



# Defence Related SME's

Analysis and Description of Current Conditions

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# Strategy of Small Defence Oriented Enterprises in a Time of Defence Budget Downsizing -Croatian Case Study-

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**Abstract.** A relatively large defence industry during the Cold War period has been significantly reduced in many transitional states in the last decade due to heavy defence budget downsizing. These heavy budget cuts caused the collapse of many large defence corporations. Furthermore, since the beginning of the 21st century in the post-Cold War period many transitional states do not need large defence industrial facilities and large defence enterprises for self-protection. But protection of their small and medium size defence-oriented enterprises (SME's) is important for protection of their economies, employment, social stability etc. In such situations, transformation and adaptation of these SME's to the new business environment and conditions is imperative for their survival. Survival strategy of these small defence related companies requires: increase of their international competitiveness, acquiring of new dual use knowledge, expertise and technologies, stronger orientation to the civilian markets, identification of a new niche in civilian and defence markets, education and shaping of future customers, acceptance of a new management and organizational culture which supports innovation and creativity, minimization of bureaucracy, a modern type of personnel management and diversification of production. Competitiveness of these SME's on the globalized markets will depend, first of all, on their efforts to increase their R&D activities and to put more R&D based innovations into their new products. The Croatian case study given here is related to the business strategy formulation of one small R&D based Croatian defence-oriented enterprise which is trying to survive in a time of heavy defence budget cuts through transformation of its old mainly defence-oriented business strategy and products to a new one.

## Introduction

In the post-Cold War period in Eastern and Central Europe, many huge military industrial state owned companies and facilities collapsed, while many of the SME's are still searching for business survival in a time of heavy defence budget downsizing. For the first time, most of these companies are being forced to deal with new issues and challenges, such as: new product development, marketing to civilian customers, private-sector financing, adopting new competitive business practices, living outside the shadow of the defence business, etc. The failure of these SME's to reach a successful adaptation of their services and products to the new defence and civilian markets would cause devastating consequences for their national economies and national security of these states. Therefore, the importance of dealing with transformation and adaptation processes and conversion issues of these SME's

cannot be overstated. It is also very important to explore new ways in which these affected SME's can adjust their core businesses to the new economic situations, characterized by the heavy defence budget downsizing. In a case of successful transformation and adaptation, these SME's may play an important role in the economies of their countries and can make a substantial contribution to the creation of new jobs and prevention of social and political crises in these states.

On the basis of hypothetical statistics, we can guess that approximately up to 5% of these former defence oriented SME's have a chance to survive and to transform themselves into the new modern, internationally competent and competitive SME's, which will be capable of competing in the international defence industry business. Another 10 % of them have a chance to survive as in-state maintenance providers, while the rest will be definitely lost. This article concentrates mainly on the first group of only a small percentage of these SME's, which can transform themselves into small, modern, competent and competitive high-tech and R&D based enterprises. Such companies will be very important for the economies of their states, but they might be also very important for economic integration of those states in a new global digitized economy, integration into the EU, integration into a common European defence industry, etc. Such companies may also function as an interface between their transitional economies and economies of well-developed states, enabling diffusion of knowledge, technologies and modern type of business management into their states. Without such successfully transformed SME's, there is no compatibility and interoperability of these states with the NATO defence industry business sector and there is no tighter integration within the NATO structures.

## **1. Offsets and the New Specific Role of Defence SME's in Small Transitional States**

There are many chances and opportunities for new specific positions and roles which defence oriented SME's may take in the near future in the small transitional countries. One among many may be related to the role of SME's in offset policy implementations and regulations. Implementation of offset policies in many transitional states should be very attractive for many small and medium-sized enterprises, as it is in the majority of developed states. In today's defence and civilian markets, offsets will have more and more acceptance and importance and this trend is not likely to be reversed in the near future. Creative, innovative and smart offsets techniques require specialized SME's for consulting assistance, education and training for intelligent and effective compensatory management transactions. It may be a challenging business opportunity for many consulting and management-oriented emerging SME's, which mainly do not exist yet in the majority of transitional developing states. A wide spectrum of activities contained in offset agreements related to the co-production and subcontracting, technology transfers or licencing of technology, in-country counter-procurements, marketing assistance, financial assistance, investments, joint ventures, etc., offers many new attractive and challenging additional opportunities for existing and emerging SME's. Offsets can bring jobs, technology and production experience to many transitional states and SME's, creating and maintaining a new more flexible, competent and competitive domestic industrial base and defence technologies. Offset programs can be very important for restructuring and developing of national economies in many transitional states, developing their defence industrial potential, opening new cooperation, organizational improvement of their enterprises, development of their scientific research institutions, better higher education, as well as restructuring of their regions threatened with unemployment. Some transitional states may also use indirect defence offset procurement as a tool for development of their civilian industry, such as in tourism, agriculture, the food industry, building their infrastructure, etc.

But many transitional states are not yet fully aware of the importance and potential of compensatory transactions in military procurements for their economic recovery and restructuring.

One specific role, which many defence-oriented SME's will have more and more of in the future in small transitional states, is the relation to the maintenance of their newly-procured military equipment. The main weapon systems and sub-systems in these countries will be procured in the future, mainly from developed industrial countries, due to limitations and inabilities of small transitional states to design and to develop modern sophisticated state-of-the-art weapon systems. Therefore, maintenance of their military equipment which needs servicing and repairing, even in some cases in the next 20-30 years, as a contractual agreement of direct offset arrangements, might be a very predictable and reliable long term business for many SME's in these states. The specific role of SME's in maintenance of these systems and sub-systems might be very challenging in a technical and technological sense as well as in many other aspects. General transformation of defence industries in small transitional states from the role of prime supplier into the role of maintenance provider is one of the guidelines for SME restructuring and their transformation mainly to maintenance provider. These facts bring us closely to a situation where small transitional states as buyers of complex defence equipment will function almost exclusively as maintenance providers based on their domestic SME's.

And finally, apart from a very few SME's which will function as defence-oriented Think Tanks in the areas of defence policy, defence industry conversion, SME restructuring and transformation, new type of PPBS strategy for a time of heavy defence budget downsizing etc., there is no competent public domain discussion related to many relevant strategic defence issues for these transitional states. There is no smart and competent political decision with long-term visions. There is no successful transformation of their SME's and, finally, there is no successful transformation of their states.

## **2. Some Guidelines for Transformation of Defence-Oriented SME's in Small Transitional States**

Successful transformation of former defence-oriented SME's may provide new power and capacity in economic consolidation and economic recovery of small transitional countries and may have an important role in future international defence industrial cooperation. What do existing and emerging defence SME's need to know in order to cope with reduction of defence markets and with the increase of emerging civilian markets? What are the guidelines for transformation and restructuring of these small and medium-size transitional enterprises? What is the role of government? These are only a few of many important questions which require a detailed and careful analysis and appropriate answers. Some general remarks and guidelines regarding their successful transformation will therefore be outlined.

### *2.1 Organizational and Business Culture*

Organizational and business culture of SME's is very important for their ability to be competitive and to be marketably self-adaptive in a changing world and a changing business environment. An organization where people can expand their intellectual capacities, where people can create the results which they truly desire, where new creative and innovative ways of thinking are nurtured, where individual and collective aspirations and objectives are harmonized, where the culture of innovation and creativity can flourish,

where people are continually learning how to work and learn together, might be a successful organization. Unique team vision, team cohesion and team discipline, even productive conflicts of ideas rather than conflicts of rigid individuals and rigid policies are important for a new modern type of organizational culture. Experience shows that talented engineers appreciate discipline when it is implemented in a way that makes sense for the particular company and project to help them to succeed. Identification of emerging long term stable civilian markets and customers, diversification and balancing among defence and civilian services and products, shaping and education of potential strategic customers, more innovative management and marketing, creative leadership, organizational flexibility and its fast adaptation to the rapid market changes and environment, flexible hiring and contracting of manpower, an innovative and modern type of management, minimization of bureaucracy, a level organizational structure, etc., would be very important characteristics of an SME's new business reshaping strategy.

## *2.2 Personnel Management*

Small companies live and die on the engineering talent they are able to hire. Talent alone is not enough, but it is very essential. Small companies which wish to remain competitive on the global market, must find ways of attracting and retaining their talents. The battle for talent must be a crucial element of their new modern agile business strategy and the minimization of friction between talented individuals must be part of their market strategy survival. Certainly companies with a small staff must take great care to make the best use of what their current employees are capable of doing and what they want to do. In such uncertain and turbulent times, characterized by heavy defence budget reductions, companies with small staff are in a surprisingly stronger position in comparison to medium size and large enterprises. Tighter connection and cooperation with universities as a main source of highly educated and flexible manpower, part-time jobs and project-based hiring and contracting of manpower, are some elements of the smart self adaptive personnel SME strategy as a mechanism for avoiding financial risks with company personnel and the maximization of R&D and business potential.

## *2.3 Research and Development*

Generally, competitiveness of defence-oriented SME's in the small transitional states in globalized markets will depend on their effort to encourage their internal innovation practice, to increase applied R&D activities, to establish and to increase cooperation within state R&D institutions and to put more R&D based innovations into their products and services. But only a very few of former defence-oriented SME's in transitional states support R&D or outsource this as a part of their innovation practice. Therefore, the governments of these transitional states must take a proactive approach to scientific and technology promoters, stimulating applied R&D-based innovation of products and services in these SME's. Firstly, they can encourage long-term relations between R&D scientific community and research institutions with SME's. However, the problem in developing transitional countries, like Croatia, is in the fact that R&D performed at government sponsored scientific institutions and universities is mainly not applicable and is too far from any serious market commercialization. On the other hand, the number of SME's in small transitional countries which have advanced technological capabilities and which may have an interest for applied R&D cooperation is very limited. The main reason for such a situation is a lack of entrepreneurship skills and competencies in state-sponsored research

institutions, a lack of financial support for application-oriented R&D projects, the level of technical competencies of the SME's management staff and sometimes the level of technical sophistication of their products and services. Researchers in state-sponsored scientific institutions enjoy their "safe haven" surroundings. Through a fear of living in the market, they do not want to taste the experience of the market's risks. Without integrated efforts of private SME's and state owned R&D institutions and commercialization of their joint products and services, there are no contributions to the overall technological in-state expertise, economic growth and new employment. The culture of evaluation of R&D only through the citation index, without an evaluation of the commercial free market in technical cooperation with SME's, will be a big failure for many small transitional states.

This means that successful and intelligent transformation of these defence SME's and their consolidation is not possible without smart government support and government funding. But government authorities must want and must know how to change the innovation practices in these SME's and how to improve their technological competitiveness. Smart strategy of changes and the innovation practice must be embedded in organizational routines of these SME's, by appropriate training and education of their leadership and management staff. However, the remaining communist mentality and culture in these states and their enterprises are the main obstacles to their transformation. Furthermore, we have to take into account that marketing of applicable R&D in small transitional states, like Croatia, is extremely difficult and barricades against its acceptance are very high. Management staff in the majority of these SME's is not yet fully aware that innovation based on R&D is better and more profitable than the old way of doing business. In a cultural sense, many SME's are cautious, suspicious of any change, because they hesitate to leave the old Cold War proven ways of doing business without innovation. A long-term contact between scientists and SME's can initiate a positive interaction which can result in new projects and innovation. A new type of doing business, based on dual use technologies, like software development and off-the-shelf hardware, might be very profitable. Some of the small transitional countries may also enter into the forefront of technology development, but the prerequisite is much higher R&D investment, at least 3% of their GDP annually into applied R&D. In addition, what is very important to stress and to anticipate is a significant reduction of conventional defence technology, as well as the advancing modern advanced defence technology market. In the past, technology development was pushed forward by military demands and military technology used to lead to civilian spin-offs. But today, civilian technology leads to military spin-offs. As an illustration, in the semi-conductor business 30 years ago the defence sector had more than 90% of the market, while today the defence sector has about 0.3% of the market.

#### *2.4 Financial management*

A smaller and smaller MOD budget has a direct negative impact on its structure for many reasons. Ideally, an MOD budget is based on the balance between total personnel income, acquisition and modernization programme costs and operational expenditures. However, in a period of heavy budget downsizing, due to social stability concerns personnel payments can cover more than 70% of the MOD budget. This MOD budget deficiency has a direct negative influence on acquisition and modernization programmes as well as in the state defence industry business. Without MOD R&D funds, lack of experience and familiarity with new high-technologies, lack of society's confidence in researchers and a remaining communist culture and mentality which presumes that investment in private enterprises leads only to corruption and criminal activities, it makes it very difficult to take a significant step forward toward successful transformation of these SME's in many

transitional states. Without state supporting programmes for defence SME restructuring in the form of appropriate loans and grants, their transformation in a majority of transitional states will remain very uncertain. With a lack of management skills and some other business risks, many SME's in a time of very uncertain MOD budget size and structure are not willing to take loans. Without the MOD, as a reliable and predictable customer and partner, there is no guarantee for any SME's that they will succeed and will have continuing revenues for loan rate payments. So it can be concluded that a loan is inappropriate, in an uncertain time and an uncertain environment, as the only means for a SME's successful business.

Venture capital still does not yet exist in developing transitional countries. The reason is in underdeveloped financial markets in these countries. Additional development of investment and pension funds, reform of the health care system and diversification of the insurance market, will lead to new trends in the financial markets of these countries. Hopefully, very soon in these states, new investors will seek for new opportunities to invest their funds into high return and high-risk assets. Venture capital funds could be one of the appropriate solutions. An excess of venture capital, for example in the USA, with an amount of more than \$40 billion, will also seek for new opportunities in emerging markets. This could be a chance for the development of venture capital markets in these countries. But a fact, which has to be considered, is that small entrepreneurs in transitional states are mostly sceptical regarding venture capital and initially they reject any idea that has any connection with it because they are not willing to lose full control over their companies by giving or selling a part of company shares to venture capitalists. With such business logic, they are missing the chance for rapid growth and development of their companies. Better promotion and marketing of venture capital and promotion of the benefits which this can bring to SME's, may reduce entrepreneurs' rejection of venture capitalists. This kind of marketing could be done by the state agency for investment promotion and should be focused on the small and medium entrepreneurs.

In developed countries classic venture capitalists are investing into whole companies, increasing their values and exiting from them. But cooperation between entrepreneurs and venture capitalists could be based on specific projects and could be very attractive. Instead of investing into a company's equity, venture capitalists might invest funds and provide consulting services to the company in order to develop specific new products and services. The venture capitalist will benefit from a percentage of sold products or services in the future.

There is no doubt that transitional defence-oriented SME's, embedding some of the guidelines and recommendations outlined in this section may have a better chance of survival in the turbulent transitional time of defence market shrinking and restructuring.

### **3. Croatian Case Study**

The case study described illustrates the programme strategy transformation of one former Croatian, mainly defence-oriented small enterprise, which is trying to survive in a time of heavy defence budget downsizing by making a balance in its defence and civilian programmes. This transformation and evolution is based on product diversification and transformation of the old business of defence-oriented strategy and products to the new more civilian markets focused on business strategy and products.

### *3.1 Old business strategy and products*

The old business strategy and products were related to modernization and upgrading of some weapon systems for the Croatian Armed Forces with the objective of increasing their lifecycle by replacing an old analogue electronic sub-system with a new commercial state-of-the-art, off-the-shelf digital technology as well as improving their technical and tactical features including design and development of some completely new products. Some of these efforts and products were related to the modernization of the old analogue guidance unit for AT-2 and AT-4 guided missile anti-tank systems with state-of-the-art digital technology in order to reach greater maintainability and provide some new technical and tactical features, like improved IR CCM capability or improved hit probability of moving targets. This also included design and development of new maintenance and troubleshooting equipment for AT-2 and AT-4 missile systems which enable automatic testing of launcher and missile parameters; design and development of new sophisticated multi-level Hardware-In-the-Loop (HIL) simulators as a powerful infrastructure for modernization of guidance and control hardware and algorithms; design and development of PC-based training simulators for AT guided missile gunners based on a high performance multiprocessor system which provides facilities for a complex and highly realistic simulation of the real AT systems, such as a 3D terrain map for the tactical scenery, 2.5D photographic imagery of real landscape or artificial 3D scene, 6DOF model of the missile's dynamics, 3D model of the target kinematics, different terrain types, different targets and trajectories and different meteorological conditions; design and development of an air-defence, state-of-the-art simulator based on virtual reality technology for the man-portable air defence system "Igla", etc.

### *3.2 New business strategy*

The new business strategy is trying to protect and to adopt company core competencies and expertise through more civilian-oriented and more profitable commercial projects which offer new business opportunities such as the Whiplash Injury Integrated High-Tech Diagnostic System (WI<sup>2</sup>HTDS) project, primarily intended for assessment and classification of whiplash injuries, including rehabilitation and quickening of the recovery process of the injured. The system is based on virtual reality technology and biofeedback sensors and it immerses a client in a completely new virtual world, which alters his impression of the real head-neck range of motion. Virtual reality, biofeedback and appropriate digital signal processing algorithms and complex statistical aggregated correlation analysis detects the inconsistencies in the client's head-neck range of motion, thereby reducing the chances of faking an injury. From the results of the analysis, conclusions can be drawn, which can be used to create a complete and objective clinical profile of the client, thus enabling financial compensations to those who really need them and preventing unnecessary expenditures. Humanitarian high-tech multidisciplinary projects based on technologies of virtual reality and digital biofeedback related to the therapy of the Croatian war veterans who suffer from PTSD is also an example of a civilian-oriented project. The main objective of this project is related to the design and development of complex dynamically controlled biofeedback- based adaptive scenarios, which have the objective of relieving the therapist who guides the patient through a virtual reality scenario from routine tasks, thereby developing an expert system that could automatically select and adapt therapeutic scenarios based on the patient's current level of

emotional excitement. MOD projects related to the psychological assessment and selection of combat-ready gunners based on biofeedback measurements of their emotional characteristics and profile under stress, use similar dual-oriented technologies and expertise.

#### **4. Conclusions**

Competent and smart defence policy, competent and knowledgeable MOD decision makers, their appropriate training and education, think tank assistance in design and development of defence strategy, are some of the most important prerequisites for smart and predictable defence budget and defence industry business in these small transitional states. On the international scene, cooperation between NATO and Partner transitional nations can make a significant contribution to the process of successful defence SME transformation as well as their adaptation to the new reality, characterized by defence market shrinking and expansion of newly emerging civilian markets. A proposal for NATO assistance to the former defence SME's in the transitional states could be related to the selection of a very few defence SME's in each Partner transitional state by assisting them through workshops, seminars, conferences and symposiums to speed-up the process of SME adaptation to the new business and security conditions and environment. The topics of these seminars and workshops could be related to modern organizational structure and management; offsets and SME's; personnel management; venture capital funds, etc. The foundation of a NATO Venture Capital Fund for investment and assistance of former defence SME's in a small transitional state as a leverage for its transformation and adaptation to the NATO defence industry business standards and procedures, might also be a very attractive proposal.