to be the national Danish cluster for defense, space, and security in the four years from 2021-2024 (CENSEC, 2023; Medlemsfolder Online Vinter, 2023).

CenSec facilitates various collaborative projects with Danish knowledge institutions, collaborating with various universities, research institutions, and knowledge networks to support innovation and development in the defense, space, and security sectors. Some of the areas where CenSec and its partners are collaborating include cybersecurity, unmanned systems, space technologies, and advanced materials. In the past, CenSec has facilitated several collaborative projects and initiatives with Danish knowledge institutions, including the development of new defense technologies, research into advanced materials for the defense industry, and the promotion of education and training programs for the next generation of professionals in the defense, space, and security sectors. The collaborative projects are co-financed by the Danish Agency for Education and Research (CENSEC, Samarbejdsprojekter, Retrieved March 14, 2023). CenSec is also a member of several European networks and initiatives related to defense, space, and security. For example, CenSec is a member of the European Network of Defence-Related Regions (ENDR). ENDR is a network of regional authorities, clusters and companies across Europe. It offers a platform to share information about new initiatives, increase their visibility, and build partnerships, and share experiences and best practices in building defense-related strategies and accessing E.U. funds.

CenSec is also part of the EU-DK Support Netværk's, the purpose of which is to coordinate advisory and service offerings within research, innovation, entrepreneurship and higher education with a view to supporting increased participation in E.U. programs and ensuring synergy effects between the various advisory services (CENSEC, Netvær, Retrieved March 15, 2023). CenSec has received funding from EU-funded programs such as the Alliance for Strategic Skills Addressing Emerging Technologies in Defense -ASSETS+ project. ASSETs+ project aspires to build a sustainable human resources supply chain which allows defense sector companies to innovate by both attracting highly skilled young workers and upskilling their employees thanks to customized, complementary education and training programs addressing three main technologies: Robotics, C4ISTAR and Cybersecurity aspects related to the first two (CENSEC, ASSETS alliance for strategic skills: Adressing emerging technologies in defence [Blog post]. Retrieved March 15, 2023). CenSec has also received funding by the European Defence Fund (EDF) as part of the Disruptive Technologies project' Robust and Light AM components for military systems' project. The project presents advanced research for additive manufacturing technologies for defence applications. It will design and manufacture lightweight military grade parts with novel materials for three military use-cases: a light metal emergency wheel, a cargo bay-door hinge and a large-scale antenna. (European Cluster Collaboration Platform, CENSEC receives funding from the European Defence Fund for the project RoLiAC. Retrieved March 13, 2023).

The European Defence Fund (EDF) is a financial mechanism set up by the European Union (E.U.) to support the development of the E.U.'s defense capabilities. The EDF aims to strengthen the E.U.'s strategic autonomy and improve its capacity to act as a security provider by supporting the development of defense technologies and equipment, as well as the collaborative research and development of defense capabilities among E.U. member states. The EDF is the first E.U. program to provide direct funding for defense-related activities, and it represents a significant step towards closer defense co-operation among E.U. member states (Camporini *et al.* 2017).

Table 2 presents the main characteristics of the CenSec Cluster, according to Markusen's typology.

As already mentioned, the main scope of the paper is to investigate if CenSec is "anchored" to one or several large governmental institutions and/or policies (Markusen 1996) or if other initiatives/ policies accelerate the cluster's development. It will not be an overstatement to say that CenSec can be characterised as a state-anchored cluster. The reason is that it relies on the support and resources provided by the Danish government. The government offers financial support for the cluster's operations, infrastructure development, and workforce training through the funding of national collaborative research projects.

Also, the Danish cluster cooperates with the Ministry of Defense procurement, logistic and repair agencies etc. to identify develop and recommend appropriate supplier and sub-contractor capability, as part of its efforts to promote innovation and entrepreneurship in the defense, space, and security industries. The cluster brings together a range of stakeholders, including firms, research institutions, and government agencies, to collaborate on research and development projects, business development and investment opportunities.

The cluster provides access to funding, expertise, and infrastructure that would be difficult for individual firms to obtain independently. In addition, the close relationships between the firms and the government can lead to knowledge sharing and innovation, which can benefit the entire cluster.

Table 2. Main characteristics of the CenSec Cluster, according to Markusen's typology

CenSec			
Cluster's Members	**Innovation**	**Governmental Institutions**	**Co-operation with companies and/ or other entities not part of the cluster**
Private companies, knowledge institutions, and public authorities	CenSec facilitates various collaborative projects with Danish knowledge institutions, collaborating with various universities, research institutions, and knowledge networks to support innovation and development in the defense, space, and security sectors.	Cooperate with the Ministry of Defense procurement, logistic and repair agencies etc.to identify develop and recommend appropriate supplier and sub-contractor capability CenSec is an Inno-Sec, funded by the Danish Ministry of Higher Education and Science CenSec was appointed by the Danish Ministry of Higher Education and Science and the Danish Board of Business Development to be the national Danish cluster for defence, space and security	CenSec has received funding by the European Defence Fund (EDF) and other EU-Funded programs CenSec is also a member of several E.U. networks and initiatives related to defense, space, and security

Source: Author's estimations and evaluation

The ministry can provide funding and support for research and development projects that are strategically important to the ministry and the firms, leading to innovations and products. In addition, the ministry can provide access to government contracts and procurement opportunities, which can be important sources of revenue for firms in the cluster. The close collaboration between the two helps to ensure that the cluster's activities are aligned with the ministry's goals and objectives.

Moreover, in 2018, CenSec was approved by the Danish Ministry of Higher Education and Science to also become a national Innovation Network for Security (Inno-Sec) and was appointed by the Danish Ministry of Higher Education and Science and the Danish Board of Business Development to be the national Danish cluster for defence, space and security.

Overall, CenSec can be characterized as a state-anchored cluster because it relies on the support and resources provided by the Danish government to promote innovation and entrepreneurship in the defence, space, and security industries. Nevertheless, some characteristics of CenSec are not endemic to the state-anchored clusters. CenSec plays a significant role in promoting E.U. funding and innovation initiatives within the local defence industry. It positions itself as a mediator between local defence companies and E.U. institutions, giving a distinct "E.U. flavor" to the cluster. CenSec is dedicated to facilitating the development and advancement of strategic alliances between the local industry and E.U. institutions. It seeks to be a focal point and catalyst for these collaborations, promoting understanding and encouraging co-operation among all parties involved. The E.U. flavor of CenSec, also, aligns with the concept of "smart specialization." This concept stresses the significance of associating regional innovation strategies with E.U. policies and programs, as highlighted by Foray and colleagues in their 2012 work.

4. Discussion

In this study, we delved into the intricate landscape of industrial clusters, focusing on the Danish Defence Space and Security (CenSec) cluster, and sought to categorize it within the framework of Markusen's typology. Our primary hypothesis was that CenSec embodies the characteristics of a state-anchor cluster, given the decisive role of the Danish government due to the nature of the defense industry. As the discussion unfolds, it becomes evident that CenSec indeed aligns with the concept of a state-anchored cluster, given its symbiotic relationship with the Danish government and the crucial support it receives in terms of funding, infrastructure, and workforce training.

One of the significant contributions of this paper focuses and lies in highlighting the multifaceted nature of industrial clusters and the implication this has in the broader European business and innovation ecosystem. To achieve this, we expanded the conventional understanding of clusters beyond mere physical co-location, emphasizing the quality and degree of interactions and relationships among firms and institutions. This nuanced perspective allowed us to recognize the unique characteristics of the defense industry, where collaboration, innovation, and competitiveness are deeply intertwined with government support and policies.

Equally important our findings underscore the pivotal role of the E.U. in shaping the trajectory of industrial clusters, as we shed light in the "E.U. flavor" of the CenSec cluster, which mainly refers to its role in promoting E.U. funding and innovation initiatives within the local defence industry and its efforts to facilitate strategic alliances between local companies and E.U. institutions. This is significant because it highlights the importance of E.U. policies and programs in shaping the development of the cluster. In a study of innovation in state-anchored clusters in Denmark, Lundvall and Sørensen (2004) argue that government support and intervention can benefit clusters, particularly in terms of providing resources and creating an environment that encourages innovation. However, they also note that state-anchored clusters can be subject to limitations and challenges, such as a lack of responsiveness to market demands. In the case of CenSec, the cluster's collaboration with E.U. institutions and promotion of E.U. funding initiatives can help to mitigate some of these limitations by providing access to broader markets, innovative ecosystems, and resources. This is consistent with the concept of "smart specialization," which emphasizes the importance of aligning regional innovation strategies with E.U. policies and programs (Foray *et al.* 2012). Moreover, CenSec's role as a mediator between local companies and E.U. institutions is in line with the E.U.'s broader efforts to promote cross-border collaboration and innovation. For example, the E.U.'s Horizon 2020 program and the European Defence Fund (EDF) program aim to support innovation and collaboration across the E.U. through funding and other initiatives. Overall, the E.U. flavor of the CenSec cluster reflects its integration into broader E.U. innovation and collaboration initiatives. Highlights the importance of aligning national strategies with E.U. policies and programs, creating a sue generis situation where governmental and pan-European strategies and considerations coexist.

Finally, it is equally important to acknowledge the limitations of our study and to suggest further topics of elaboration that could facilitate the better understanding of the phenomena studied in this paper. One significant constraint lies in the scope of our analysis, which focuses specifically on the dynamics of CenSec. A more extensive understanding of the complexities of cluster collaborations could be achieved through a comparative study involving multiple clusters across diverse E.U. countries. Comparing different clusters allows for the identification of commonalities and divergences in collaborative strategies, government interventions, and industry-specific challenges, offering a wealth of insights and findings for further elaboration and study. Additionally, a more extensive study could involve longitudinal analysis, tracking the evolution of cluster/s over time. Such an approach would provide valuable insights into the sustainability and adaptability of collaborative models, helping to identify and analyse patterns, challenges, and successful strategies that emerge over the years.

Conclusions and Further Research

The aim of this paper is to investigate and identify which of the four types of industrial clusters described by Markusen, CenSec cluster belongs to, thus using a case study as a main tool to investigate the key question set. Despite the inherent challenge of generalizing findings from a single case study to larger populations or diverse contexts, this study has managed to overcome the associated limitations, as the specificity of our case, centered around the CenSec cluster, does not limit the broader applicability of our conclusions. In fact, the implications of our study stretch far beyond the defense industry, encompassing diverse sectors and international collaborations. The findings actually highlight the importance of nurturing collaborative ecosystems in an intra E.U. level, suggesting that similar strategies could be applied in other strategic sectors.

Moreover, the significance of our study extends far beyond its academic context, reaching policymakers, industry leaders, and scholars alike:

- For policymakers, our study offers crucial insights into the role of government support in fostering industrial clusters, particularly in the sensitive domain of national security. This is examined in close correlation with the E.U. innovation ecosystem, thus providing guidance to policymakers on integrating their initiatives/ institutions/ governmental entities within the broader European frameworks. Though this process a broader pan/inter European process could be facilitated that will allow for the identification of synergies and the maximization of impact.
- For industry leaders, our study serves as a blueprint for successful collaboration and innovation strategies. Recognizing the importance of collaboration in advancing innovative solutions within the defence

sector, industry leaders could understand the impotence of knowledge exchange, seeking to create synergies that will benefit not only their own business entities but also the wider defence research and innovation ecosystem.

- Last but not least our study contributes to the academic discourse on industrial clusters, offering a nuanced perspective that expands the conventional understanding of these economic entities. Through our comprehensive exploration of theoretical approaches, and the study of the CenSec cluster, we have successfully provided an extra "flavor" to the traditional concept of a cluster, and we propose a definition that goes beyond the geographical concentration of firms and institutions, encompassing the qualitative aspects of their interactions, relationships, and the unique attributes of their respective industries. This expanded definition operates synergistically with existing theories, rather than contradicting them. In essence, the results of our study serve as a collateral addition to the comprehensive understanding of clusters, shedding light on the intricate web of interactions and relationships that define their importance and functions.

As already mentioned, a future research direction could potentially try to provide further elaboration to the phenomena studied by providing a comparative study involving multiple clusters across diverse E.U. countries. Such an approach could potentially validate and reinforce our current findings and also uncover sector-specific nuances on cluster dynamics and international cooperation. Longitudinal studies tracking the evolution of clusters over extended periods could also provide insights into their sustainability and adaptability in the face of economic, political, and technological changes, thus providing another decisive future research direction.

Towards that direction, a rather insightful and radical aspect could also be to delve into the integration of emerging technologies, such as artificial intelligence, within collaborative ecosystems, similar to the one described in this paper, assessing how these new technologies could facilitate information exchange, and streamline collaborative efforts. Obviously, this represents a significant and challenging avenue for future research, mainly due to the fact that a multidisciplinary approach is needed in which researchers across fields like computer science, engineering, social sciences, and policy studies should collaborate. Despite the complexity, exploring this intersection holds the potential for groundbreaking insights. In this context, several pivotal research questions emerge, aiming to unravel the complexities of this transformative synergy, such as this one: "*How can artificial intelligence enhance the understanding of complex collaborative networks, aiding policymakers and industry leaders in strategic planning"?*

Such an approach could also "multiple" the practical applications for the results of this study, by facilitating the easier integration of a bigger set of results and/or date. Nevertheless, even without this very radical but also difficult to elaborate aspect, our study has profound practical applications across various domains, offering actionable guidance to policymakers, industry leaders, and collaborative initiatives. In essence, our conclusions offer a steppingstone for future research, policy formulation, and practical applications, opening doors to a multitude of future endeavors.

Credit Authorship Contribution Statement

Vasileios Kyriazis: Conceptualization, Investigation, Methodology, Software, Formal analysis, Writing – original draft, Data curation, Validation).
Theodore Metaxas: Project administration, Supervision, Writing – review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Ahedo, M. 2003. Cluster policy in the Basque country (1991–2002): constructing 'industry–government' collaboration through cluster-associations. *European Planning Studies*, 12(8): 1097-1113. DOI:https://doi.org/10.1080/0965431042000289232

[2] Balakrishnan, K. and Johar, T. N. 2023. The Role of Stakeholders in Managing Government Research and Development Funding for Defence Industrial Innovation: The Case of Malaysia, *Defence and Peace Economics*, 34 (8): 1110-1129. DOI: https://DOI:10.1080/10242694.2022.2100588

[3] Barbieri E., Tommaso, M. Di and Huang, M. 2010. Industrial Development Policy and Innovation in Southern China: Government Targets and Firms' Behaviour. *European Planning Studies*, 18 (1): 83-105, DOI:https://doi.org/10.1080/09654310903343542

[4] Belin J., Droff, J. and Malizard, J. 2017. The Economics of European Defense: Some Additional Insights. *Armament Industry European Research Group (Ares Group)*.

[5] Belin, J., and Guille, M.2008. Defence and firm financial structure in France. *Review of Financial Economics*, 17 (1): 46–61. DOI: https://doi.org/10.1016/j.rfe.2007.02.002

[6] Bell, S., Tracey, P. and Heide, J. 2009. The Organization of Regional Clusters. *The Academy of Management Review*, 34 (4): 623-642.

[7] Belussi, F. 2015. The international resilience of Italian industrial districts/clusters (ID/C) between knowledge re-shoring and manufacturing off (near)-shoring. *Investigaciones Regionales – Journal of Regional Research*, 32: 89-113.

[8] Belussi, F. and Caldari, K. 2009. At the origin of the industrial district: Alfred Marshall and the Cambridge school. *Cambridge Journal of Economics*, 33 (2): 335–355. DOI: https://doi.org/10.1093/cje/ben041

[9] Bianchini, F. 1991. The Third Italy: Model or Myth? *Ekistics,* 58 (350/351): 336–345.

[10] Boja, C. 2011. Clusters Models, Factors and Characteristics. *International Journal of Economic Practices and Theories*, 1(1): 34-43.

[11] Boschma, R. and Ter Wal, A. 2007. Knowledge networks and innovative performance in an industrial district: the case of a footwear district in the South of Italy. *Industry and Innovation*, 14 (2): 177–199. DOI:https://doi.org/10.1080/13662710701253441

[12] Boschma, R. 2000. An empirical analysis of the industrial rise of the Third Italy paper to be presented at the 40th Congress of the European Regional Science Association 30 august – 2 september 2000, Barcelona, Spain.

[13] Breschi, S. and Malerba, F. (Eds.) 2005. *Clusters, Networks, and Innovation*. Oxford University Press.

[14] Camporini, V., Hartley, K., Maulny, JP. and Zandee, I.2017. "European Preference, Strategic Autonomy and European Defence Fund." #22 - Report, ARES Group.

[15] Carbonara, N. 2002. New models of inter-firm networks within industrial districts. *Entrepreneurship and Regional Development,* 14 (3): 229-246. DOI: https://doi.org/10.1080/08985620210136027

[16] Clark J., Huang, HI and Walsh, JP 2009. "A Typology of "Innovation Districts": What it means for Regional Resilience." Industry Studies Annual Conference May 28-29, 2009, University of Illinois at Chicago, Chicago, Illinois.

[17] Clift, B. and Woll, C. 2012. Economic patriotism: reinventing control over open markets. *Journal of European Public Policy,* 19 (3): 307–323. DOI: https://doi.org/10.1080/13501763.2011.638117

[18] Cooke, P. and Morgan K. 1998. The automotive components industry and the regional economy: a case study of the West Midlands. *Regional Studies*, 32(5): 467-479. DOI: https://doi.org/10.1080/02690949908726458

[19] Cumbers, A., Mackinnon, D. and Chapman, K. 2003. Innovation, collaboration, and learning in regional clusters: a study of SMEs in the Aberdeen oil complex. *Environment and Planning A*, 35: 1689 - 1706. DOI:https://doi.org/10.1068/a35259

[20] Duranton, G. and Puga, D. 2004. Micro-foundations of urban agglomeration economies. *Handbook of regional and urban economics*, 4: 2063-2117. DOI: https://doi.org/10.1016/S1574-0080(04)80005-1

[21] Eliassen K. and Sitter, N. 2006. Arms Procurement in the European Union: Achieving Mission Impossible? Paper for the Third Pan-European Conference on EU Politics, 21-23 September 2006, Istanbul, Panel: Security and Military Issues in Contemporary Europe, ISSN 1500-2683.

[22] Ferreira MP. and FAR Serra 2009. Open and closed industry clusters: The social structure of innovation. *Revista de Administração e Contabilidade da Unisinos*, 6 (3): 193-203. DOI:https://doi.org/10.4013/base.2009.63.01

[23] Foray, D., David, PA and Hall, B. 2012. Smart specialization--the concept. *Knowledge Economists Policy Brief*, 7: 1-12.

[24] Ghent Mallett, J. 2004. Silicon Valley North: The Formation of the Ottawa Innovation Cluster. *Technology, Innovation, Entrepreneurship and Competitive Strategy*, 9: 21–31. Available at SSRN: https://ssrn.com/abstract=1497297

[25] Gomis, R. and Carrillo, J. 2016. The role of multi-national enterprises in the aerospace industry clusters in Mexico: The case of Baja California. *Competition and Change*, 20 (5): 337-352. DOI:https://doi.org/10.1177/1024529416656511

[26] Gordon, I. R. and McCann P. 2000. Industrial Clusters: Complexes, Agglomeration and/or Social Networks? *Urban Studies*, 37 (3): 513–532. DOI: https://doi.org/10.1080/0042098002096

[27] Gray, M. Golob, E. and Markusen, A.1996. Big Firms, Long Arms, Wide Shoulders: The 'Hub-and-Spoke' Industrial District in the Seattle Region. *Regional Studies*, 30 (7): 651-666. DOI:https://doi.org/10.1080/00343409612331349948

[28] Guerrieri, P. and Pietrobelli, C. 2000. "Models of industrial districts' evolution and changes in technological regimes." Prepared for the DRUID Summer Conference "The Learning Economy. Firms, Regions and Nation Specific Institutions", Rebild / Aalborg University, Denmark, June 15-17, 2000, The research leading to this paper has been supported by the European Commission through the DGXII TSER Project «SMEs in Europe and East Asia: Competition, Collaboration and Lessons for Policy Support» (Contract No. SOE1CT97-1065).

[29] Hans-Joachim, B., Cooke, P. and Heidenreich, M. 1998. *Regional Innovation Systems: The Role of Governances in a Globalized World*. Routledge; 1st edition, London.

[30] Hayward, K. 2001. The globalisation of defence industries. *Survival*, 43(2): 115-132. DOI:https://doi.org/10.1093/survival/43.2.115

[31] He, J. and Fallah, H. 2011. The typology of technology clusters and its evolution — Evidence from the hi-tech industries. *Technological Forecasting and Social Change,* 78 (6): 945-952. DOI:https://doi.org/10.1016/j.techfore.2011.01.005

[32] Heidenkamp, H. Louth J. and Taylor, T. 2013. The Defence Industrial Triptych – Government as Customer, Sponsor and Regulator, RUSI Whitehall Paper No. 81, Taylor and Francis: London.

[33] Hervas-Oliver, L., Sempere-Ripoll, F., Estelles-Miguel, S. and Rojas-Alvarado, R. 2019. Radical vs incremental innovation in Marshallian Industrial Districts in the Valencian Region: what prevails? *European Planning Studies*, 27 (10): 1924-1939. DOI: https://doi.org/10.1080/09654313.2019.1638887

[34] Jankowiak, A. 2012. The Cluster initiatives and the role of government in the development of clusters. Challenges of the global economy, Working Papers Institute of International Business University of Gdansk 2012, no. 31.

[35] Jankowska, B., Götz, M. and Główka, C. 2017. Intra-Cluster Cooperation Enhancing SMEs' Competitiveness - The Role of Cluster Organisations in Poland. *Journal of Regional Research*, 39: 195-214.

[36] Karaev A., Koh, SCL and Szamosi, LT 2007. The cluster approach and SME competitiveness: a review. *Journal of Manufacturing Technology Management*, 18 (7): 818-835. ISSN: 1741-038X

[37] Keeble D. and Wilkinson, F. 1999. Collective Learning and Knowledge Development in the Evolution of Regional Clusters of High Technology SMEs in Europe. *Regional Studies*, 33 (4): 295-303. DOI:https://doi.org/10.1080/00343409950081167

[38] Keohane, D. and Valasek, T. 2008. Willing and Able? EU Defense in 2020, Centre for European Reform: London, ISBN 978 1 901229 84 4.

[39] Krause, K. 1992. *Arms and the State: Patterns of Military Production and Trade*. Cambridge: Cambridge University Press.

[40] Krugman, P. 1991. Increasing returns and economic geography. *Journal of Political Economy*, 99 (3): 483-499. DOI: https://doi.org/10.1086/261763

[41] Kudrina, O. Klius, Y. and Y. Ivchenko, Y 2023. The role of innovation clusters for the sustainable development of the region. *Baltic Journal of Economic Studies*, 9 (1): 82-88. DOI:https://doi.org/10.30525/2256-0742/2023-9-1-82-88

[42] Lan, W. and Kai, W. 2009. The Multilevel Gray Evaluation of Innovation Capability of Hub-and-Spoke Enterprise Clusters, 2009 International Conference on Information Management, Innovation Management and Industrial Engineering. Print ISBN:978-0-7695-3876-1

[43] Lundvall, BÅ and Sørensen, JB 2004. Science, technology and innovation policy. *In The Handbook of Innovation*: 599-631. Oxford: Oxford University Press. ISBN (Print) 0199264554

[44] Malipiero, A., Munari, F. and Sobrero, M. 2005. Focal firms as technological gatekeepers within industrial districts: Evidence from the Packaging Machinery Industry. DRUID Working Paper No. 5: 10-18. DOI:http://dx.doi.org/10.2139/ssrn.717702

[45] Markusen, A. and Park SO 1993. The state as industrial locator and district builder: the case of Changwon, South Korea. *Economic Geography*, 69: 157-81. DOI: https://doi.org/10.2307/143534

[46] Markusen, A. 1996. Sticky Places in Slippery Space: A Typology of Industrial Districts. *Economic Geography*, 72 (3): 293-313. DOI: https://doi.org/10.2307/144402

[47] Martin, R and Sunley, P. 2003. Deconstructing clusters: Chaotic concept or policy panacea? *Journal of Economic Geography*, 3: 5-35. DOI: https://doi.org/10.1093/jeg/3.1.5

[48] McKenzie, KJ., Nica, M., Roman, M. and Petrea, R. 2017. State-anchored clusters and economic development policy. *International Journal of Public Administration in the Digital Age* 4 (2)

[49] Moravcsik, A. 1991. Arms and Autarky in European History. *Daedalus,* 120 (4): 23-46.

[50] Morgan, R. and Hunt, S.1994. The Commitment-trust theory of relationships marketing. *Journal of Marketing*, 57 (3): 20-38. DOI: https://doi.org/10.2307/1252308

[51] Morrison, A. Rabellotti R. and Zirulia, L. 2012. When Do Global Pipelines Enhance the Diffusion of Knowledge in Clusters? *Economic Geography*, 89 (1): 77–96. DOI: https://doi.org/10.1111/j.1944-8287.2012.01167.x

[52] Müller, L., Zombori, Z. and Meier Zu Koecker, G. 2012. European Clusters Go International Networks and clusters as instruments for the initiation of international business cooperation. *Journal of Applied Economics and Business Research*, 2(2): 83-103.

[53] Munnich, L., Love, P. and Clark, J.1999. Industry Clusters: An Economic Development Strategy for Minnesota, Technical Report. Accessed online: (PDF) Industry Clusters Study for Southwest Minnesota (researchgate.net)

[54] Nelsen, L. 2005. Perspectives on biotechnology clusters. *Nature Reviews Drug Discovery*, 4(9): 776-776.

[55] Pietrobelli, C. 2002. Industrial Districts' Evolution and Technological Regimes: Italy and Taiwan, prepared for the International Conference on SCIENCE, TECHNOLOGY AND INNOVATION, Emerging International Policy Issues, Harvard University, Cambridge, Massachusetts, USA, 23-24 September 2002.

[56] Porter, ME. 1990. The Competitive Advantage of Nations. *Harvard Business R*eview, 73-91, March-April

[57] Randelli, F. and Lombardi, M. 2014. The Role of Leading Firms in the Evolution of SME Clusters: Evidence from the Leather Products Cluster in Florence. *European Planning Studies*, 22 (6): 1199-1211. DOI:https://doi.org/10.1080/09654313.2013.773963

[58] Rugman, AM. and Verbeke, A. [Eds] 2003. Multi-national Enterprises and Clusters: An Organising Framework, in Mahnke V., Pedersen T., *Governing Knowledge-Processes. Management International Review*, vol 3, Gabler Verlag.

[59] Seeley, E. 2007. Modeling the Propensity for Industry Clustering. *Journal of Business Inquiry: Research, Education and Application*, 6 (1): 64-71.

[60] Seeley, E. 2011. A New View on Management Decisions that Lead to Locating Facilities in Industrial Clusters. *The Journal of Business Inquiry*, 10 (1): 81-94.

[61] Singh, RK, Garg, S. and Deshmukh, SG 2008. Strategy development by SMEs for competitiveness: A review. *Benchmarking Int. Journal*., 15: 525–547. DOI: https://doi.org/10.1108/14635770810903132

[62] Singh, RK, Garg, S. and Deshmukh, SG 2010. The Competitiveness of SMEs in a globalised economy: Observations from China and India. *Management Research Review*, 33: 54-65. DOI:https://doi.org/10.1108/01409171011011562

[63] Smith, D., and Ibrahim, G. 2006. Cluster Dynamics: Corporate Strategy, Industry Evolution and Technology Trajectories – A Case Study of the East Midlands Aerospace Cluster. *Local Economy*, 21 (4): 362–377. DOI:https://doi.org/10.1080/02690940600952004

[64] Stake, RE. 1995. *The art of case study research*. Sage Publications.

[65] Waltz, K. 1979. *Theory of International Politics*. New York: McGraw-Hill.

[66] Wang, M, Zhang, M., Chen, H., and Yu D. 2023. How Does Digital Economy Promote the Geographical Agglomeration of Manufacturing Industry? *Sustainability*, 15(2): 1727. DOI:https://doi.org/10.3390/su15021727

[67] Yin, R. 2013. *Case study research: Design and methods*. Thousand Oaks, CA: Sage, ISBN: 9781452242569

[68] Zhong, Q and Tang, T. 2018. Impact of Government Intervention on Industrial Cluster Innovation Network in Developing Countries. *Emerging Markets Finance and Trade*, 54 (14): 3351-3365. DOI:https://doi.org/10.1080/1540496X.2018.1434504

[69] CENSEC, (2020, April 15). ASSETS alliance for strategic skills: Adressing emerging technologies in defence [Blog post]. Retrieved March 15, 2023, from https://censec.dk/blog/2020/04/15/assets-alliance-for-strategic-skills-adressing-emerging-technologies-in-defence/

[70] CENSEC, Netværk [Network]. Retrieved March 15, 2023, from https://censec.dk/netvaerk-2/

[71] CENSEC, Samarbejdsprojekter [Collaborative projects]. Retrieved March 14, 2023, from https://censec.dk/samarbejdsprojekter/?doing_wp_cron=1678103549.8659210205078125000000

[72] CENSEC. (2023). Medlemsfolder Online Vinter 2023 [PDF file]. Retrieved March 14, 2023, from https://censec.dk/wp-content/uploads/2023/02/Medlemsfolder-online-vinter-2023.pdf.

[73] CENSEC. (n.d.). Vores medlemmer [Our members]. Retrieved March 13, 2023, from https://censec.dk/medlemmer

[74] European Cluster Collaboration Platform, Retrieved March 17, 2023, from https://profile.clustercollaboration.eu/profile/cluster-organisation/6cb00a31-184c-42a6-9400-7216b7738bfe

[75] European Cluster Collaboration Platform. (2021, September 30). CENSEC receives funding from the European Defence Fund for the project RoLiAC. Retrieved March 13, 2023, from https://clustercollaboration.eu/community-news/censec-receives-funding-european-defence-fund-project-roliac

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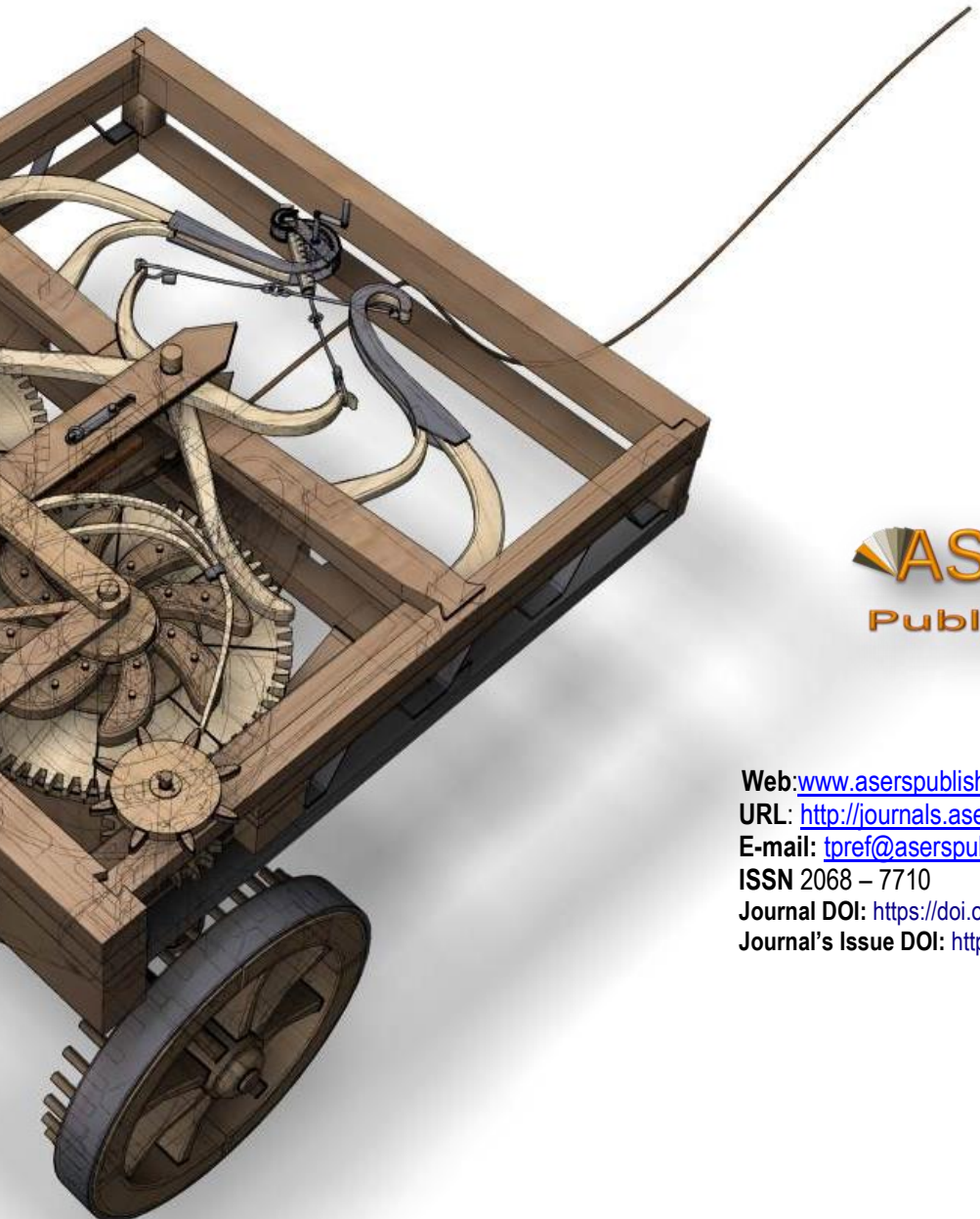

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