MAIN DIRECTIONS OF DEVELOPMENT IN THE DEFENCE INDUSTRY SECTOR IN THE ASPECT OF GLOBALIZATION

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Abstract

The defence industry is one of the demanding elements of the economy. The European defence market brings together many entities operating in various economic forms. Each of these entities operates under conditions of strong competition requiring large capital expenditures. The main directions observed is the integration of member states in the field of security and defence and the concentration of defence industry, which main objective is to strengthen the European industrial and technological base, international approach to program implementation research and production, and above all, avoiding the multiplication of identical research programs and technological competence as well as seeking opportunities to reduce production costs. Due to the high costs of developing new military technologies, the vanishing of the defense sector's territorial division and the merging of US, European and others of the world cannot is highly probable. At the beginning, probably in individual projects, as technology develops, consolidation can be permanent.

Keywords: Defense industry; Collaboration; Globalization; Defense and security; International projects.

1. Introduction

The defence industry is one of the most capital-intensive and labour-intensive sector of the economy. In 2014, the turnover on the defence market among enterprises operating in the European Union amounted to EUR 97.3 billion. In addition, production, maintenance and overhauls of military equipment as well as research and development in the field of defence and security generate 0,5 million direct and 1.2 million indirect jobs (European Parliament, 2018). Since 2010, the expenditure of EU member states in the area of defence and security they do not reach a level lower than USD 270 billion; moreover, since 2014, the expenditures have been systematically growing, reaching a level of approximately USD 285 billion in 2017 (Beraud-Sudreu, 2018).

The European defence market brings together many entities operating in various forms of economic activity, beginning with small sole trader's enterprises and ending with large corporations with the majority share of the state treasury. Each of these entities operates under conditions of strong competition and specialized production, requiring large capital

expenditures (research and development, intellectual potential, know-how). Realisation of public contracts in the fields of defence and security area have a specific character where holders of budgetary funds equally focus on tactical and technical characteristics and the quality of purchased military equipment as well as security of supply and availability of maintenance potential, binding parties to the contract, often for many years. Highly specialized production, mainly in the high-tech area, makes the European defence market an oligopoly, on the one hand, where only a small part of enterprises are able to cope with the economic and intellectual challenges of modern military equipment (small enterprises play the role of subcontractors) and, on the other hand, monopsony recipients drastically limit the market.

The main tendencies observed since the end of the 20th century is the integration of member states in the field of security and defence and the concentration of defence sector enterprises, both on the EU market and national markets. The main objectives are (1) to strengthen the European industrial and technological base of the defence sector, (2) to establish an international approach to program implementation research and production, (3) to avoid the multiplication of identical research programs and technological competence as well as (4) to seek opportunities to reduce production costs, including through outsourcing and offshoring.

The purpose of this article is to analyse the main tendencies – integration and off-shoring – of changes of actors from defence and governmental side in the European defence sector resulting from globalization as well as to define factors that affect the defence economy sector which can be observed from the end of 20th century.

Due to the nature of the work, the following research methods will be used in this paper: content analysis and data analysis, as well as a historical-comparative method. These methods will be used for in-depth analysis of available data. The comparative and descriptive method will fulfil the main role. Hence, an analysis of phenomena taking place in the European defence sector of the economy will be carried out.

This article will firstly examine the phenomenon globalization, subsequently, the two main tendencies of change will be analysed, following by highlighting the factors that affect this sector and lastly conclusions will be presented..

2. Globalisation

Under the concept of globalization of the economy different elements are comprised such as the processes of organizing and conducting production, exchange and flows of capital on a global scale and treating entities by the whole of the world as the one common market. The factors determining the economic development of the processes of economic globalization are:

- the development of technical means of communication,
- liberalization of foreign trade,
- reduction of barriers, aiming to improve flow of goods and capital (Winiarski, 2006).

According to G. Kołodko (2003), globalization is understood as a historical process of liberalization and in the wake of this accelerating integration, previously largely in the isolation of functioning commodity markets, capital and, to a lesser extent, labour force in one commodity market. Thus, as a result of the process of globalization, elements of the global economic organism are emerged, which is connected by numerous bonds.

From G. Shangquan (2000) perspective, economic globalization refers to the increasing interdependence of world economies as a result of the growing scale of cross-border trade of commodities and services, flow of international capital and wide and rapid spread of technologies.

Analysing above definitions of the phenomenon, it can be concluded that the main element conditioning the process of globalization is the integration of entities thanks to the liberal organizational bases and appropriate technological conditions.

Globalization is a multifaceted process of the wide spectrum of human activity, where the most visible sphere will be the economic space, but the international flows of ideas, people, cultures, social models, religions have a significant impact on every area of human activity.

Analysing statistical data, it can be concluded that global trade and capital flows at the turn of the 20th and 21st centuries were growing at a faster pace than the global product. In the intervening years 1980-2006, there was almost a six-fold increase in global exports of goods, while the value of global GDP increased four times. The value of foreign direct investments in 1980 was 4.7% of the worldly GDP, while in 2005 it increased to 20.7%. Sales of multinational enterprises reach a value that is twice as high as global trade (Polish Ministry of Economic Affairs, 2007).

As noted by G. Kołodko (2003), globalization processes should be looked at objectively. Therefore, globalization should not only be comprehended as new markets, sales, growth and transfer of technologies, but also as the marginalization of less developed entities and the collapse of existing enterprises, which as a result of historical and political factors, do not have adequate technological facilities to compete with economic giants on the open market.

However, from the other hand, integration and cooperation creates additional opportunities for all entities participating in the market, including those that are at a relatively lower level of economic, organizational, and technological development. However, it should be borne in mind that the opening of markets also brings additional risks, the amount of which is determined by the adopted strategy of economic development.

The increase of exchange between economies, the increase in the liberalization and integration of trade markets, deregulation of capital flows, and above all the unification of laws that determine a given business activity significantly affect the course of action and conditions of enterprises operational activity. Globalization of the economy leads to wide activity, which is manifested by the dispersion of production in order to seek ways to reduce operating costs.

In conditions of highly specialized production, the main determinant of production is knowledge; therefore, companies can flexibly choose the location of the production lines, without being dependent on primary products and energy. In addition, the technological progress in the area of communication made it possible to divide the production process, including its fragmentation and placement in various places around the world, as well as the involvement of a wide range of subcontractors.

As mentioned before, globalization is a phenomenon that carries with it a certain risk, however, with regard to the economic sphere of advantages, it is much more than disbenefits and should be considered as a positive economic process. Such a position can be justified by the following advantages:

- it creates conditions for cooperation of entities in the creation of economic and legal programs,
- it will enable the development of multinational enterprises,
- it gives the possibility of unlimited transfer of technology and the flow of labour,
- it drives the development of transport and communication.

3. The impact of globalization on the defence sector

As other sectors in the EU, the defence sector was heavily influenced by globalization. The characteristics of this phenomenon affecting this specific sector are the strive for joint actions and off-shoring.

3.1. Striving for joint action

The EU aims at joint actions in order to strengthen the industrial and technological base and to find synergy in the aspect of implementing technologically advanced defence programs. One of the best example of an international approach to the implementation of joint design and construction of military equipment was the program for the construction of the European multi-role aircraft Eurofighter Typhoon. The program was implemented as a part of the cooperation between Germany, Italy, Spain and the United Kingdom by the Eurofighter GmbH holding from three European companies: Alenia Aeronautica, BAE Systems and EADS. The program was the largest and one of the first joint armament programs carried out on the European continent, which was a success and resulted in the establishment of permanent cooperation of EU countries in the field of military equipment production. Through the implementation of cooperation, the following benefits have been achieved in a wide range of fields in the area of economics and technology.

1. About 105,000 highly qualified employees in the armaments sector were involved in the Typhoon program (Germany - 20,000, Italy - 20,000, Spain - 25,000, WB - 40,000).
2. The sub-suppliers sector covered around 50,000 jobs.
3. The aircraft has been designed in such a way as to meet the design assumptions and battle space requirements for 40-45 years. This period of aircraft life cycle generates permanent employment over the years for some employees participating in the project.
4. The high level of technological advancement of the program required high qualifications involved in the project engineers and additionally stimulated the development of many technologies, including management, software, and pilot training system.
5. Earnings of people employed in the implementation of the project were higher by 60% than average earnings in the EU.
6. Many of the applied solutions have been directly implemented into other branches of production (automotive, electronic, construction of Airbus A380 aircraft). The technology of carbon composites developed during the project, flexible connection of composite materials or integrated avionics has been applied (spill-over effect) in civil flight control systems, jet engine technology and the automotive market, among others in Formula 1 cars - Ferrari and McClaren. These technologies have been estimated at EUR 7.2 billion (Hartley, 2006).

The implementation of the joint project was key to building self-sufficiency and autarkic abilities in the area of high-tech equipment. Additionally, through the use of modern models of project management and supervision of the institution representing NATO governments (NETMA - NATO Eurofighter and Tornado Management Agency), the program achieved high efficiency (costs increased by 14% compared to planned ones, while delivery time was delayed by 54 months if compared to a project implemented only by one country - USA, F/A 22 where costs increased by 127%, while the delay was 117 months) (Hartley, 2006).

The above program, particularly the achieved benefits, was crucial for the future perspective of the defence sector, both in relation to the manufacturing branch as well as the Member States administrations.

Great Britain, France, Germany and Italy in 1996 signed an agreement on the establishment of the Organisation for Joint Armament Cooperation OCCAR (*Organisation Conjointe de Cooperation en Matiere d'Armamnet*). Subsequently Belgium and Spain joined the agreement. Currently, the range of countries involved in joint programs consists of 13 Member States. Abovementioned countries form part of a permanent agreement, while the Netherlands, Turkey, Poland, Sweden, Finland, Lithuania and Luxembourg cooperate in various armaments

programs without having the status of a member of the agreement. Since the beginning of the OCCAR activity, the portfolio of operational programs of armaments has increased to 13 complicated projects, the implementation of which will absorb EUR 60 billion (OCCAR, 2018). In 2018, the organization will allocate over EUR 3 billion to finance technical modernization of the member states armed forces. The result of OCCAR's work is the implementation of the following projects:

- tactical and strategic airlifter Airbus A400M,
- Eurocopter Tiger combat helicopter,
- FREMM multi-mission frigates,
- surface to air antimissiles FSAF - PAAMS,
- counter battery radar – advanced weapon locating system COBRA,
- multirole armoured vehicles BOXER
- The European secure software defined radio ESSOR,
- multinational space-based imaging system MUSIS,
- LSS logistics support ship,
- European medium altitude long endurance remotely piloted aircraft system MALE RPAS,
- MMCM maritime mine counter measures,
- multinational multi role tanker transport aircraft fleet MMF,
- multirole offshore patrol vessel PPA.

Each of the above projects brings together from several to dozen member states in a joint effort, enabling them to participate in organizational and technical as well as production terms by invoking elements of national economies in order to mobilize defence enterprises, acquire innovative technological capabilities and seek new cooperation opportunities. It is worth noting that in the case of the French-Italian FREMM frigates project, the Italian government is facing the lack of sufficient financial resources, but due to the overwhelming benefits of the implementation of the program, i.e. substantial economic and employment benefit not only for navy shipyards, but also for subcontractors, the government decided to take out a loan from the Ministry of Industry instead of financing the purchase of the said frigates from the national defence budget (Defence Industry Daily Staff, 2008). Besides, it is indicated that it is more profitable to finance the mentioned armament project even in the perspective of increasing the budget deficit.

On 12 July 2004, the European Defence Agency (EDA)[1] officially launched its activity, which on the basis of successes of OCCAR was the embodiment of the ideas of Robert Schumann, Jean Monnet and Konrad Adenauer on the level of defence cooperation, but it was also the response of EU Member States to the challenges of globalization on the armaments market. The main assumption of EDA is to implement the vision of the European armaments market and the wide cooperation of Member States on the basis of the production of new weaponry systems. However, due to the limited tools and various threats to the sovereignty of individual member states, EDA activities at this stage consist in simplification of the search for the armaments which are suitable for each states requirement (Turczyński, 2014).

In implementing the Common Security and Defence Policy, 23 EU Member States signed a notification on permanent structured cooperation - PESCO on November 13, 2017 (European

[1] In July 2014, the European Council approved the plan for the establishment of the EDA, however the actual activity began at the beginning of the next year, by the end of 2004, the 2005 budget was adopted, and the structure and rules of the Agency's operation were built.

Council, 2017). Countries participating in PESCO approved in December 2017 a declaration on the first 17 projects that will be implemented under this instrument. The projects are run by leading countries, from a few to a dozen participating countries, and several countries with observer status. They are an attempt to strengthen cooperation in specific areas with each different composition of participants. The projects are divided into two categories - some aim to increase the possibilities of participating in EU missions and operations (eg. European Medical Headquarters). The second is to support the development of military capabilities (such as the armoured infantry fighting vehicle). Participation of individual countries and the content of projects shows that PESCO's focus on a wide range of possible areas of cooperation is to enable EU countries to cooperate in developing organizational capabilities for military cooperation and building joint industrial capabilities in the field of arms production by involving specific industrial sectors of participating countries projects.
This is another step towards striving for the unification of investment plans in order to increase the level of security and defence, which should result in the growth and unification of EU industrial defence capabilities.

At the industrial level, the concentration processes were parallel to the institutional association of the Member States. The main example of the consolidation of European armaments companies is the second largest aviation company in the world, the Airbus Group, which was created as a result of the re-branding of the EADS (European Aeronautic Defence and Space System consisting of the German DASA, Spanish CASA and the French Aerospatiale Matra).

To sum up, on the European level several attempts have been made in order to develop joint actions in the defence economy sector.

3.2. Case study – mini globalisation

Efforts in the EU are made to face the difficulties and obstacles of globalization in the defence sector. The Polish government has successfully implemented a project that consisted in the consolidation of dispersed industrial entities, which could serve as a case study for the EU in order to implement a similar project on a European or perhaps international level.

This project is a specific example of the phenomenon of striving to integrate the industrial sphere to be more competitive and to meet the challenges of the common market. Polish Armaments Group (a national Polish champion in armaments production) was created on November 26, 2013 by the Minister of the Treasury as the entity. The main purpose was to meet the state security and defence needs in the field of research, development, production, servicing, maintenance, modification, modernization and repairs of military equipment and its promotion and marketing.[2] The chief assumptions to establish a consolidated leader in the defence sector was to effectively use the potential of domestic industry, to enable the correlation of investment and research and development activities, as well as to eliminate mutual competition between domestic defence companies that compete for participation in the modernization of the Armed Forces of the Republic of Poland (Walczak, 2018). The entity is the result of consolidation with the majority share of the Treasury for which ownership supervision is carried out by the Minister of National Defence, which gathers more than 60 companies in the armaments sector, employing 17,500 employees, achieving a total of 4.5 billion zlotys of annual turnover (Polish Armaments Group, 2018). An unambiguous assessment of the consolidation effects of the Polish armaments industry is beyond the scope

[2] § 4 of the Articles of Association of Polska Grupa Zbrojeniowa S.A. - Uniform text of the Articles of Association of the Company, prepared on the basis of notarial deeds of 28 August 2014 (Rep. A 14556/2014) and of 8 May 2015 (Rep. A 7193/2015), as worded in the National Court Register on June 10 2015.

of this study and it is not possible at this stage, although attempts are made to investigate this issue, whose results indicate an ambiguous evaluation of the process.[3] However, bearing in mind that the above mentioned consolidation of defence sector entities consisted of focusing independent enterprises with separate management bodies which belongs into one capital group, the effects of the evaluation of the carried out consolidation may indicate the validity of such solutions in the future.

What is interesting, we can find great similarity in the goals and paths to achieve them, between the integration of entities within the framework of globalization and the consolidation of entities within the national market. The situation of consolidated companies within the domestic market may be in some sphere a reflection and testing ground for giants in the global world.

3.3. Offshoring or the way for a create new product: export of production capacities

Besides the attempt for joint actions, another element characterizing the armaments sector in the globalization era is offshoring. It is an occurrence involving the transfer of operational processes on an international scale by transferring own competences to subsidiaries or third parties and building cooperation networks at the scientific and production level. One of the main reasons for using offshoring models in the company's activities is to reduce costs and to search for capital and labour resources necessary for the further development of the company.

From the perspective of the enterprise realizing the production of armaments, the natural feature of its operational activity is the striving to reduce production costs or optimize the production process. On the other hand, each country should spend budgetary resources in a rational and most effective way. Therefore, governments will strive to achieve the greatest benefits resulting from the purchase of armaments. It turns out that in the sphere of technical modernization of the armed forces, both from the perspective of suppliers and contracting entities, it is possible to achieve a certain level of synergy and mutual benefits in the form of lowering costs and optimizing the production process, as well as engaging domestic industry, increasing its development possibilities and protecting jobs.

Good example of above-mentioned situation may be the shipbuilding industry. Modern warships are one of the most expensive and technologically advanced weapon systems. Therefore, the contracting authorities will seek the possibility of the largest return of funds spent, including by establishing their own technological capabilities based on technology transfer and including their domestic companies to the supply chain of the main supplier and even the production and sale of weapons based on the license granted, as well as the involvement of indigenous industry in long-term process of warships maintaining.

In the case of the French naval concern Naval Group, it can be concluded that offshoring combined with the transfer of technology has become not just a way to improve the financial condition of the company but one of the basic products offered on the armaments market. Naval Group is a key entity that performs tasks in the field of defence and security for the French Armed Forces, in particular in the area of shipbuilding. The company manufactures surface vessels, submarines, including submarines with atomic propulsion, carrying ballistic missiles with atomic warheads constituting the core of the atomic force of deterrence in accordance with the defence doctrine of France. Nevertheless, most of the ship's production is directed to export, in a specific production model. Naval Group through technology transfer and support in the

[3] Research project "Consolidation of the Polish defense industry in the conditions of a competitive European armaments market" carried out at the Faculty of Management and Administration of the Jan Kochanowski University in Kielce (commissioned research work No. 614571).

area of qualified personnel and management programs enables armaments importers to build production capacity in the field of armaments based on license agreements in line of French know-how. This solution allows establishing the production, maintenance and repair potential, in consequence the importer can build an appropriate level of security of supply and the availability of operational weapons - required in accordance with its defence doctrine - and raising the level of investment on the importer's market through the implementation of capital and labour-intensive projects based on infrastructure and human capital of the indigenous industry.

Naval Group has subsidiaries all over the world, among others Canada, Brazil, Chile, Egypt, Saudi Arabia, Ireland, India and Australia, which are involved in the production processes for the domestic armaments market and production aimed at export as well. The French manufacturer is currently implementing:

1. Building process of 4 submarines for Brazilian naval forces based on their own project. The production potential is established in Brazil based on technology transfer from France.
   In addition, under the Brazilian-French agreement, in line of the competences transferred from the Naval Group, Brazil develops its own capabilities in the nuclear sector.
2. Delivery of 4 warships to Egypt with the transfer of technology enabling the implementation of French service solutions throughout the life cycle.
3. Establishment of technical and organizational capabilities to support operation and training of Malaysian submarines and the transfer of shipbuilding technology.
4. Establish technical capabilities to secure the operation of 9 warships in Saudi Arabia.
5. The program of building of 6 submarines for India on the basis of own project, in line of the production potential established in India based on technology transfer from France.

Naval Group's operating model indicates an additional product that appears on the armaments market, namely along with military equipment as the main element of the contract, production capacities, knowledge and the ability to manage complex armaments programs are offered.
It is worth noting that this production model is used by the largest players on the armament market as a standard offer due to the fact that member states are primarily interested in access to modern technologies and treat armament purchases as an impulse for the economic development of the domestic market. Hence, off-shoring of production is a common tendency due to globalization.

4. Conditions of the common European armaments market

Due to the specificity of the European market, several unique conditions exist in the common European market. The 23 member states of the European Union are at the same time members of the *North Atlantic Treaty Organization*, which obliges each member to (The North Atlantic Treaty, 1949) "separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack" (article 3). The effect of the aforementioned obligations is the aspiration of most EU member states to acquire the synergy of international military cooperation and development of individual defence potential in line with the legal regulations of the Washington Treaty, while building these capabilities (in the field of defence and security procurement) based on the legal regulations of the European Union upon the defence market applying the principle of free competition.

In most of the Member States, individual abilities in the field of defence and security are based on the defence system of the state, which one of the elements is the industrial defence sector which brings together state and private entities. Bearing in mind the above circumstances and the specific, i.e. still more national than the consolidated character of the European defence market, Member States are interested in maintaining full sovereignty of their defence capabilities and security, pointing to all elements of the state's defence system, strongly emphasizing the autonomy of supplies and services for the Armed Forces.

State security requirements, preservation of its sovereignty and integrity in the possible situation of crisis and war, oblige the contracting side to guarantee security of supply and the possibility of using military equipment on the highest level during the process of armaments acquisition. Guarantee which is realized on the basis of civil law agreements in line of the content of EU law may turn out to be insufficient and in conditions of a changing geopolitical situation may result in the state's dependence in the area of supply and exploitation of armaments (constituting the quality of military capabilities of the state) from third parties in such important sphere is the sovereignty of the state. Therefore, Member States use the available methods to autonomies from third parties (economic interventionism, i.e. through the follow the Article 346 of the Treaty on the Functioning of the European Union) to protect the defence potential established in the territory of a particular member state. Such behaviour additionally limits competition on the defence market.

However, it is impossible to achieve the autarky in this regard. The requirements of the modern combat space require the most modern technical solutions in the field of weaponry. An example of limited possibilities of building an autonomous economy in the field of defence and security are states from eastern part of Europe, especially states from behind the Iron Curtain such as Poland. Despite attempts to consolidate and reform the Polish defence sector, the economic and political transformations that have begun in 1989 affect the armaments industry, resulting in the loss of the possibility of producing modern, competitive military equipment and opportunities in the field of new technologies development (Zamelek, 2013). A necessary condition for development and competitiveness of Polish entities is innovation based on technology transfer from foreign companies. Under such conditions, preserve the autonomy of supplies and services in the field of armaments is extremely difficult, limited by the need to administer the EU defence procurement law for military equipment purchasing.

Considering the external factors and limited European defence market, it turns out that the necessity of cooperation on the market with other entities also applies to the largest actors in the European Economic Area. In order to search for new markets around the world, the European defence industry must be competitive in relation to other global entities, primarily from the USA (SIPRI - Stockholm International Peace Research Institute, independent international institute dedicated to research into conflict, armaments, arms control and disarmament, publishes a list of 100 largest armaments exporters every year. In 2016 in the top ten there were only 3 companies from outside the USA: Airbus Group in 7th position, followed by Italian Leonardo and French Thales in 9th and 10th places respectively) (SIPRI, 2017).

In 2017 (fiscal year, from 01/10/2017 to 30/09/2018), the United States allocated USD 523.2 billion for armaments expenses (Amadeo, 2018). In 2016 in USA, nearly USD 72 billion (Vetterkind, 2018) was spent on research and development related to military technologies, while EU countries spent about EUR 6.1 billion (Eurostat, 2018) on the development of identical technologies. Significant financial resources for development and investment, as well as armaments procurement spent by the armaments sector and the governments of non-European countries make the European defence market adapt its operational strategy to the conditions of globalization in order to be able to compete effectively in the old continent and in third markets.

For that purpose, the enterprises of the European defence sector, taking into account the main aim of purchasers, i.e. securing defence and security needs, will strive to achieve higher economic dynamics, by taking advantage of economies of scale which are the results of international trade, effective allocation of capital and increasing qualifications of human capital and know-how companies involved in international projects (Kołodko, 2013).

Hence, the EU conditions such as protectionism of indigenous economies, the necessity of individual and common development of military capabilities and development of technological base with forerank know-how are pivotal in taking under consideration in the defence sector activity and development.

5. Conclusions

The challenges of the global market, mainly the wide range of competition and technical advancement of modern military equipment and capital-intensive research and development work, result in a tendency to connect both the production side and the governments in the armaments sector. Based on the previous examples, it can be assumed that the process of consolidation of enterprises will develop and the Member States will search for new areas of cooperation. Due to the high costs of developing new military technologies, the vanishing of the defence sector's territorial division and the merging of US, European and other parts of the world is highly probable. At the beginning, most likely in individual projects, as technology develops and new areas of science development appear, consolidation can be permanent. More research in this field is needed, especially to analyse the short-term and long-term consequences of consolidation and above-mentioned off-shoring model.

However, the importance of the defence sector in the economy has to be highlighted, not only in economic terms but also in the sphere of security. Considering the protectionism of Member States in relation to domestic armaments companies, a balance between a liberal open market for global armaments corporation and the protection of domestic production potential needs to be found, including, above all, jobs, will be very difficult in long-term perspective and will depend primarily on political factors and integration at the governmental administration level.

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