



Qi3 Insight:

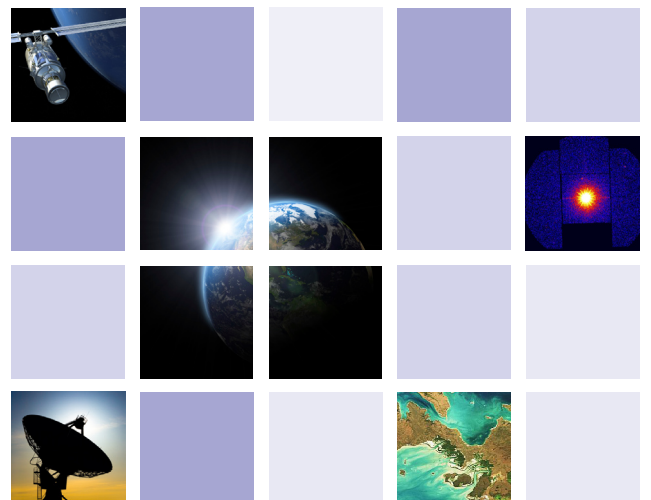
Diversification by Defence Companies into Civil Markets

Challenges, Opportunities, and Strategic Drivers

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1. Where are the new revenue streams for defence companies?

Declining defence budgets, increasing competitive pressures, customer pricing pressures are the major factors driving change in defence company business strategy.

Defence companies are looking to new market opportunities either in terms of developing new technologies to meet the changing nature of threats or diversifying geographically or into lateral civilian markets to maintain or grow revenue streams.

This Qi3 Insights White Paper discusses the challenges facing defence companies, the drivers for diversification and the practical steps that need to be taken to identify and exploit new market opportunities.

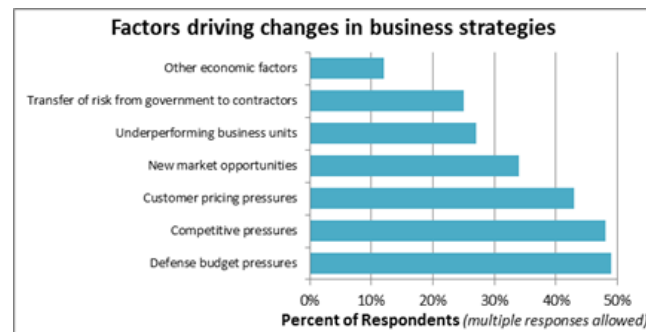


Figure 1: Factors Driving Change

Source: KMPG Aerospace & Defense 2012 Industry Outlook Survey

Challenge 1: Declining Defence Spend

Global defence spending is widely reported as being flat and forecast to decline. US defence budgets reductions of \$487 billion over the next 10 years were agreed in 2012¹. Not only does this affect US based defence companies, but also UK and European companies. Half of the revenues derived by UK based firms come from sales made to export markets with the US Department of Defense (DoD) being the primary export customer². In the UK, Defence Spending is forecast to fall from £45.8 billion in 2012 to £44 billion in 2015³. Whilst this will partially be offset by increased spending in the Far East, especially China, these markets may not be easily accessible or allowable for Western defence companies.

Challenge 2: Changing Priorities

The changing 'nature of threat' facing western countries such as chemical, biological, radiation and nuclear (CBRN) terrorist threats, hostile cyber attacks and natural disasters⁴ has changed national science and technology policies. Growth segments within the defence market are now in areas such as Military IT, Data & Computing which is forecast to enjoy an annual 4.6% global market growth rate during 2012 to 2022⁵.

Science & Technology Priority Challenges

- Identify & mitigate CBRN threats
- Protect assets from cyber threats
- Neutralisation & protection against improvised explosive threats
- Understand human & social dynamics
- Effective communication, manage information from sensors & develop real time pictures
- Extract value from complex data sources
- Develop ability to identify & assess future risks & threats

Figure 2: UK Science & Technology Challenges

1 Aerospace Industries Association "The Real Defense Budget Challenges Lie Ahead" 26 January 2012

2 Deloitte UK Observation, 14 December 2011

3 www.ukpublicspending.co.uk

4 National Security Strategy, October 2010 <http://www.official-documents.gov.uk/document/cm79/7953/7953.pdf>

5 Strategic Defence Intelligence <http://finance.yahoo.com/news/global-defense-industry-updates-counter-121500541.html>

Challenge 3: Increasing Competitive Pressure

Defence companies are experiencing increased competitive pressure both from within the industry and from new sources of innovation.

Internal competition

Defence companies have established business models and processes which make them very effective and efficient in responding to traditional major defence customers such as the UK MoD or US DoD. Not surprisingly many defence contractors are adopting a 'grow or die' philosophy in their traditional markets resulting in increased competitive pressure ⁶. One example is Lockheed Martin's stated ambition to build overseas revenue to 25% of turnover in the next five years. It has invested in UK facilities to address UK and European markets. Whilst this strategy may incur high short term costs, as Lockheed Martin drafts in significant numbers of skilled workers from the US to address major contract wins in the UK even though it is "the most expensive way to address it" ⁷, it maps well to its core sales & marketing and technology capabilities.

External competition

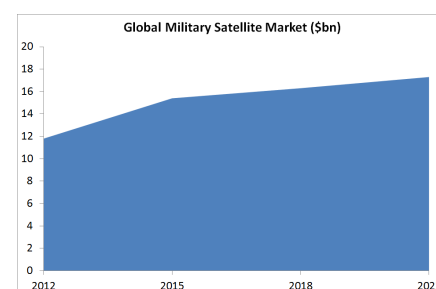
External innovation from non-defence companies is being actively pursued by governments and other industrial sectors:

- Firstly civilian technologies, particularly in the area of consumer electronics, are developing at such speed that military projects can find themselves locked into outdated expensive technology, as is the case with US Joint Tactical Radio ⁸.
- Secondly, in times of constrained budgets, there have been active initiatives to spin-in technology from sectors which are used to working in extreme operating environments - such as the "Motorsport to Defence" initiative set up by the Motorsport Industry Association ⁹.
- Thirdly, the solution required to some of the changing threats may well be already available from the civilian sector. DSTL now actively seeks to work with non-defence companies. "We need inventive people looking at that research and development to see how it could be adapted to be of use to the Ministry of Defence. We are interested in every branch of science and technology, and are looking to work with people and organisations that have never worked with us before. The next big leap in defence technology, or the next small innovation that has a large impact on our soldiers' lives, could come from someone who today hasn't even thought their work could be of interest to us." ¹⁰

Challenge 4: Customer Pricing Pressures

Customers need to seek the most cost effective solution, and with defence budgets under pressure and increased competition, the result is increasing price pressure. In many areas cheaper civilian COTS products are available, examples include:

- British defence contractor, BAE Systems, calculated that a £300 video card from a leading gaming graphics company could replace £30,000 worth of military computing equipment used for engineering simulation ¹¹.
- In military satellites, there is a gradual transition towards selecting commercial providers rather than defence contractors ¹². The result is a dramatic slow down in the global market.



⁶ KMPG: 2011 Aerospace and Defense Executive Survey

⁷ Lockheed Martin invests its fighting spirit in Britain by securing major contracts - www.telegraph.co.uk/finance/newsbysector/industry/defence/9830504/Lockheed-Martin-invests-its-fighting-spirit-in-Britain-by-securing-major-contracts.html

⁸ How to blow \$6 billion on a tech project. <http://arstechnica.com/information-technology/2012/06/how-to-blow-6-billion-on-a-tech-project/>

⁹ www.eurekamagazine.co.uk/design-engineering-features/technology/leading-edge-motorsport-technology-finds-applications-in-defence/44179/

¹⁰ Dr Frances Saunders, Chief Executive, Defence Science and Technology Laboratory (Dstl) March 2010 <https://www.dstl.gov.uk/downloads/25March2010.pdf>

¹¹ War Games. Military use of consumer technology. The Economist Dec 10th 2009

¹² Source: Strategic Defence Intelligence

Profitable Diversification into Civilian Markets

Defence companies can seek new market opportunities by either investing in new technology (and products) or expanding into new markets. Geographical expansion is one option but is still within the competitive defence market. Exploitation of defence technology in lateral civilian markets is proving to be a successful option for revenue growth.

In contrast to the defence market, civilian applications of many military technologies are forecast to enjoy strong growth, such as infrared cameras, communications, command & control (C3), UAVs and radio communications.

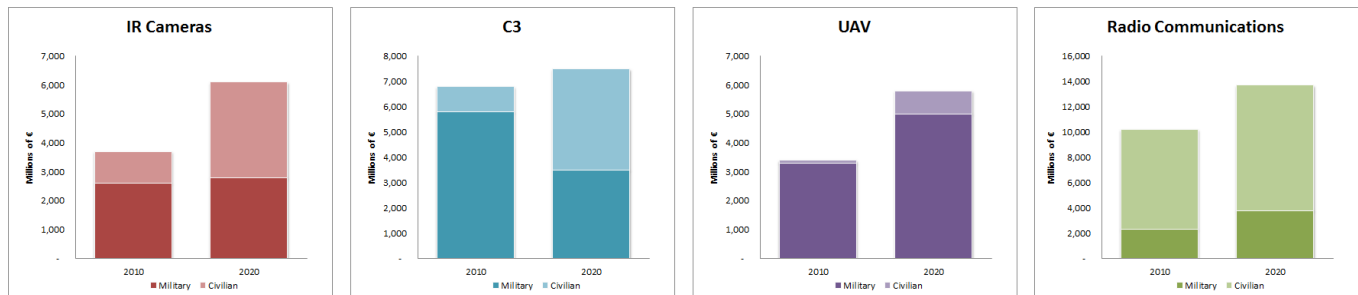


Figure 3: Worldwide Military & Civilian Market Sizes. Sources: Forecast International, DECISION, FLIR, Sirica, Yole

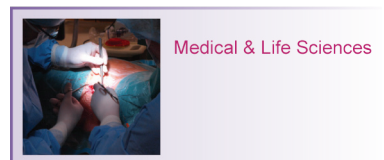
Analysis of successful diversification of military technology into civilian security markets over the last 10 years in Europe has highlighted C3 and sensors (including tracking & tracing, biometrics and screening & scanning) as being the strongest areas ¹³.

However, diversification is not just limited to security applications:

- Defence contractors Saab originally developed 3D mapping for missile targeting for the Swedish Armed Forces. In 2007, it spun off C3 Technologies to develop commercial applications. Saab sold its share to Apple in July 2011 for \$150m.
- In the UK, the DSTL has set up Ploughshare Innovations ¹⁴ to manage the commercial licensing of defence technology to industry. Just one example, liquid repellent nano-coating technology is now used in diverse commercial applications ranging from smartphones, medical devices and gas turbines to walking boots.

Diversification, not only opens up new potential revenue streams in growth markets, but importantly also gives greater visibility of innovation trends and technologies which may become important to the defence sector, thereby protecting competitive advantage.

For example, developments in civilian aircraft communications are currently being driven by the passenger expectations for broadband connectivity during flights and the infotainment service providers servicing these needs. Defence contractors have many of the components which can be developed to deliver customer requirements. Ignoring these opportunities may result in other players developing competing technologies which can then be spun-in to the defence sector.



High Performance Industry



Consumer Electronics

Security



Lifestyle



Space



Pharmaceutical



Oil & Gas



¹³ http://ec.europa.eu/enterprise/policies/security/files/doc/study_ecorys_cimisos_final_report_en.pdf

¹⁴ www.ploughshareinnovations.com

2. Which civilian market?

With so many potential applications, which market sector should you go for first? One that is both attractive in terms of market size, growth and profitability, but also one that fits with your existing processes and way of doing business. Many commercial applications may just be emerging in markets a long way from the core market expertise residing within defence companies. Often there is no readily available market data. Semi-quantitative analysis, such as probably density maps, can quickly identify which application areas are likely to generate additional revenue streams.

Qi3 has worked with major defence companies such as MBDA, BAE Systems, Lockheed Martin and Selex ES to assist them in developing market entry strategies into civilian markets for specific technologies. It has also worked with large corporates in assessing technology from organisations such as Ploughshare Innovations and its applications within their business.

When assessing new market opportunities, defence companies need to investigate a range of (sometimes unrelated) new markets and understand both exploitation routes and fit to existing business processes. For example, moving to a low value high volume, highly fragmented mass market would require significant changes in the existing business model which is unlikely to be achievable in the short term. Qi3 typically investigates 4 dimensions:



Dimension 1 - Market Attractiveness

Defence companies understand their traditional markets and customers extremely well. Diversification, in its very nature, requires investigation of new markets, some of which may be emerging. Identifying and assessing market opportunities requires an understanding of the market size, growth rates and drivers in sectors that are likely to be very diverse. For example, a recent project investigated location tracking applications in market segments varying from cow fertility and fire-fighters, to sailing regatta racing and freight logistics. Some of these segments were well defined, others were emerging niches.

Ranking diverse segments at different stages of maturity can be extremely challenging. Often, a combination of qualitative market research and quantitative market modelling is used to score specific criteria in order to determine attractiveness of the market segment. These criteria not only include market size and growth, but also criteria such as market disruption potential, and concentration of customers.

Identifying potential customers, engaging with them and investigating whether there is any real market traction within a particular segment is much more valuable than pure desk based research and market modelling. It is essential that this type of information is included within the ranking criteria.

Dimension 2 - Competitive Environment

It is important to understand how the current market is being served, the concentration of market players and how your technology or product compares to existing solutions. However, defence companies are sometimes seeking to diversify with leading edge technologies which may be addressing emerging market opportunities. It is, therefore, important to identify sources of potential competition not just from competing technology but also from alternative solutions addressing the market's problem. There may be alliances or 'working groups' developing parallel enabling technologies which could freeze out other players from the sector.

Dimension 3 - Business Exploitation and Fit

Defence company business models are aligned to serving their existing customers, which are traditionally single, or very large customers in a homogeneous market. When assessing diversification opportunities, it is essential to consider the optimum business model for a new sector and, more importantly, the fit with existing company business models and processes. Johnson, Christensen and Kagermann¹⁵ identify four key components of a business model:

- Customer value proposition - how a company creates value for its customers, addressing a fundamental problem that needs a solution
- Profit formula – how a company creates value for itself whilst providing value to the customer. This combines the revenue model, cost structure and a margin model.
- Key resources – the key elements that create value for the customer (eg people, technology, products, channels and brand)
- Key processes – the operational and management processes that allow companies to deliver value in a way which can be successfully repeated

Qualitative market research is imperative to whether the company has the ability to operate in the new markets identified.

Dimension 4 - Other benefits

In certain technology areas, particularly in some of cyber and communications areas, innovation may be happening faster in the civilian sector than the defence sector. Defence companies may suddenly find themselves leap-frogged by civilian innovation and their core capabilities under threat. The US Joint Tactical Radio System (JTRS) 15 year software and hardware development programme "provides a textbook case of what not to do in a technology development program ... that remains blinkered to what's going on in the world around it"¹⁶.

Diversification may give defence companies sight of civilian innovation and opportunities to spin-in or respond to technologies which otherwise may destroy their competitive advantage.

¹⁵ Reinventing your business model, Johnson, Christensen and Kagermann, HBR Review December 2008

¹⁶ How to blow \$6 billion on a tech project. <http://arstechnica.com/information-technology/2012/06/how-to-blow-6-billion-on-a-tech-project/>

3. Prioritising Opportunities

As discussed in the previous sections, investigating and assessing diversification opportunities requires a combination of qualitative and quantitative market research. In emerging markets, it may not be possible to predict with certainty the precise nature and level opportunity each segment presents.

To address this challenge, Qi3 has developed a qualitative analytical technique which can be used to prioritise diversification opportunities across different market segments based on probability density mapping. The probability density mapping can model the market segments with greatest promise and size, combining the criteria identified in the previous sections, rather than just providing generic qualitative findings. When used across a portfolio of technology diversification opportunities, the probability density map is 2 dimensional as shown below, but works equally well in 1 dimension for individual technologies.

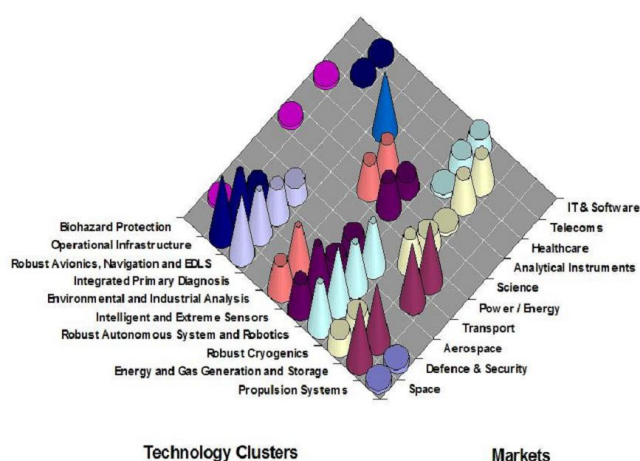


Figure 4: Example Probability Density Map

4. Conclusions

The Defence sector is facing many challenges at the moment including:

- Declining defence budgets
- The changing nature of threat
- Competitive pressures from within and outside the sector
- Customer price pressures within a declining market

Diversification into lateral markets provides a coherent approach to managing these challenges. Traditionally defence companies are very good at understanding and modelling their own markets and working with external innovation providers (such as universities) to aggregate and spin-in leading edge technologies. However, it is when companies need to assess diversification opportunities across a myriad of different civilian market sectors and segments, that they find themselves either without the capabilities or resources to do it in-house.

Qi3 uses a combination of qualitative and quantitative research and analytical techniques engaging directly with the market to identify and prioritise diversification opportunities. We have helped defence contractors to actively engage in market sectors far from the defence arena through careful analysis of market opportunities and subsequent tailoring of the company's offerings to new potential partners. Qi3 has 13 years of technology commercialisation experience in civilian markets. Our commercial experience is valued by the range of defence companies that have engaged us to assess civilian market opportunities. Our client base includes Selex Elsag, BAE Systems, Lockheed Martin, MBDA and DRS.