THE FUTURE OF THE SURVEYING PROFESSION

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Abstract
The aim of this paper is to endeavour to predict the future of the surveying profession. This is attempted by reference to quantifying the current surveying market in Europe, and in Ireland, and identifying the nature of the different market sectors. The range of factors inducing change in these sectors are discussed, including new technology, competition from other professions, EU Directives, marketing and service supply via the Internet, competition from globalization, and the emergence of new business opportunities. Finally, a number of challenges facing the surveying profession are examined and recommendations made to prepare for a future which is likely to be quite different from contemporary concepts of the surveying profession.

1. Introduction
The future of any profession depends on the market sectors it is engaged in, the role it plays in those sectors, and how these sectors are likely to develop in the future. Much work has been done in the last few decades to describe and understand surveying markets both at national and international levels and many organisations such as FIG, ICA, IAG, IUGG, ISPRS, CEN/ISO, CLGE, WPLA, and EUROGI, have all contributed to the knowledge base of the policies, strategies, techniques and methodologies being used to deliver the wide range of surveying services available.

2. Quantifying the Nature and size of the Surveying Market
Mahoney and Kavanagh (2005) suggest there are two distinct and separate markets for surveying services in Europe – the regulated market and the free market. The free market operates in all countries, whereas the regulated market only operates in some countries by regulating particular surveying functions to licensed professionals. The characteristics of these two markets are quite distinct.

The characteristics of the regulated markets include:

- A need by private surveyors to have a license to practice. These licenses are normally provided by Country administrations (Czech Republic) or by State administrations (Germany) rather than licenses provided by professional bodies. The concept is that when surveyors act under their license they act as ‘Agents of the State’. Surveying functions which are commonly regulated include cadastral surveying and the establishment of geodetic survey points, but can also include surveys for major infrastructural construction works;
- These regulated markets are normally small niche markets, State or Country specific, confined by the jurisdiction of the laws of that State or Country;
- High qualifications normally to masters level is necessary to acquire a license;
- Surveying standards are normally high and well documented by virtue of the regulation;
- Competition between licensed surveyors tends to focus on quality of the services and products supplied rather than price;
- Licensed surveyors have an acknowledged role in society, developed over time.

By contrast the characteristics of the free market include:

- The market spans local, national, regional and international markets with increasingly fewer barriers to trade;
No need for a license to practice, although an informal regulation is provided through professional indemnity insurance;

- No need for any formal qualifications in surveying;
- Competition between surveying companies tends to focus on price rather than quality;
- Surveyors have a much less acknowledged role in society.

However, there is yet another important part of the surveying market in Europe, the national mapping markets. Each Country has a National Mapping Agency (NMA) engaged in the supply of core spatial information datasets for their jurisdictions. The characteristics of these markets include:

- The NMAs are established and operate under national statutes to provide a range of spatial information datasets for the respective national territories;
- NMA activities are predominantly limited to their national territories, although some Countries with colonial traditions are also active outside their national territories;
- NMAs spatial information is mostly of a medium to high standard due to a tradition emanating from a history spanning most of the 19th and 20th centuries, and the development and adoption of international convention for survey standards;
- NMAs are undergoing significant institutional change mostly in one of two diametrically opposed approaches; (a) the establishment of commercial companies (currently State owned) outside the public service with a remit to recoup their costs, and (b) the amalgamation of existing separate State organisations into one organisation responsible for Land Management functions relating to spatial information supply, land tenure, and valuation for land taxation (the function of land use has remained with local planning authorities to date). Preliminary evidence seems to suggest that Countries using approach (a) are experiencing more difficulties developing and implementing Spatial Data Infrastructures (SDI) than Countries which have adopted approach (b);
- NMAs are beginning to outsource spatial data acquisition to the free market;
- Competition beginning to be experienced by NMAs from the free market in the supply of spatial information datasets.

Consequently these markets are not mutually exclusive any longer, and more and more competition will be experienced from players in the different markets (figure 1). The development of a framework for international business by the World Trade Organisation, and attempts by the European Union to develop an open market at a regional scale across the frontiers of the member countries of the EU is continuing apace, so how these markets operated traditionally will continue to change in the future.

![Figure 1](image.png)

Figure 1 The character of the surveying market in Europe with some interaction between the national mapping markets and the free market, but little interaction of the regulated market with the other two.

Many attempts have been made during the last decade to quantify the size of these surveying markets both at European and at national level. Frost and Sullivan (1998) computed the value of the Geographic Information Systems market in Europe at €1.3B in 1998 and estimated market growth at 10.7% per annum until 2010. This puts a value of €2.9B on the GIS market for 2006; a small but significant section of the total markets described.
The Council of European Geodetic Surveyors (CLGE) and Geomter Europas (GE) published a Market Report (Schuster et al., 2003) which quantified the surveying market in 23 Countries in Europe at €24.4B per annum and estimated that over 520,000 professional geodetic surveyors were employed in this market.

A European Commission study (Pira et al., 2000) valued the Public Service Information market in Europe at €68.2B per annum, of which more than 50% related to the geographic information market (Figure 2).

Each of these estimations has a margin of error, but they are useful to suggest a current market capitalisation of approximately €20B to €25B per year for all three surveying markets in Europe.

This size of the market capitalisation in Europe can be tested by examining national surveying markets in detail and extrapolating their size to test this European figure.

The national market in Ireland was examined in 2004 by carrying out a survey of the 2003 turnover results of 30 small private surveying companies. Each company had between 2 to 15 staff, so the total number of staff was approximately 300, and all companies were corporate members of the Irish Institution of Surveyors. The total turnover of €17.25M was presented under the three main areas identified as the ‘profile of the surveying profession of the future’ (Enemark, 2001): Measurement Science (traditional land surveying area of spatial data acquisition), Spatial Information Management, and Land Management.
These 30 companies had a turnover of €17.1M under the Measurement Science sector (under the headings outlined in figure 3). However, it is estimated that these 30 companies only represent about 25% of this market sector in Ireland, so the total for this market sector is estimated at €68.3M.

Although the companies surveyed only had a turnover of €0.1M under the Spatial Information Management sector, two attempts to quantify this market sector have already been conducted with which the author was associated in 1999 (€48M) and in 2001 (€70M). This market sector has expanded significantly during the last decade, is considered to be the major growth area within the surveying market, and was estimated to be ~ €100M in 2004.

The Land Management market is the one market sector for which there is little information to date. Although the companies surveyed only had a turnover of €0.1M for this sector, the size of the market is considered to be quite significant and growing. The CLGE / GE study of the surveying market in Europe estimated the size of the Irish market as €240M in 2003. If this figure is in the correct ballpark, then the size of the land management sector could be as much as €70M (€240M – (€68M + €100M).

The growing importance of the Land Management sector was identified in a post-graduate research project carried out in the Technical University of Madrid (figure 4). This suggests that the Land Management sector could potentially become the largest sector of the surveying market in Ireland, and may represent a significant business opportunity for existing surveying companies.

![Figure 4](image-url) An evaluation of the surveying market in eight European countries which identifies the Land Management sector as the largest sector (~ 50%) of the whole surveying market (Cavero, 2005).

In conclusion therefore, the estimation of the market size in Ireland is slightly less than that estimated by the European study (Schuster et al., 2003), so the current surveying market in Europe is more likely to be in the region of €20B to €25B annually, with over a half a million professionals earning a living from it.

The surveying market in Ireland is estimated at €200M to €250M annually, so by using population figures only (Ireland – 4M; Czech Republic – 10M) the surveying market in the Czech Republic has a potential size of €500M to €625M. It is appreciated that there are many factors which affect market conditions, and using population figures in this way may be inappropriate, but it has the desired effect of indicating what the potential may be.

### 3. Factors Inducing Change in the Surveying Market

The surveying market operates at a number of levels, small niche markets at local level where the surveyor can build a rapport with their clients on a personal level. Then there are national markets supplying the national economy either by NMAs providing core spatial data products to central and local government, or by private companies servicing the construction, retail and marketing and utility sec-
tors to mention a few. Finally, there are international markets supplying the needs of the national and global economies in sectors ranging from construction, car navigation, and environmental sectors etc.

However, there are many factors inducing change in these markets generally and in how business is conducted. The surveying market is no different, and it has a range of factors impacting on it, modernising it, providing new business opportunities mainly due to the shift towards applying digital techniques and using digital information (Figure 5).

Modern technology is simplifying surveying equipment including electronic levels, total stations, GPS etc. which are progressively becoming more user friendly such that some market commentators suggest the market only needs ‘low grade surveyors’ to press the buttons any longer. The author does not agree. The professional surveyor is still needed to ensure proper procedures are followed, to identify and fix problems as they occur, and to ensure the spatial data acquired meets the intended use. Too often surveyors meet situations on the ground which requires professional knowledge and experience to decide on a proper course of action. However, this ongoing development of new technologies and techniques means surveyors must keep up-to-date and apply the technology to improve production efficiency and product development to improve its effectiveness. Complacency in this regard is not good for business.

Figure 5 The Factors inducing change in the Surveying Market.

Surveyors, who participate in the free market and the national mapping markets, have competition from other professions in the supply, adding value, and optimising the use of geographic information. The trend both nationally and internationally is to create and use interdisciplinary teams (Figure 6) of IT professionals, planners, geographers, geologists, engineers, architects and surveyors to develop improved and more sustainable solutions. Consequently, surveyors with the necessary set of specialised skills will need to operate as equals within these teams and contribute positively to the overall project.

Figure 6 Professional groups competing for business in the geographic information ‘space’.
Both national and European legislation is impacting on these surveying markets both at macro and micro levels. In Ireland most new legislation these days is reactive to EU Directives. Although some of the new Irish legislation may have an impact on the surveying markets, there is normally a consultation period before a bill is passed to identify and tease out particular issues. At European level there is currently a wide range of EU Directives including the Water Framework Directive, the Services Directive, INSPIRE, the re-emerging Public Services Information Directive, the Environmental Directives all of which have the potential to significantly impact upon these surveying markets. Other initiatives such as Galileo (the European Global Navigation Satellite System), GMES (Global Monitoring and Environmental Systems) and eGovernment (to create an Information Society and Knowledge Economy) will all contribute to these changes. There is an increasing need for the surveying profession to participate proactively in the debates giving rise to the development of these laws and initiatives.

The use of the Internet as a marketing tool (as distinct from a tool for delivering electronic information) is increasingly being used to advertise services and products across traditional boundaries of the surveying markets. To those who use it, it has the potential to generate extra business and create extra sales, but it is not yet the panacea initially imagined. The public have been slower than anticipated to adopt it as a sales medium, but the trend is continuous and upwards. The surveying profession needs to prepare to use this new medium to complement existing sales and delivery mechanisms.

Competition from the global marketplace, such as the recent introduction of ‘Google Earth’ is increasing. Products such as this, help to make the public more aware of their spatial environment and provide them with new forms of spatial information. Some surveyors feel this threatens their business by fulfilling a spatial information need traditionally supplied by them. However, surveyors should have the skills necessary to maximise the potential of these systems, so they should use them to their benefit and ensure they are used appropriately.

Changing markets provide new business opportunities for those discerning enough to identify trends and gaps emerging in the market, or identifying new products and developing innovative leading edge ideas in how they might be applied. New business opportunities require people to be risk takers, to be able to invest time or money or both in the new ideas. Perhaps the provision of a surveying focused capital investment vehicle on a European wide basis should be examined to identify and nurture good ideas for the future?

The only certainty from all these factors is that change is certain to occur. The surveying markets of the future will not be the same as those of today. So how can surveyors predict what it will be, and how can they prepare for it, to ensure they are not left behind?

4. Challenges for the Future of the Surveying Market

There are many challenges for the future, but the most important include educational challenges, professional challenges and Institutional challenges.
Lifelong learning skills and Continuous Professional Development (CPD) are required to allow professionals update their competencies and provide the ability to develop best solutions for the future. Enemark (2001) suggests that the educational profile of the future for surveyors should encompass the three areas of Measurement Science (traditional spatial data acquisition), Spatial Information Management, and Land Management (Figure 7).

The length of academic programmes producing surveyors for the future must reflect the need to develop not only the technical skills, but also the professional skills, so programmes of 4 year duration are considered a minimum and programmes of 5 year duration are recommended to fulfil this dual role. This need for stimulating change in existing curricula and adopting this educational profile of the future is possibly best portrayed using a model for the development of the surveying profession (Figure 8). It is important to note that the old traditional land surveying areas are not replaced but expanded to encompass the new geo-informatics and geo-services areas.

The professional bodies are also faced with a challenge, because whereas in the past certain functions were best performed by particular professionals, the future requires multi-disciplinary teams to design, implement and manage the whole lifecycle of projects.

Similarly, surveyors cannot expect to have a regulated market in these new areas of geo-informatics and geo-services, so professional bodies should consider adopting a multi-disciplinary profile for professionals practicing in these areas for the future. There is a gradual but prevailing move by the European Union to reduce regulation limiting competition within European markets, so new frameworks to supply quality professional services will be needed for the future. Finally professional bodies will also need to develop new ethical principles and codes of professional conduct suitable for these new roles.

Existing institutions will also be challenged by the changing nature of their traditional power-bases. Strong professional bodies will be critical to challenge existing structures and to find best approaches for the future of society rather than best approaches to maintain existing empires. Clear and transparent benchmarking procedures will be necessary to evaluate performance, identify needs and develop best practice for the future.

There is also a need to promote and cultivate public private partnerships between central government agencies, local government authorities, and private surveyors where there is a clear split of responsibilities and a good definition of the roles played by each partner. These partnerships should adopt an approach where the private surveyors are responsible for the delivery of services, and the public surveyors are responsible for the quality assurance system controlling the quality of the services provided and as guardians of national spatial information resources.
5. Conclusions

- The character of the surveying markets is going to change, so surveyors need new skills to compete. Education and CPD are seen as critical for the future.
  - No CPD = no future;
  - Little CPD = standing still;
  - Much CPD = a bright future and new opportunities.
- There is an increasing demand for higher qualified professionals in all the surveying market sectors.
- Value added services and consultancy services will be major opportunity for surveyors.
- Market trends are good, so the future looks bright, but surveyors should not be complacent.

6. Recommendations

It is one of the European Union’s strategic goals to develop Europe into an Information Society and Knowledge Based Economy, so since the surveying profession are the suppliers of spatial information the future looks bright on the surface. However, the profession can expect much competition both externally from other professions, and market segments not traditionally supplying spatial information, as well as internally from competition from all three sectors of the surveying market to supply the information needs of this society.

Change is normally feared because of a fear of the ‘unknown’. But change is certain to occur, so surveyors need to minimise their fears by eliminating this ‘unknown’ element. This can only be done by proactively using education to up-date and improve competencies, adopting new technologies to improve production efficiencies and service effectiveness, researching and understanding trends in the surveying markets and applying that knowledge to gain competitive edges in the marketplace.

References


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Biographic Note

Paddy Prendergast has been a lecturer in the Department of Spatial Information Sciences in the Dublin Institute of Technology since 1995 and he was previously employed for 15 years on the senior man-
agement team of Ordnance Survey Ireland whilst serving as an Army Officer. He graduated from the National University of Ireland in Galway with a primary degree in science, then completed a postgraduate diploma in surveying in the Royal Engineer’s School of Military Survey in the UK, and recently graduated with a PhD from Trinity College Dublin. Paddy has been an active member of the Irish Institution of Surveyors (IIS) since it was established in 1989, has served on its council for over 12 years, and as its President from 2000 to 2002. He also represented Ireland on the Council of European Geodetic Surveyors for nearly a decade and served as the CLGE President from 1998 to 2001.

Paddy has extensive experience in the acquisition and management of spatial information, together with the associated technologies and business processes. He has been actively engaged in a wide variety of successful national and international projects including: an inter-departmental Working Party on the implementation of GIS in Ireland; a CLGE Working Party on surveying education; an OSi Task Force on Ireland’s new coordinate reference system; an IIS Task Force on Ireland’s Passive GPS Network; and an IIS Working Party on Land Registry’s digital mapping system. Paddy is a regular contributor at national and international surveying conferences and has published widely on a range of surveying topics.