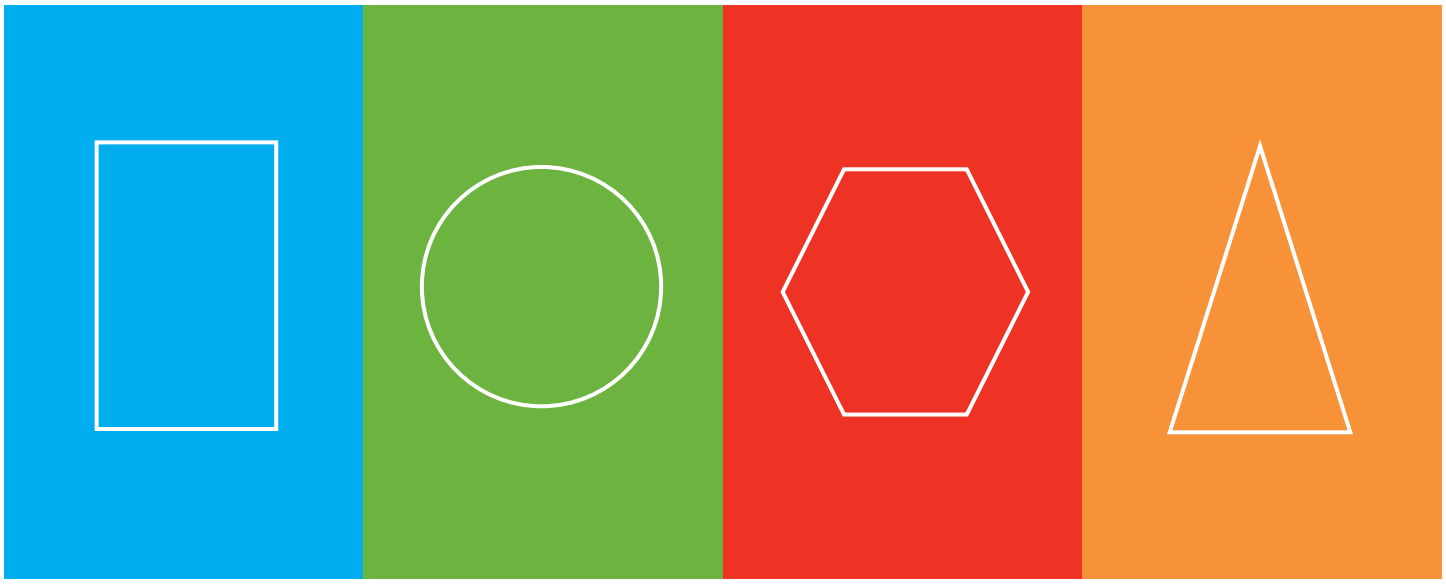
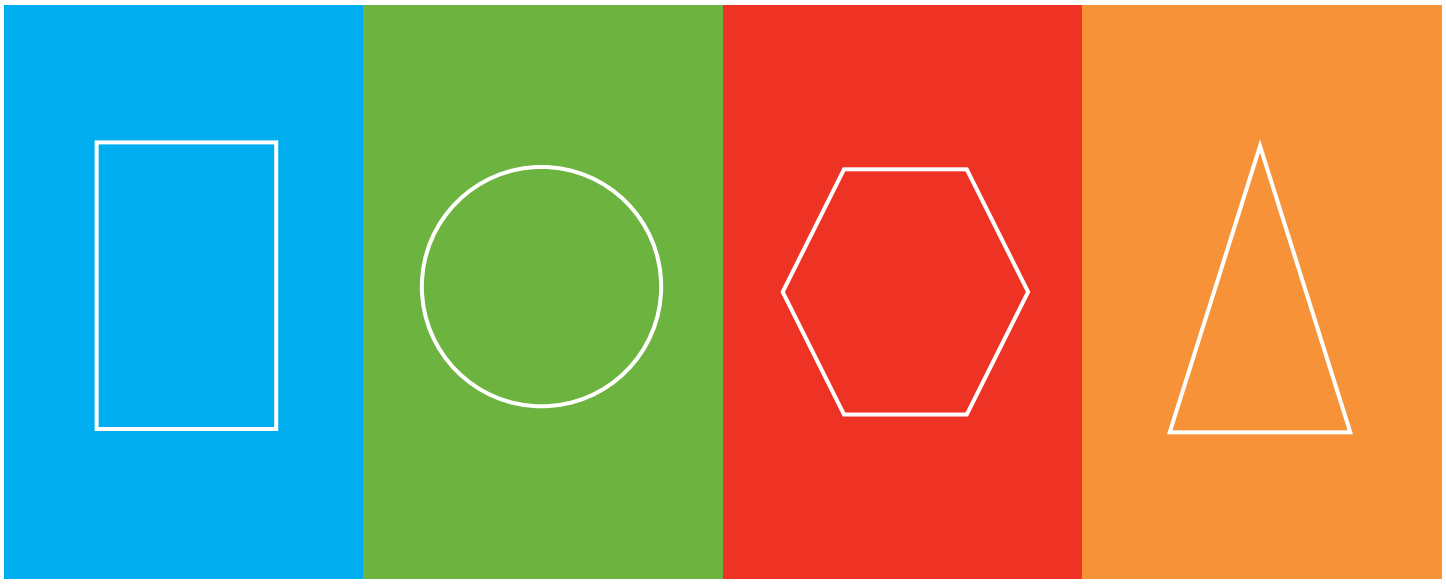


Future Skills and Research Needs of the International Financial Services Industry

Expert Group on Future Skills Needs
December 2007

Expert Group on
Future Skills Needs



Future Skills and Research Needs of the International Financial Services Industry

A study for the
Expert Group on Future Skills Needs
December 2007

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Acknowledgements
This report is based on contributions from both individuals and organisations, the principal of who are outlined here and others are identified throughout the text. The study was overseen by a Steering Group, the membership of which is set out in Appendix Two.

Contributions
The report is substantially based on research carried out by PricewaterhouseCoopers for the Expert Group on Future Skills Needs, Forfás, and IDA Ireland.

The Skills and Labour Market Research Unit of FÁS conducted the quantitative research for the report.

Forfás managed the development of this study.

Taoiseach's Foreword

Since the foundation of the *International Financial Services Centre* in Dublin in 1987, the international financial services industry has prospered, and Ireland has become a significant player on the international stage.

The impressive growth of the IFS Industry in Ireland over recent years is reflected in any number of indicators. Since 2001, for instance, Irish banking assets have tripled in value from €422 billion in 2001 to €1.2 trillion in 2006. In the same period, the value of investment funds domiciled in Ireland has increased threefold, while the value of investment funds administered in Ireland has increased by an even greater amount. This Irish Stock Exchange has become the largest exchange for funds listings with over 4,300 listed.

In addition to the industry's direct contribution to the Exchequer, amounting to €1,118 million in corporation tax in 2006, its positive impact on the labour market is also particularly noticeable. According to recent figures, over 22,000 individuals are employed in IFS in Ireland. More than this, however, the industry has led to the creation of a large number of high-value, high skilled opportunities for Irish workers and graduates – exactly the type of employment opportunities we are seeking to create as we move towards the development of a knowledge economy.

The good news is that Ireland remains an attractive investment location for multinational firms. Indeed, employment growth of 16.1 percent in 2006 is testament to the resilience and competitiveness of IFS in Ireland, and is an encouraging sign for the future.

Companies are drawn to invest here by a combination of factors, notably our favourable regulatory and taxation environment, the experience which is embedded in the workforce after 20 years of success, our English language ability and our strategic location to form a bridging point between east and west to support 24-hour markets. Not least of Ireland's advantages is our supply of high calibre workers – repeated studies have emphasised the esteem in which the well-educated Irish labour force is held by multinational corporations. The quality of the Irish workforce offers any firm locating in Ireland a distinct competitive advantage, and one which is recognised by the number of major international financial companies currently operating out of Ireland.

The challenge now is to ensure that the environment in which international financial services companies operate in Ireland remains attractive and that we leverage all possible international competitive advantage. We must also stimulate the development of indigenous companies in this area, whether they are providing support and service functions to existing MNCs or are engaged in innovation and research activities intended to initiate the next wave of product and market developments.

An adequate supply of skilled workers is required to meet the needs of enterprise. Addressing the skills needs of the sector is a significant challenge, and is one which I believe is of paramount importance to the continued success of IFS in Ireland. We must address both the quantity of skills available to companies and the quality of skills.

With this in mind, and following on from *Building on Success*, which was published in 2006, the Expert Group on Future Skills Needs was asked by the Clearing House Group to examine the skills needs of the entire international financial services industry and to put in place a strategy to ensure a continued and sustainable supply of skills to meet the needs of employers. This study is the result of extensive research and consultation and clearly identifies the actions required to support the continued development of the industry.

I believe that, having identified the skills issues of most concern, the time is right for Government Departments, State Agencies and the industry, to work together to deliver upon the recommendations set out by the EGFSN. In doing so, we can put in place a skills framework that will facilitate the continued development of the industry, thus, enhancing our international competitiveness.

I would like, on my behalf and on behalf of my colleagues in Government to thank the members of the EGFSN for their important work, and Forfás and IDA Ireland for their support with this study.

An Taoiseach

Chairperson's Foreword

On behalf of the Expert Group on Future Skills Needs, I am pleased to introduce this report entitled *Future Skills and Research Needs of the International Financial Services Industry*, based on research undertaken at the request of the Clearing House Group.

The report re-emphasises the importance of the International Financial Services industry to Ireland. It is reassuring that the consultations confirmed Ireland's continued attractiveness as a location of investment. The report, however, also highlights a number of skills issues which need to be addressed in order to ensure the continued competitiveness of the industry in Ireland.

As a result of the EGFSN research, four main issues have been identified as priorities – the shortage of particular skill sets, particularly in relation to certain high skilled occupations; problems relating to staff retention in many sub-sectors engaged in routine yet crucial back-office functions; the development of a research agenda in international financial services; and the manner in which education and training programmes are developed, coordinated and implemented between providers and industry.

Like most developed economies, certain highly desired skills sets are in short supply in Ireland. This is partly a result of our extraordinary economic growth over the last decade which has produced a tight labour market with low unemployment. The analysis in this report finds significant needs for graduates with good quantitative and mathematic skills, as well as demand for individuals with knowledge of compliance, risk management and actuarial skills. Looking to the future, our forecasts suggest that these are likely to persist, and indeed, it seems probable that we will also experience increasing demand for staff with expertise in derivative structuring, credit analysis, languages, and pan-European legal and taxation experts. We must, therefore, plan accordingly.

In response to these issues, the EGFSN has proposed a set of recommendations designed to improve the flow of skills for international financial services. These recommendations require responses from the universities, the Institutes of Technology, the professional institutions, training providers, and industry itself, and involve the development of new courses and modules, as well as flexible delivery systems, and improved coordination between industry and education and training providers.

The report also draws attention to the issue of staff retention in international financial services – many sub-sectors have experienced significant turnover rates in recent years and this is adding to costs and, all the while, damaging efficiency. The EGFSN has proposed a solution involving the development of more innovative HR strategies and the provision of improved career guidance to potential employees.

In terms of the research agenda in international financial services, it is clear that there is currently a communication deficit between academics engaged in financial-based research and companies operating in the marketplace. A common understanding and language is required and a shared recognition of the value and role of research in international financial services must be developed in order for a mutually beneficial relationship to be cultivated between enterprise and academia. Indeed, this is an area in which Ireland can develop a competitive advantage.

Finally, in order for all other recommendations to succeed, there is a need for improved cooperation and coordination between all of the interested parties in the sector. Industry needs to clearly communicate its' needs to skills providers and to take a greater role in course design and delivery, while the providers need to ensure that their offerings reflect industry demand and are responsive to the rapidly changing marketplace.

Certainly, the challenges outlined above are pressing and need to be addressed quickly in order to protect the continued development of international financial services in Ireland. This report should be viewed as providing an opportunity for the sector. This report places Ireland at the forefront of a global quest to develop and source talent in financial services. By taking affirmative action now to address the challenges raised by the Expert Group, Ireland can enhance its reputation as a centre for high-value International financial services functions allowing both industry and providers alike to reap the benefits of growth.

I would like to thank all those who have contributed to the production of this report. In particular I would like to thank all those who made submissions to the process and who participated in workshops, meetings and consultations, all of which were invaluable in producing this report. I would especially like to express my gratitude to the members of both the Expert Group and the Steering Group who generously contributed both their time and expertise. Finally, I would like to thank the team in Forfás and FÁS that provide the secretariat and research support to the Expert Group on Future Skills Needs.

Anne Heraty
Chairperson, Expert Group on Future Skills Needs

Executive Summary

Introduction

Since the early nineties, Ireland has established a reputation as a leading international financial services centre. A number of factors have been instrumental in this success. These include: an attractive fiscal and regulatory environment, the availability of a highly skilled educated workforce, a relatively favourable cost structure, as well as political and economic stability.

In 2006, the Clearing House Group (CHG) published the *Building on Success* report which adopted a vision that Ireland will be 'a major player in international financial services focused on niche opportunities, recognised as being a world class location for innovation and transaction execution by leveraging key competitive strengths'. This report identified a number of opportunities for Ireland in the financial services sector. In particular, it highlighted opportunities for Ireland to develop as a major centre for specialist debt/financing products and securitisation, including risk securitisation. It also envisaged Ireland as a centre for managing global/regional banking products and a centre of excellence for funds servicing. Opportunities for Ireland to develop as a centre of scale in asset management and a pan-European location for insurance products were also highlighted. Finally the potential for Ireland in the areas of software development and as a centre for product development and innovation were also noted.

Building on Success noted that in order for the International Financial Services (IFS) sector to fulfil its' developmental potential in Ireland, the provision of high quality education and skills is essential. Consequently, the Clearing House Group requested that a specialist study to be conducted by the Expert Group on Future Skills Needs (EGFSN), to examine the issue skills and research relevant to the sector.

Terms of Reference

In line with the recommendations in *Building on Success* the focus of this study is to identify the skills, education, training and research needs of the industry. The terms of reference of this study were as follows:

- To determine likely future skills required by leading international financial services firms both in Ireland and selected markets;
- Based on the likely future development of the international financial services industry, assess Ireland's ability to provide the necessary skills for this advancement of the industry through education, training and research provision;
- Based on identification of best practice skills provision internationally, in particular the UK (London) and USA (New York and Boston), to provide advice on meeting any gaps identified in the study in regard to Irish educational and/or training provision;
- Identify existing financial services programmes, niches and research competencies in Irish Institutes of higher education;
- Identify company research priorities (at a corporate level) and map them against the existing strengths of their Irish subsidiaries and Irish academic strengths;

- Identify leading international academic financial services institutions to assess best practice in relation to skills training and research programmes, the delivery of research, their mechanisms to engage industry in collaborative projects and how they collaborate internationally with other institutions;
- Engage with leading financial services companies to improve understanding of RD&I roadmaps and to assess what these companies would expect of the Centre for Financial Services Skills and how they might engage in the development and funding of research programmes; and
- To provide policy advice on the role of the Centre for Financial Services Skills in this context.

Approach and Methodology

A sub-group of the EGFSN was established to guide this project. The various strands of the project are outlined below:

- Research and consultations with stakeholders undertaken by Forfás – as well as developing a detailed terms of reference for the project, Forfás produced a background paper articulating a vision for IFS in Ireland and engaged with a large number of stakeholders in the industry to ascertain their views on the development of the sector.
- Call for Submissions – A call for submissions from relevant parties was placed in the national press at the beginning of the project. As a result, Forfás received a number of submissions from industry and academia.
- Research from the Skills and Labour Market Research Unit (SLMRU) in FÁS – The SLMRU have produced a report analysing both current and future supply and demand for skills in the financial services sector. This analysis informs the other elements of the project.
- Forfás, on behalf of the EGFSN engaged PwC to undertake an extensive national and international consultation process to capture the views of industry and education and training providers, regarding the likely development of the international financial services sector in Ireland. This process included 29 interviews with 44 executives from a selection of leading financial services providers in the areas of banking and capital markets, investment management and insurance in Dublin, New York and London, and 22 interviews with education and training providers in Ireland, the UK and the US. PwC also facilitated a workshop which was attended by a number of industry representative bodies and training organisations. Based on these consultations, PwC submitted a report to Forfás summarising the feedback received.
- All of these strands have been drawn together in this document.

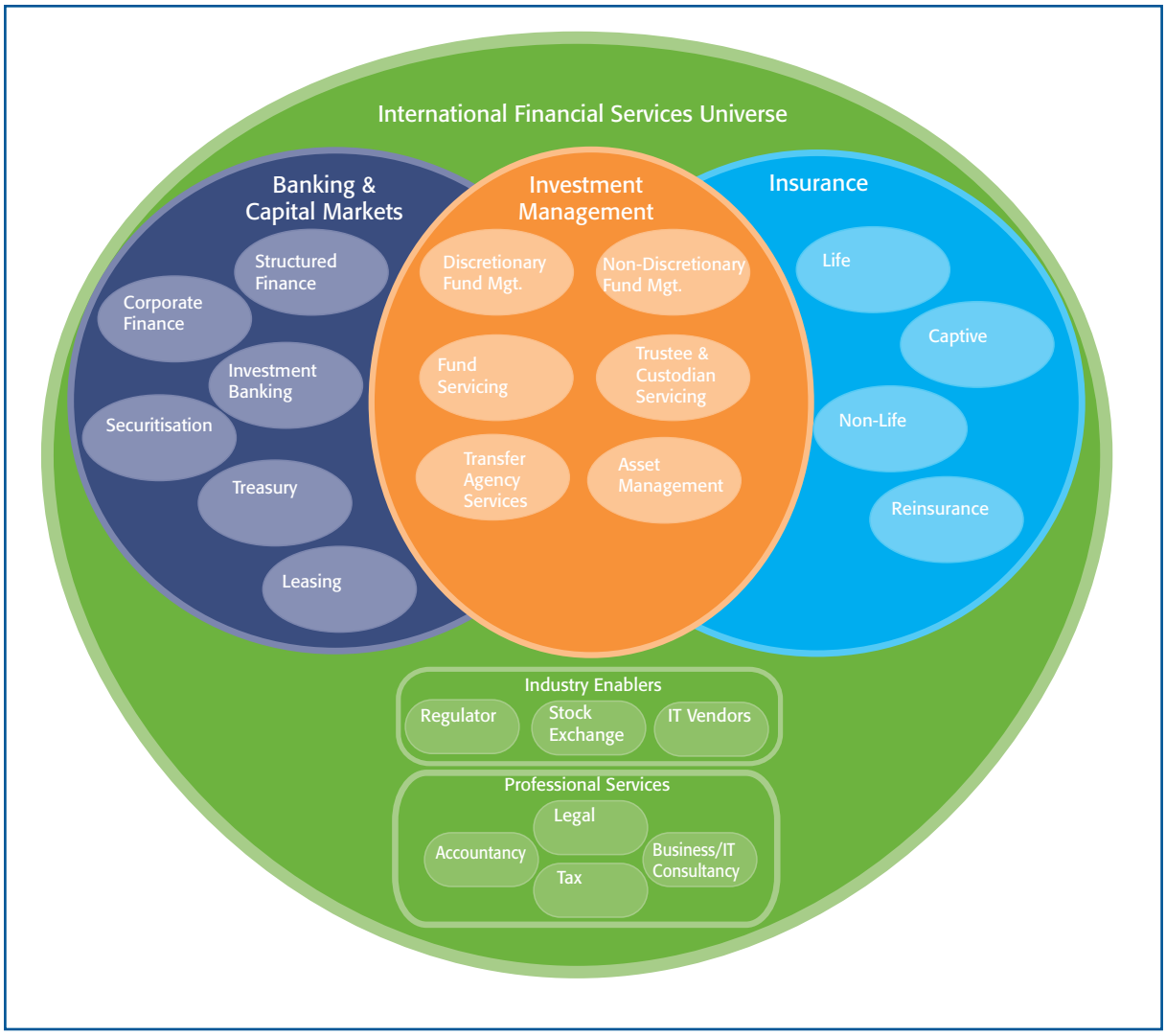
In broad terms, the research approach has involved a high-level review based largely on qualitative interviews with key informants. On the topic of course provision in particular, while the review of the courses available from the selected providers is comprehensive, it is not intended to incorporate a detailed audit of course provision in individual universities/colleges, and the report recommendations should therefore be viewed in this context.

International Financial Services Industry Overview

The term 'international financial services', is typically used to encapsulate the three sectors of banking and capital markets, investment management and insurance.

Figure 1 below provides an overview of these three sectors and their sub-sectors as well as identifying a number of the key industry enablers.

Figure 1 International financial services sector



At a global level, the sector is experiencing strong growth rates. The total value of global assets managed on behalf of investors increased to reach $88.3 trillion in 2005 and the value of professionally managed assets, across the top 28 national markets, grew by 15 percent in 2005 to $49.1 trillion.

Financial Services in Ireland

There are currently 148,000 people employed in financial occupations across the Irish economy. It is projected that by 2015, employment will have increased to approximately 187,000 persons; 45 percent of these will be employed in clerical positions (c. 82,000 persons), 37 percent in professional/associate professional (c. 70,000 persons) and the remainder in managerial occupations. According to the analysis, the greatest employment growth is forecast to occur amongst accountants and banking clerks, although significant growth is expected in underwriting and taxation occupations.

The International Financial Services (IFS) sector, which is a sub sector of financial services, has grown dramatically in Ireland over the last 2 decades – banking assets have trebled from €422 billion in 2001 to €1.2 trillion in 2006.

Impressive overall sectoral growth at a global level is also replicated in the individual sub-sectors in Ireland, with the banking and capital markets sub-sector demonstrating 300 percent growth in banking assets in Ireland from 2001 to the end of 2006, to stand at a value of €1.2 trillion at the end of 2006.

Similarly the investment management sub-sector demonstrated a compound annual growth rate of 32 percent over the past five years, which exceeds the growth rate for European funds over the same period of 11 percent. The value of funds serviced in Ireland is estimated to be €1.3 trillion and the sub-sector employs in excess of 9,000 people across 11 counties.

The third and final sub-sector of insurance is divided between life and non-life insurance. In line with the European trends in insurance, the Irish based cross-border life insurance sector increased premium income in 2006 by 25 percent to a value of €15.8 billion. Also in line with European and global trends, premiums in the non-life sector remained relatively flat at €3.27 billion in 2006.

On the whole, the IFS industry in Ireland is undergoing a process of evolution. The main drivers of change from an Irish perspective were identified during the course of consultations and are summarised in Table 1 below.

Table 1 Summary of key industry trends

Area	Trends
Banking and Capital Markets	**Operations:** ■ **Industry is consolidating** towards a smaller number of truly global providers, and in streamlining their offerings these global providers have relocated elements of their operations to centralised locations or "centres of efficiency". ■ Organisations are focusing on technology enabled process innovation to achieve increased efficiencies. ■ Risk management and regulation are key focus areas. ■ Ireland has established a reputation for expertise in debt products and securitisation. **Products:** ■ The product set is relatively stable but pricing mechanisms are becoming more complex.
Investment Management	**Industry Growth:** ■ Strong growth in funds flows into Irish listed funds. ■ Ireland has established a reputation for listing and administration of funds. **Staff:** ■ Some **less specialised tasks are being transitioned** out of Ireland as they no longer align with the cost base. This trend is freeing up some capacity to take on higher value middle-office functions. ■ Staff turnover is providing a challenge to the cost base and service levels. ■ Ireland needs more graduates equipped with the skills to operate in front-office activities. In addition, the education system needs to provide more graduates with specialist skills in emerging areas e.g. derivative structures and hedge funds. **Products:** ■ Strong growth in the popularity of derivative and hedge fund products has increased the levels of product complexity which has fed through the value chain of support functions. ■ Growth in some front-office operations is being constrained by a lack of suitably skilled and experienced resources.
Insurance	■ Sales in pan-European and cross-border life products are increasing. ■ Ireland is establishing a reputation for capabilities in servicing pan-European products. ■ The reinsurance market is showing strong potential for growth.

IFS currently employs approximately 22,000 people in Ireland – just over 9,000 in investment management, almost 10,000 in banking and capital markets and just over 3,000 in insurance.

On the whole, international financial services companies continue to view Ireland as an attractive investment proposition. This is due to a combination of factors, notably:

- A favourable regulatory environment;
- A favourable taxation environment;
- Availability of experienced and knowledgeable staff;
- A good geographic location which provides a natural bridge in time zones between market centres in Asia and the US;

- An English speaking workforce; and
- A culture/work ethic which is a hybrid of both US and EU cultures, allowing companies in Ireland to work well with both markets.

All of these advantages will continue to contribute to the on-going development and expansion of the international financial services sector in Ireland, and are reflected in the employment forecasts for the sector. It is estimated that IFS employment in Ireland will increase by 9,700 to almost 32,000 by 2012, as outlined in the table below[1].

Table 2 Estimated growth in employee numbers in the Irish international financial services sector 2006-2012

Sector	2006	2012
Banking	**9,923**	**14,607**
Senior management	1,985	2,922
Operational	7,938	11,685
Investment management/funds	**9,227**	**13,631**
Senior and mid management	2,108	3,4391
General and junior management	7,119	10,240
Insurance	**3,027**	**3,614**
Senior management	605	722
Operational	2,422	2,892
Total	**22,177**	**31,852**

Source: PwC derived – based on various assumptions.

These demand estimates are based on secondary data, feedback from consultations and a series of assumptions. The basis for the calculations is further described in Section 3. The calculation provides a basis for 'guestimating' the future demand for employees at senior and operational levels within each of the three sectors of the international financial services sector – banking, insurance and funds. The estimated increase of 9,700 in employment levels in the sector is further detailed in Table 3.

Table 3 Breakdown of forecast employment growth by levels

Sector	Growth in employee numbers from 2007-2012	
	Operational level	Specialist/Middle-senior management level
Banking	3,750	950
Funds	3,100	1,300
Insurance	500	100
Total	**7,350**	**2,350**

1 *These estimates are based on growth rates of:*
- *10 percent for all banking roles;*
- *3 percent for all insurance roles;*
- *10 percent for senior roles in the funds sector; and*
- *8 percent for operational roles in the funds sector, in 2006. .*
- *All growth rates are adjusted downwards towards the end of the period.*

This equates to an average growth level of approximately 1,600 additional resources per annum, approximately 400 at specialist/middle-senior management level and 1,200 at operational levels. Combining employment growth of 9,700 with replacement requirement of just over 17,500 yields a total recruitment requirement of almost 27,500, over the period from 2007 to 2012, or approximately 4,600 per annum.

Ireland's young population (only 11 percent of the population over 65) relative to other European countries results in a large proportion of the population belonging to "working age" demographics[2]. Further population growth combined with continued investment in our educational system will be critical going forward to ensure there is a sufficient supply of skilled resources to support the projected growth in the finance and business sector of the labour market.

Skills Demands

While the Irish education system in seen as producing good quality graduates a number of industry respondents highlighted that Irish graduates were perceived as "skilled generalists" and very rarely had specialised knowledge in a particular area of financial services, which would enable them to operate at higher levels. This contrast was particularly marked when viewed against the US system, which facilitates students specialising in particular niches which ensures a higher level of proficiency upon course completion. This apparent lack of specialisation was also raised in the context of our market positioning and cost base. It was suggested that if graduates were expecting to command above average levels of remuneration then being a skilled generalist was not sufficient as many competing centres also have high volumes of "skilled generalists" available at lower labour cost rates. It was suggested that our education system should provide a greater focus on specialising in a number of selected areas which would support the development of an internationally distinctive competence which was more aligned with a mid to high cost base.

A number of respondents commented on the lack of relevant work experience that many graduates now have when seeking employment in the financial services industry. The increasing trend towards travelling during summer breaks to work in casual employment has resulted in a large number of graduates who despite strong academic qualifications lack experience of working in an office environment. This was termed as a lack of "industry readiness" in graduates. This contrast was particularly marked when viewed against continental European countries where undergraduates are required to participate in a number of internships as part of their educational studies. This ensures that they see the practical application of their education in a live work setting, and as graduates, that they can adapt and contribute immediately as they encounter less of a learning curve in entering the work environment.

Companies are also reporting serious problems with staff turnover which have been highlighted at corporate levels (i.e. in the US). This is creating real disruption in company operations and compounding the cost-base issues as competition for skilled resources for certain roles is leading to increases in remuneration packages which are detrimental to overall competitiveness.

Further, there is ample evidence of skills needs at all points along the skills spectrum in relation to the IFS industry. As a result, company operations are adversely impacted and, there is anecdotal evidence that the insufficient numbers of high skilled graduates with appropriate qualifications and skills is resulting in potential IFS investments being diverted to other locations.

The quantitative and qualitative research found a high level of consistency in the types of skills and occupations where companies experience needs or difficulties in sourcing qualified staff, and these needs are illustrated in Table 4, below.

2 *Irish Times Report on CSO study – June 2007.*

The table also illustrates likely future skills needs. While the overall range of skill-sets is not expected to change significantly over the medium term, and the skills currently in short supply will continue to be critical to the wellbeing of IFS, it was suggested that demand for skills in the future will be influenced by a number of factors including:

- Increasing regulation;
- Technological development;
- Off-shoring;
- Increasing product complexity;
- Product innovation; and
- Further automation at lower levels.

Table 4 Summary of current and future skills needs

Current and future	Future
1. Maths/Economics/Quantitative modelling 2. Accountancy (funds, audit and financial reporting) 3. Risk management 4. Compliance 5. Middle-management with financial services experience 6. Project and change management 7. Funds servicing and banking back-office 8. Actuary	1. Derivatives structuring 2. Quantitative analysis 3. Credit analysis 4. Hybrid technologists – business analysis with IT/ systems skills 5. Business development with detailed product knowledge/industry qualifications 6. Pan-European tax/legal specialists 7. Behavioural economists 8. Funds servicing – client relationship management for complex products 9. Fluency in European languages 10. International compliance

For some of the higher skilled roles it was suggested that Ireland does not have the capacity in the short term to produce these resources at the volume and speed required to support industry growth ambitions, and therefore does not have the capacity to step up to support a distinctive competency in these higher value chain activities. It was suggested that further enhancements of the recently introduced Green Card scheme for non-EU workers and other measures to ensure that Ireland can continue to attract high-skilled workers are required to provide greater support for ease of movement for highly skilled resources.

Finally, there is concern that Ireland's positioning is not appropriate for a mid/high cost centre and is not internationally distinctive. While elements of this sector are highly specialised, the resource intensive elements are at the lower end of the skills range. This has resulted in Ireland having established an international reputation and competency in the funds administration sector which does not easily align with a higher cost base.

Comparing Supply and Demand

A recent FÁS/SLMRU[3] report indicated that there are approximately 13,500 educational awards annually in financial services-related courses. Any attempt to calculate the quantity of skills supplied to the international financial services industry, however, is complicated by the diverse pool from which resources can be drawn. Nevertheless, table 5 summarises the annual educational enrolments and awards of relevance to the IFS industry (where data was available).

Table 5 Summary of estimated education output across financial fields

Field	Enrolments		Awards	
Higher education	5,000		1,200[4]	
Professional institutions	15,000		1,800	
Accounting technician	5,500		4,300	
Accounting		25,500		7,300
Actuarial studies		600		40
Economics and statistics		1,400		400
Tax		1,300		300
Higher education undergraduate	1,500		600	
Higher education postgraduate	350		200	
Professional institutions			4,600	
CFA	300		50	
FÁS	100		100	
Finance and insurance		2,250		5,500
Risk		200		70
Total		**31,250[5]**		**13,610**

Source: SLMRU report, 2007 (PwC amended).
Note: figures are rounded.

Of the potential supply indicated above, only a portion opts to pursue a career in international financial services. Many of the graduates/awardees are already in employment (e.g. the actuarial and accountancy students) and many others go into employment in either domestic financial services or non-financial services sectors.

The industry consultations provided some insight into the nature and causes of the skills needs experienced in the sector.

- Specifically at operational levels, the lack of supply was primarily due to a shortage of personnel, but also personnel with a qualification in insurance, finance and/or accounting, with a particular international financial services dimension.
- Within the middle/senior management/specialist functional roles the lack of supply is due to:
  - The low number of graduates choosing a career in international financial services;
  - The lack of graduates with a specialist knowledge of international financial services;

3 *FÁS/SLMRU (2007) – A Study on the Future Skill Requirements of the Financial Services Sector, unpublished.*
4 *This figure was not in the SLMRU Report, but was subsequently provided to PwC by FÁS.*
5 *The enrolments figure for 'Finance and Insurance – professional institutions' was not available; hence the total figure for enrolments is understated in the table above.*

- The lack of graduates with specialist skills in areas such as: actuarial studies; economics; maths; statistics; and international taxation; and
- In the case of some roles, the limited availability of personnel with these skills, but also with appropriate levels of experience e.g. middle management; risk management, etc.

In summary, the nature of the supply of educated personnel is not aligned to the education and skills demands of the international financial services industry.

To satisfy this demand, it is recommended that specific modules addressing these needs are added to existing course curricula and where needed that new courses are introduced addressing the demand for skills outlined in the recommendations chapter.

In essence, at **foundation level** the requirement is for short courses with flexible delivery mechanisms, aimed at bringing alternative populations of personnel (back) into the workforce in high numbers.

At **undergraduate – graduate level** the emphasis is on both: developing specialised modules which can be updated regularly to reflect industry trends and incorporated into existing degrees programmes; and developing new or updating existing degree programmes to provide greater focus on particular skills demands (e.g. tailored towards hybrid technologists or credit analysts). Where appropriate, applied or case study elements and work experience should be incorporated into these programmes.

The **postgraduate** proposition is for specialist programmes of varying length focused on particular specialist skills (e.g. international compliance, behavioural economics, etc.). Again these courses should incorporate applied or case study elements. The focus at this level is primarily on new courses, which are dynamic in nature, reflecting latest industry trends.

Research, Development and Innovation (RD&I) in Financial Services

All of the research conducted to date indicates that formalised R&D functions in financial services do not appear to be commonplace in IFS in either Ireland or internationally. The speed of change within the industry resulted in very short timelines which were not suited to more formal R&D cycles. Instead, the term "innovation" has a greater resonance with the majority of financial services organisations, and in many cases innovation is viewed as being an integral part of maintaining competitiveness. Several of the companies interviewed were actively pursuing opportunities to improve their products and processes through innovation initiatives.

A number of key factors underpin the low level of RD&I activity, most notably:

- A lack of collaboration between industry and educational institutions;
- A lack of understanding of best practice processes for innovation;
- The financial risks associated with scale investments in R&D; and
- The lack of government incentives/supports.

Where RD&I investments are undertaken, it is typically by the larger scale organisations which offer diversified products and services and where they are very often engaged in end-user delivery. Technology plays a critical role in enabling the delivery and processing of financial services products, and where companies are making significant investments in RD&I, these generally have a technology focus.

There is potential for Ireland to position itself as a solution centre rather than a market centre – at the higher end of the skills spectrum academia could be involved in research into industry relevant themes

which could then be used to provide Ireland with an advantage in complex product development e.g. structured credit (CDOs), hybrid products, LIBOR market pricing model.

From an academic perspective, research is considered strategically important, with each of the international institutions having at least one dedicated financial services research centre. The primary purpose of these research centres are to undertake research activity, however, many are also involved in organising conferences, seminars and workshops to feed research findings back to students and industry. Industry is supportive of this research contributing to it via: funding for research centres; joint-research programmes; student sponsorship; and the provision of/access to data. This differs from the situation in Ireland, with academic institutions reporting a general lack of interest from industry in research. This reflects the greater focus on industry relevant themes in international institutions vis-à-vis Irish institutions. This can be partly explained by the greater collaboration between industry and academia (referred to above) which occurs internationally, and perhaps the fact that the findings of research conducted within the International institutions are typically fed back to students and/or industry via conferences, seminars, and workshops while there is little evidence of this happening in Ireland.

In terms of funding for research, a combination of different sources have been identified: universities, for instance, reported receiving funding from a combination of different sources, including: Irish Government/ State Bodies (e.g. PRTLI, SFI, EI, IDA); the EU (e.g. FP7 Brussels); the University (including inter-institutional funding); and Industry – however, funding from industry was found to be limited. Indeed, a number of universities expressed concerns that the growth of financial services research has been hugely limited by the lack of available funding. In particular, the cost of purchasing data for financial services research is considered an enormous expense for Irish research providers. It was also considered that there is a "*disconnect*" between the importance that the Irish Government attaches to financial services research and the actual funding that its makes available.

The Centre for Financial Services Skills

The concept of a *Centre for Financial Services Skills*, which would form a central support for the industry in the areas of education, training and research, was proposed in the *Building on Success* Report published by the Department of the Taoiseach and the Clearing House Group.

One of the strands of the Terms of Reference of this project requested the EGFSN to "provide policy advice on the role of the Centre for Financial Services Skills". Further, the EGFSN were also asked to provide advice of the form of the proposed Centre.

As an input, opinions were sought from education providers and industry on the form the proposed Centre might take. On balance, the consensus from both academia and industry was that a Centre should provide a single point of contact for both industry and academia, while having responsibility for ensuring that the skills and resources required to support the development of the industry are available.

Furthermore, it was suggested that a Centre would have responsibility for the coordination of education, training and research (facilitating discussions with, and ensuring involvement between, both academia and industry) as well as the promotion of the industry, in particular opportunities within it, in order to attract sufficient numbers of new employees from all groups i.e. secondary school students, back-to-work parents, third level graduates, other industry sectors and overseas.

A model is outlined in the report to reflect the balance of opinion expressed during the consultation process. However, the EGFSN ask that the following considerations be taken into account if a Centre is to be developed:

- Consideration should be given to how a Centre will interact with the current enterprise development apparatus of the State. Any mechanism should be complementary to existing mechanisms and leverage the expertise of existing State agencies;
- While recognising the need for a relatively light structure, if developed, a Centre would need to have a clearly articulated mandate and power to influence in a meaningful way the skills and research agendas outlined in this report. Clear guidelines should be developed describing how the proposed structure and activities of a Centre will derive its authority to influence and execute the functions and the agendas that it may be assigned;
- As well as establishing the mandate of a Centre, it will be crucial that it be provided with adequate resources, budgets and reporting lines to fulfil any mandate it may be given; and
- The Governance of any new entity needs to complement existing mechanisms for public/private collaboration. Existing entities' roles e.g. the *Clearing House Group* need to be clearly defined vis-à-vis any proposed Centre.

The development of a Centre should not been seen as an end in itself and should not slow progress on addressing the skills and research gaps outlined in this report. In finalising its recommendations, the Expert Group has identified the next steps which current stakeholders should take in order to progress the significant skills agenda which exists for the international financial services industry. The development of an alternative mechanism such as a Centre may over time provide a forum to continually address these issues, but its absence in the short term should not deflect attention from the core issues at hand.

There is an immediate task to be undertaken in identifying what education and training provision and research can be undertaken within current resources and what additional funding is required and available to address the remaining gaps recognising that both the State and industry have a role to play.

Conclusions and Recommendations

Due to the diverse nature of IFS, it is clear that no single solution will meet all of the challenges facing the industry from a skills perspective. It is also clear, however, that there is a sense of urgency, amongst both policymakers and amongst the industry itself, to take immediate action to rectify some of the more pressing issues. This will help to protect the existing industry in Ireland which in turn, can act as the foundation for the future development and expansion of the industry.

The EGFSN has outlined a range of challenges facing the IFS industry. Essentially, however, the challenges can be grouped under four broad headings:

- To urgently tackle current skills needs;
- To address staff retention issues;
- To put in place a skills pipeline that a) meets the likely future needs of the industry, and b) delivers a supply of high skilled workers that can help to build the knowledge economy and shape the type of IFS industry that develops in Ireland; and
- To put in place the infrastructure (from a skills perspective) that will allow a financial services research agenda to develop in Ireland.

In response to these challenges, the EGFSN has identified 6 key recommendations, incorporating 18 different elements.

Summary of Recommendations

1 **Education**: Increase the supply of graduates emerging from **formal education** with appropriate skill sets to meet the needs of the international financial services industry. This will require the introduction of new education and training modules and/or courses at graduate, postgraduate and professional level.

- Increase the numbers of graduates and postgraduates undertaking courses and modules appropriate to the needs of the IFS industry. Specifically, this requires the development of new modules and, where appropriate, new courses designed specifically to meet the needs identified in this report. Mathematical and technological skills sets are fundamental to the industry.
- Provide opportunities to specialise in specific areas of financial services through elective modules e.g. derivatives structuring, risk management, financial modelling etc.

Next Steps

(i) The international financial services industry, through the offices of Financial Services Ireland (FSI) should collectively agree on short-term priorities in relation to their skills needs as set out in this report in early 2008.

(ii) Higher Education Institutes should be provided with an opportunity to respond to the contents of this report. The Higher Education Authority (HEA) should facilitate this consultation in early 2008. HEIs responses should identify opportunities to address the recommendations within current funding; identify opportunities to introduce modules onto existing programmes; and outline planned provision.

(iii) The HEA and FSI should work together through the Clearing House Group to agree an action plan to deliver the prioritised skills sets. The Clearing House Group has established a subgroup to facilitate this process.

(iv) Having completed steps (i)-(iii) and identified the remaining gaps that cannot be met through existing provision and funding, the HEA should, subject to funding, issue a call for proposals.

2 **Training**: Introduce improved training mechanisms to upskill new entrants into the industry. In particular, the requirement to expand the pool of labour available to international financial services firms will require an expansion of the supply of **foundation level skills**.

- Develop mechanisms to support rapid skills development to ensure that resources can develop the requisite understanding of the industry and proficiency in core areas e.g. 8-week intensive course incorporating simulated environments.

Next Steps

(i) FÁS currently offers a number of courses relevant to the international financial services industry such as its *hedge fund administration* course and is seeking to expand its offerings in the financial services sphere in 2008. The development of these programmes should be prioritised in consultation with industry.

(ii) The *Clearing House Group* subgroup supported by the Development Agencies should seek proposals from other education and training providers such as the Vocational Education Colleges (VECs) and professional institutes to deliver these skills.

3 **Human Resource Management:** In order to expand the supply of labour available to international financial services firms, innovative approaches to **Human Resource Management** are required.

- Evaluate the core skills and competencies required to operate at foundation level and develop competency profiles for standard roles e.g. client servicing, funds administration.
- Identify alternative labour pools e.g. school leavers, parents returning to the workplace, well educated migrant workers currently employed in other sectors, who are capable of performing foundation level roles and of meeting probable skills needs.
- In order to boost the stock of human capital, both firms and education providers should recruit world-class talent, regardless of where that talent is to be found. This requires a flexible and attractive immigration system that minimises the burden on both individuals and their employers.

Next Steps

(i) A forum is required to bring together the HR managers from IFS companies to develop responses and share best HR practices. This could be addressed by the Shared Services Forum.

(ii) The Expert Group on Future Skills Needs should continue to monitor the skills requirements of the IFS industry and communicate these needs to the Employment Permits section of the Department of Enterprise, Trade and Employment.

4 **Awareness/Promotion:** More effective **career advice and promotion** is required to highlight the career opportunities on offer in the international financial services industry.	■ Promotion of financial services career paths to second level students, with a particular focus on high-level mathematics students. ■ Promotion of career opportunities to third-level students, focusing on students in business/finance, mathematics/ statistics, engineering and technology courses. ■ Identification and targeting of promotional activities towards specific population groups, e.g. parents returning to the labour force, those changing careers, migrants working in other sectors etc.

Next Steps

(i) The industry, coordinated by Financial Services Ireland, and supported by IDA Ireland and FÁS, should develop a strategy for careers information. These bodies should ensure that all those involved with the provision of career guidance and information are fully aware of the positive career opportunities within the industry.

5 **Research**: Establish an international financial services **research capability** in collaboration with industry tasked with developing leading edge thinking and solutions which are shared through structured industry fora.	■ Identification of key thematic areas of research by academia that are relevant to industry requirements/interests. ■ Sharing of research undertaken by academia with industry via 'research seminars' and 'conferences'. ■ Research themes should also be expanded to include new subjects in the humanities and emerging disciplines such as behavioural economics. ■ Interaction between academia and leading international researchers and education and training providers to identify innovative areas of research. ■ Additional research funding to academia from industry, e.g. sponsorship of research projects, research centres and provision of data.

Next Steps

(i) IDA Ireland, Enterprise Ireland, HEA and Science Foundation Ireland (SFI) on an ongoing basis will facilitate a forum for industry and academia to jointly agree a research agenda that will be mutually beneficial. The first forum should be held in early 2008.

(ii) Existing funding sources (SFI), the Irish Research Council for Science, Engineering and Technology (IRCSET) and the Irish Research Council for the Humanities and Social Sciences (IRCHSS)) should be leveraged in order to progress the international financial services research agenda.

(iii) SFI plans to increase its funding of research in the area of financial mathematics over the coming years. Any funding should be cognisant of the findings of this report.

(iv) Similarly, the Development Agencies currently operate a number of schemes to support their companies in undertaking R&D activities research funding in the area of IFS. In particular, IDA Ireland is developing concepts and specifically targeting R&D from financial services companies.

6 **Communications and Collaboration:** Encourage **academic collaboration with industry** to support course development and delivery at graduate and postgraduate level.	■ Improve linkages between academia and industry to ensure the relevance of course curricula and research topics. ■ Increase the frequency of course reviews and reduce the time taken to revise course contents. ■ Examine mechanisms that provide for greater flexibility in introducing topical, practical and industry relevant modules and courses. ■ Encourage the use of industry placements and internships as part of course delivery.

Next Steps

(i) An ongoing mechanism is required to facilitate academic – industry collaboration. In the short term, the HEA and FSI should facilitate a forum between industry and academia to discuss the skills needs outlined in this report. This forum should take place on foot of the consultations undertaken in relation to Recommendation 1, which deals with the supply of graduates. Such a forum should take place in early 2008.

Chapter 1: Introduction

1.0 Introduction

The international financial services industry is recognised as an area with potential for generating high growth in enterprise development and economic output into the future. The industry has grown dramatically in Ireland since its inception in 1987 to form a vital part of the Irish economy, and is now a major contributor to Ireland's economic strength. In 2006 the international financial services industry was responsible for 5 per cent of the country's GDP and according to the Bank of International Settlements, Ireland is now ranked as the eleventh largest international market in the world based on the cross border positions of banks.

Despite the success to date in attracting leading players there is recognition across the industry that this industry is highly mobile, and that Ireland needs to continue to invest to ensure the on-going development and growth of this sector.

1.1 Background to the Expert Group Study

The Government strategy document, *Building on Success*, published in 2006 outlined a set of proposals for the further development of the international financial services industry in Ireland. This report set out a framework which identified five priority areas for development, which are required to sustain Ireland's competitive advantage in the financial services industry.

The five areas identified were:

(i) Flexible and sound regulatory environment;

(ii) Attractive legislative and fiscal environment;

(iii) Expertise in markets;

(iv) World class skills, education and training; and

(v) Product development/innovation/R&D.

Investment in world-class skills, education and training was recognised as one of the critical elements required to compete in, and advance to the top of, the "value chain" of the international financial services industry.

Subsequently, the Clearing House Group asked that a specialist study be undertaken by the Expert Group on Future Skills Needs (EGFSN) to consider the skills needs of current and future activities in the sector and to identify the types of additional educational provision required to meet the future skills needs of the industry. Having identified the industry needs, this study should also provide a roadmap to support the delivery of the associated educational provision to meet these needs.

1.2 Terms of Reference

In line with the recommendations in *Building on Success* the focus of this study is to identify the skills, education, training and research needs of the industry. The terms of reference of this study were as follows:

- To determine likely future skills required by leading international financial services firms both in Ireland and selected markets;
- Based on the likely future development of the international financial services industry, assess Ireland's ability to provide the necessary skills for this advancement of the sector through education, training and research provision;
- Based on identification of best practice skills provision internationally, in particular the UK (London) and USA (New York and Boston), to provide advice on meeting any gaps identified in the study in regard to Irish educational and/or training provision;
- Identify existing international financial services programmes, niches and research competencies in Irish Institutes of higher education;
- Identify company research priorities (at a corporate level) and map them against the existing strengths of their Irish subsidiaries and Irish academic strengths;
- Identify leading international academic financial services institutions to assess best practice in relation to skills training and research programmes, the delivery of research, their mechanisms to engage industry in collaborative projects and how they collaborate internationally with other institutions;
- Engage with leading international financial services companies to improve understanding of RD&I roadmaps and to assess what these companies would expect of the Centre for Financial Services Skills and how they might engage in the development and funding of research programmes; and
- To provide policy advice on the role of the Centre for Financial Services Skills in this context.

1.3 Approach and Methodology

A sub-group of the EGFSN was established to guide this project. The various strands of the project are outlined below:

- Research and consultations with stakeholders undertaken by Forfás – as well as developing a detailed terms of reference for the project, Forfás produced a background paper articulating a vision for IFS in Ireland and engaged with a large number of stakeholders in the industry to ascertain their views on the development of the sector.
- Call for Submissions – A call for submissions from relevant parties was placed in the national press at the beginning of the project. As a result, Forfás received a number of submissions from industry and education and training providers.
- Research from the Skills and Labour Market Research Unit (SLMRU) in FÁS – The SLMRU have produced a report analysing both current and future supply and demand for skills in the international financial services sector. This analysis will inform the other elements of the project.

- Forfás, on behalf of the EGFSN engaged PwC to undertake an extensive national and international consultation process to capture the views of industry and education and training providers, regarding the likely development of the international financial services sector in Ireland. This process included 29 interviews with 44 executives from over 20 companies in Dublin, New York and London, and 22 interviews with education and training providers in Ireland, the UK and the US. PwC also facilitated a workshop which was attended by a number of industry representative bodies and training organisations. Based on these consultations, PwC submitted a report to Forfás summarising the feedback received.
- All of these strands have been drawn together in this document.

In broad terms, the research approach has involved a high-level review based largely on qualitative interviews with key informants. On the topic of course provision in particular, while the review of the courses available from the selected providers is comprehensive, it is not intended to incorporate a detailed audit of course provision in individual universities/colleges, and the report recommendations should therefore be viewed in this context.

Target Company Selection

The target list of companies to be interviewed was agreed in advance based on discussions between PwC, Forfás, IDA Ireland and industry representative bodies.

Interviews were carried out at a senior level in each company, with people who were considered to have a good perspective on the company's strategic plans and the likely impact on skills and research needs going forward. Key informants typically were drawn from a range of senior management roles including Managing Director, VP/Director of Human Resources, Chief Operating Officer, Chief Technology Officer and Head of Risk Management etc.

International Academic Institution Selection Criteria

The international academic institutions consulted, as part of this programme of work, were selected based on a number of criteria, namely:

- Industry recognition of the institution;
- Other universities/colleges recognition of the institution;
- Accreditation of the institution i.e. Financial Times 'Best Business School' and Guardian University Guide; and
- Achieved RAE rankings for research undertaken.

Interviews were conducted with senior faculty members from departments/faculty involved in the provision of financial services related courses i.e. finance, business, economics and mathematics faculty. In addition, a number of faculty involved in various institutions dedicated research centres were also consulted.

1.4 Report Structure

This introduction is the first of seven chapters in the report. The remainder of this report comprises 6 additional chapters. An overview of the remaining chapters content is provided below.

Chapter 2 provides a contextual background to the study by describing the international financial services environment. This includes an overview of the global and Irish international financial services market and a review of recent industry trends and key drivers of change. This chapter also examines the current numbers employed and the potential growth over the medium term.

Chapter 3 seeks to assess the demand for international financial services skills, based on in-depth discussions with the target companies. This chapter includes a review of existing skills needs and outlines future skills requirements within the international financial services industry. This chapter also reviews the supply-side dynamics to provide additional context against which industry growth is reviewed.

Chapter 4 comprises a review of the Irish Financial Services Skills and Research Providers.

Chapter 5 reviews skills provision and research in a number of selected international institutions and then compares and contrasts the Irish and international situation.

Chapter 6 looks specifically at the topic of research and innovation in international financial services and the role that support structures could play in fostering and supporting leading edge industry research. To do this, the chapter examines the evidence available from three sources – a review of international literature on RD&I strategies, the evidence from discussions with leading-edge international financial services companies, and the evidence from discussions with US and Irish education providers.

Chapter 7 examines the role that the proposed Centre for Financial Services Skills could play in supporting and enabling development initiatives in the sector.

Chapter 8 concludes the report by summarising the key findings arising from the earlier chapters skills and the key conclusions and outlines the recommendations arising from these findings.

Chapter 2: International Financial Services Sector

2.0 Introduction

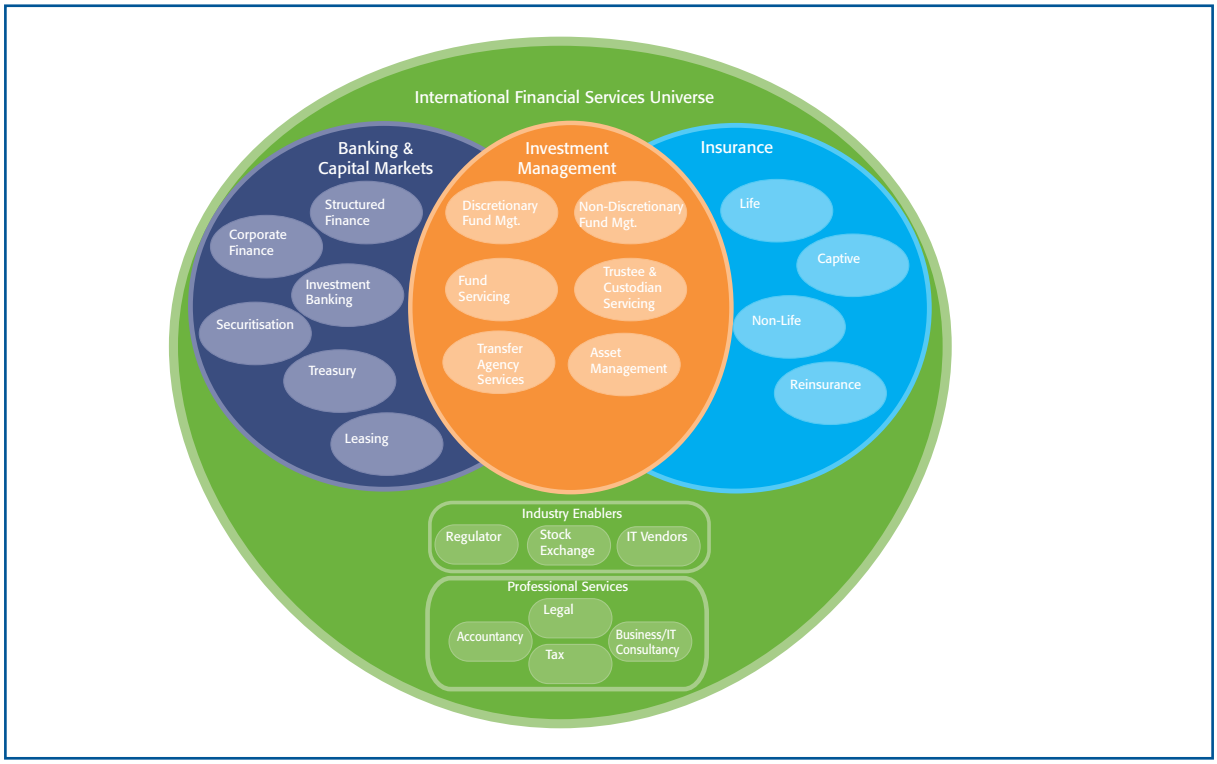
The purpose of this chapter is to provide contextual background to the international financial services sector, both globally and in Ireland, and to highlight the scale and growth of this sector in Ireland since the establishment of the IFSC in 1987. The main areas covered in this chapter are:

- The international financial services landscape;
- An overview of each of the sectors within the international financial services market; and
- International financial services sector in Ireland.

2.1 International Financial Services Landscape

The term 'international financial services' is an umbrella term which is typically used to describe the three areas of banking and capital markets, investment management and insurance. Figure 2.1 below provides a summary of the principal components of each of these areas and some of the key industry enablers.

Figure 2.1 International financial services sector



Source: PWC Derived.

Despite being shown separately above, the traditional offerings of banks, asset managers and insurers are increasingly converging as these organisations enter new sub-sectors which span the "traditional" sector divides.

The size and shape of the international financial services sector is also undergoing significant change driven by a number of key factors, which include:

- Demographics – the "greying economy" and increasing reliance on private pensions;
- Economic cycles – maturing developed economies and high growth emerging economies;
- Politics – cross-border integration and increased requirements for transparency;
- Product sophistication – increased product sophistication e.g. hedge funds, derivatives;
- Regulation and reporting – increased regulatory requirements e.g. CRD, MiFiD; and
- Technology – integration of platforms, automated processing and timely access to information.

Due to the overall scale, differing categorisations of the sub-sector components, increasing convergence across sub-sectors and the dynamic nature of asset values, it is difficult to provide a definitive sizing of the international financial services market. However, despite this, there are a number of indicators which provide a view on the overall industry scale and growth trends, namely:

- Total value of global assets managed on behalf of investors increased to reach $88.3 trillion in 2005[6];
- The value of professionally managed assets across the top 28 national markets grew by 15 percent to $49.1 trillion in 2005[7]; and
- The stock of shares and public and private debt securities held in America grew from 2.4 times GDP in 1995 to 3.3 times GDP in 2004. These figures do not include derivatives, notional amounts traded privately or over-the-counter (OTC) securities which have grown from $258 trillion in 2004 to $370 trillion in 2006[8].

All of the above indicators point to an industry which is experiencing strong rates of growth. International financial services have become a key driver of growth for several advanced economies, contributing significantly to GDP and overall employment. In the US for example, the financial services sector is the third largest contributor to GDP at 8 percent and has averaged an annual growth rate of 5 percent over the past decade[9]. In the UK, the financial services sector contributes 6 percent to GDP and employs 4 percent of the national workforce.

The international markets for banking and capital markets, investment management and insurance are described in further detail below[10].

6 *Boston Consulting Group Wealth Report December 2006.*
7 *Boston Consulting Group Wealth Report December 2006.*
8 *The Economist – Special Report Alchemists of Finance, May 2007.*
9 *Sustaining New York's and the US Global Financial Leadership – McKinsey*
10 *UK Skills Bill – Part 1, 2007.*

Sector Overview – Investment Banking and Capital Markets

Investment banking and capital market activities is the term used to describe trading debt, equities, fixed income, funds, foreign exchange, commodity and derivative instruments and the origination of equity finance. Figures 2.2, 2.3 and 2.4 provide a summary of global trends for these investment banking and capital markets activities by illustrating[11]:

- Trading volumes for equities and bonds;
- Corporate finance and advisory revenues; and
- The value of equity origination.

Figure 2.2 Global trends in trading volumes and bonds

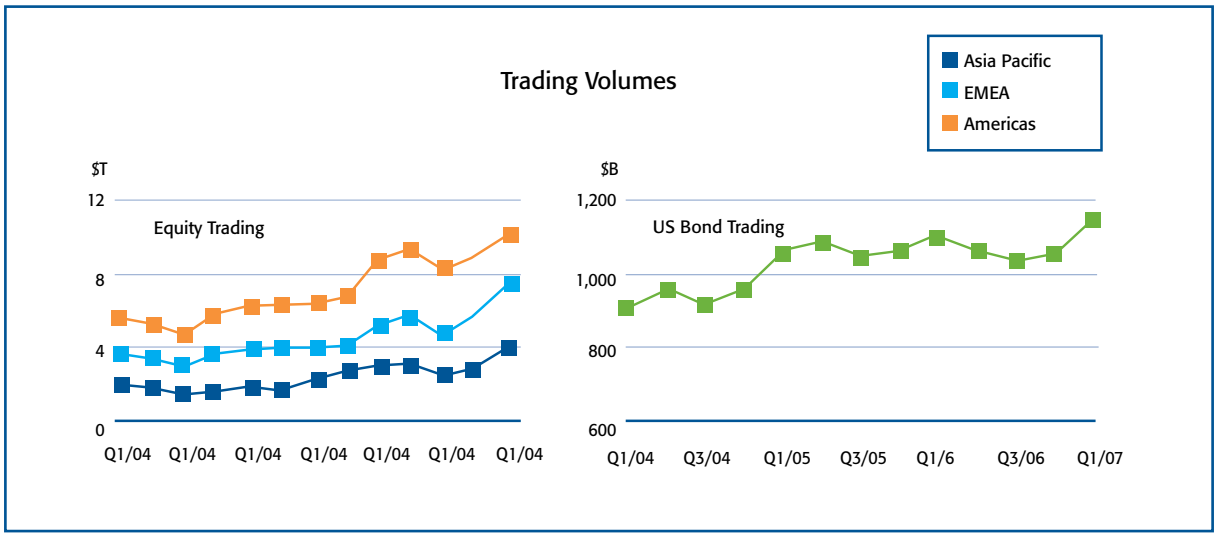
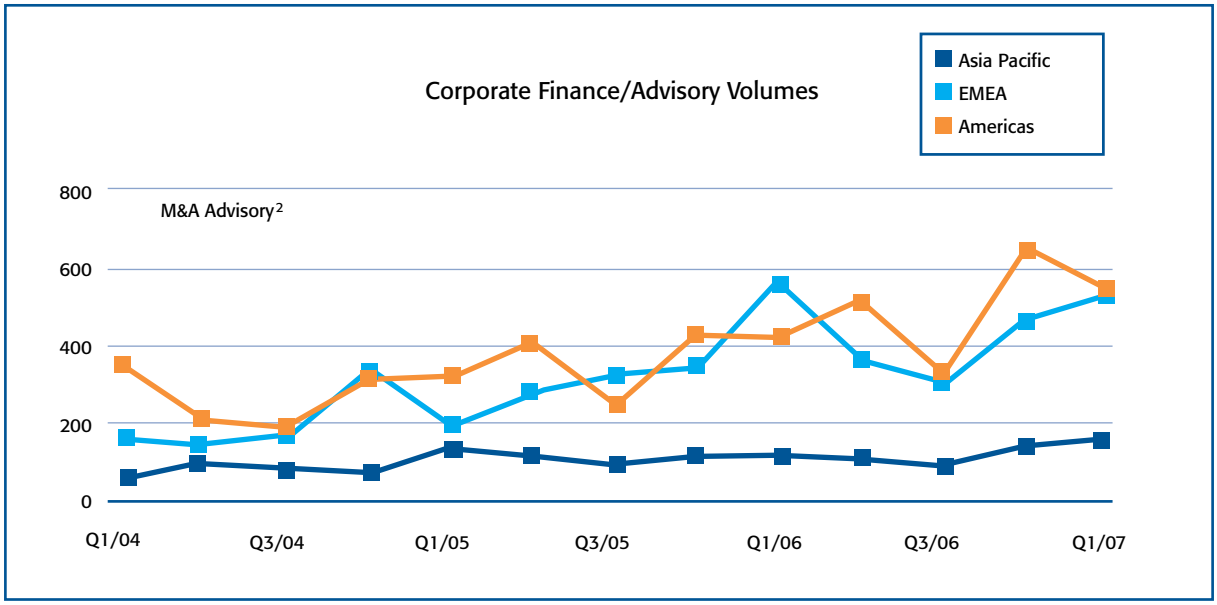
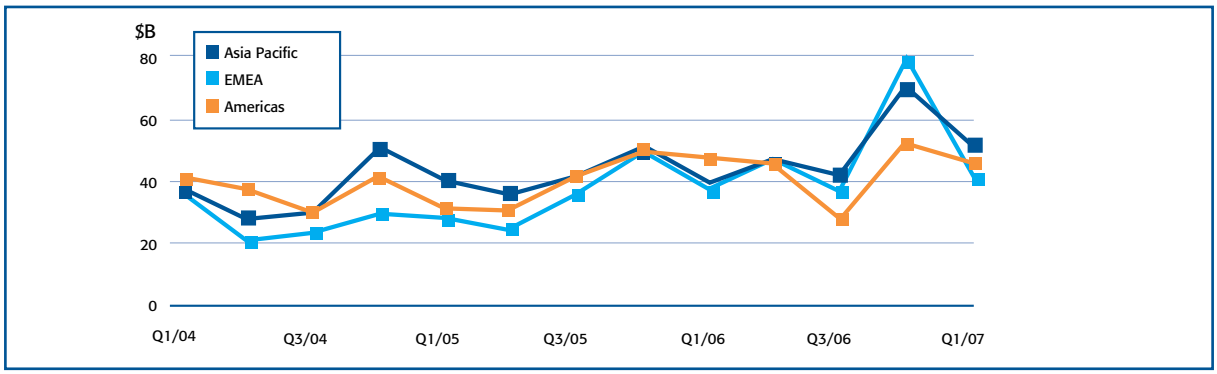


Figure 2.3 Global trends in corporate finance/advisory volumes



11 BCG Investment Banking and Capital Markets Report – May 2007.

Figure 2.4 Global trends in equity origination



Source: BCG Investment Banking Report – Q1 2007.

A further breakdown of investment banking and capital market sector revenues by location of headquarter, as illustrated in Table 2.1 below, shows that North America remains the largest market by value, but that Europe is recording a faster pace of growth and higher operating margins[12].

Table 2.1 Breakdown of investment banking and capital markets by location of headquarters

Geography	2006	2005	YoY revenue growth	Avg. operating margin
North America	232,386	191,937	18%	33%
Europe	212,971	173,943	22%	43%
Asia	101,139	90,488	16%	37%

Source: McKinsey CIB 50.

The top ten corporate and investment banking companies in 2006 ranked by revenues are detailed in Table 2.2 below.[13]

Table 2.2 Top 10 corporate and investment banking companies 2006

	Company	2006 revenues ($m)	2005 revenues ($m)	YoY revenue growth
1	Goldman Sachs	28,374	20,054	41%
2	Morgan Stanley	20,215	15,063	34%
3	Citigroup	20,120	17,172	17%
4	Deutsche Bank	20,095	16,092	25%
5	Merrill Lynch	18,917	13,844	37%
6	UBS	17,350	14,035	24%
7	JPMorgan Chase	17,170	13,137	31%
8	Credit Suisse	16,655	12,254	36%
9	Lehman Brothers	15,166	12,701	19%
10	Royal Bank of Scotland	12,580	10,179	24%

Source: McKinsey CIB 50.
Note: According to the IBF several of the top 10 banks such as Citigroup, Merrill Lynch and JP Morgan have established wholesale banking operations in Ireland.

12 *McKinsey Global Corporate Investment Banking 50 – August 2007.*
13 *McKinsey Global Corporate Investment Banking 50 – August 2007.*

All of the top ten companies experienced significant double-digit growth rates in revenues in 2006. Total revenues for the investment banking and capital markets sector have shown an annual increase of 22.7 percent in 2007.

Sector Overview – Investment Management

The total assets managed by the world's 500 largest asset managers increased by 10 percent in 2005 to reach $53.6 trillion[14]. The largest European based managers have continued to increase their share of assets under management accounting for half of the top 20 fund managers and 57 percent of the assets, an increase of 5 percent on 2004[15].

The top ten global asset managers in 2005 ranked by value of assets are shown in Table 2.3 below.[16]

Table 2.3 Top 10 global asset managers

	Company	Country	Assets ($m)
1	UBS	Switzerland	2,016,000
2	Barclays Global Investors	UK	1,513,043
3	Allianz Group	Germany	1,493,488
4	State Street Global	US	1,441,058
5	Fidelity Investments	US	1,421,903
6	AXA Group	France	1,260,202
7	Capital Group	US	1,165,754
8	Credit Suisse	Switzerland	1,128,365
9	Deutsche Bank	Germany	1,026,875
10	Vanguard Group	US	957,589

Source: Watson Wyatt Fund Management World Rankings.
Note: According to the Dublin Finance Yearbook several of the top 10 asset management companies such as Allianz, State Street, Fidelity, Axa, AIG and Zurich Financial Services have established operations in Ireland.

The European investment fund market has continued to show strong growth rates with total net assets in Q1 2007 in excess of €7,574 billion[17]. Ireland and Luxembourg have experienced exceptional rates of growth as many of the larger investment management companies have selected either of these locations as part of a migration to a single-hub strategy. While European funds have grown at a rate of 11 percent over the past five years, Ireland has experienced a Compound Annual Growth Rate (CAGR) of 32 percent[18]. Ireland and Luxembourg accounted for €285 billion of net flows in 2006, equating to 89 percent of total European subscriptions[19]. Luxembourg still dominates overall funds flows but Ireland has established a lead in the money market sector.

Table 2.4 shows the significant growth which has occurred in the European funds industry during the period 2002-2006.

14 Watson Wyatt Fund Management World Rankings 2006.
15 Watson Wyatt Fund Management World Rankings 2006.
16 Watson Wyatt Fund Management World Rankings 2006.
17 KPMG, State of the Investment Management Industry in Europe, July 2007.
18 European Fund Market Data Digest 2007, FERI, p21.
19 European Fund Market Data Digest 2007, FERI, p21.

Table 2.4 Growth in European funds industry 2002 to 2006

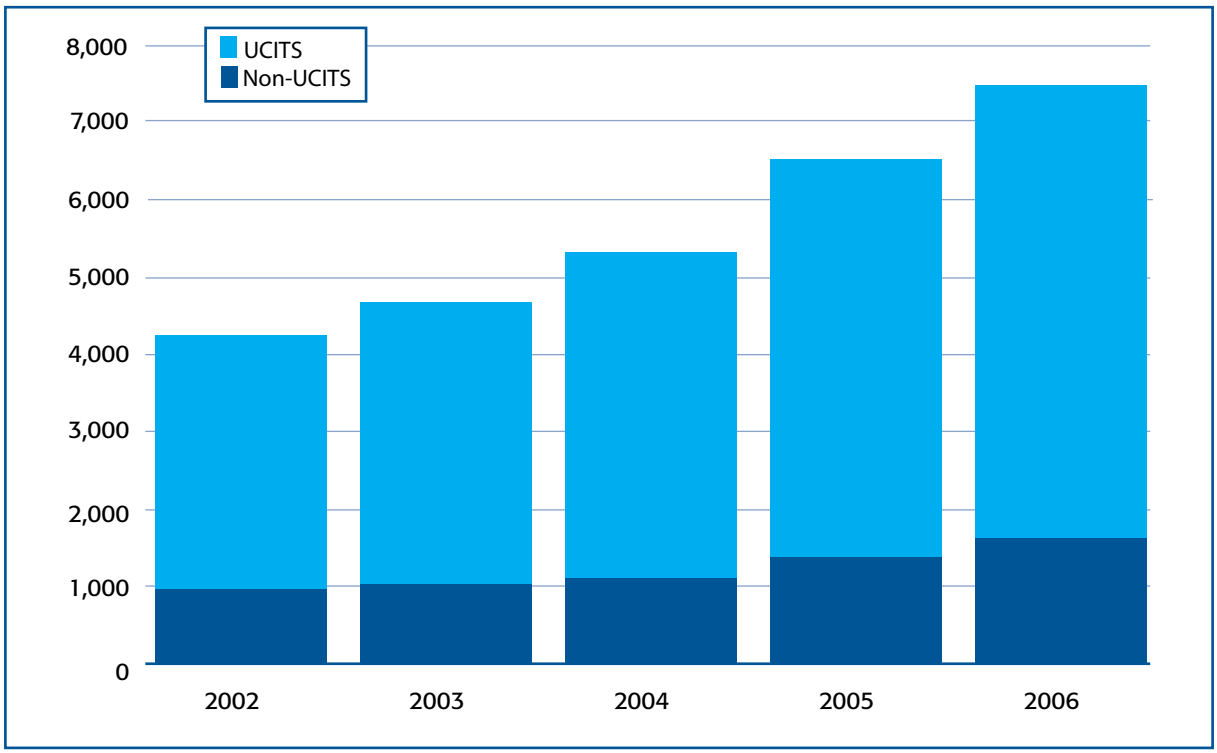
	2002 €m	2003 €m	2004 €m	2005 €m	2006 €m
Assets	2,817,125.5	3,234,896.5	3,604,159.0	4,589,144.2	5,083,298.2
Growth	-147,494.0	417,771.0	369,262.6	984,985.2	494,154.0
Net sales	141,258.1	219,286.6	133,021.1	364,946.5	320,677.3
Performance	-288,752.1	198,484.4	236,241.5	620,038.7	173,476.7
Sales as % of growth		52.5%	36.0%	37.1%	64.9%

Source: European Fund Market Data Digest 2007, FERI.

The implementation of the UCITS III directive has provided a spur to market growth levels, which has driven new sales volumes and launched the industry into a new phase of product development. Some market analysts such as FERI are forecasting that based on a cautious estimate the industry will grow from €5 trillion to €8 trillion by 2011, equating to an annual growth rate of 10.2 percent[20].

Figure 2.5 shows that UCITS based funds have been major drivers of the growth of European Investment funds[21]:

Figure 2.5 Net assets of European investment funds (€billions)



Source: EFAMA Trends in the European Investment Fund Industry, March 2007.

20 *European Fund Market Data Digest 2007, FERI, p9.*

21 *EFAMA, Trends in European Investment Funds Industry, Q1 2007.*

In 2006, UCITS funds were the main contributor to the growth in European assets with annualised growth of 15.1 percent. The use of derivatives in a portfolio under UCITS III has facilitated increased levels of flexibility in product construction allowing for an expansion of funds offering absolute and total return market strategies.

Sector Overview – Insurance

Worldwide insurance premiums reached $3,726 billion in 2006 with year-on-year growth in total premium volume of 5 percent (adjusted for inflation)[22]. The main driver of growth was the life sector which showed an annual increase of 7.7 percent, whereas the non-life sector grew by a more modest 1.5 percent[23]. Growth in premiums was driven mainly by emerging markets which increased by 16 percent, whereas the more mature industrialised countries experienced a growth rate of 4 percent.

Table 2.5 provides a geographic breakdown of changes in insurance sector premiums in 2006.

Table 2.5 Geographic breakdown of changes in insurance premiums 2006

	Life premiums		Non-Life premiums		Total premiums	
	US $bn	% change vs 2005	US $bn	% change vs 2005	US $bn	% change vs 2005
Industrialised countries	**2,038**	**6.6%**	**1,357**	**0.6%**	**3,390**	**4.0%**
United States	534	3.6%	638	1.0%	1,170	2.1%
Japan	363	(2.0%)	97	0.3%	460	(1.5%)
United Kingdom	312	30.2%	107	(2.1%)	418	20.1%
Germany	95	2.4%	110	(1.0%)	205	0.6%
France	178	15.1%	73	1.1%	251	10.6%
Italy	90	(7.5%)	49	0.3%	139	(4.9%)
Emerging Markets	**176**	**21.1%**	**157**	**10.8%**	**333**	**16.3%**
Latin America and Caribbean	29	14.1%	43	10.0%	71	11.6%
Central and Eastern Europe	13	19.2%	43	9.2%	56	11.4%
South and East Asia	97	23.6%	42	14.5%	138	20.8%
Middle East and Central Asia	5	5.3%	14	5.7%	19	5.6%
Africa	35	21.6%	14	6.2%	50	17.5%
World	**2,209**	**7.7%**	**1,514**	**1.5%**	**3,726**	**5.0%**

Source: Swiss RE Sigma Study of World Insurance 2006.

22 *Swiss Re Sigma Study on World Insurance 2006.*

23 *Swiss Re Sigma Study on World Insurance 2006.*

Table 2.6 provides a breakdown of European premium income and growth rate by insurance category:

Table 2.6 European breakdown of premium income and growth rate by category

	Premium income (€bn)		Growth Rate	
	2005	**2006**	**2005/2004**	**2006/2005**
Life	618.3	659.3	9.7%	4.4%
Non-life	377.0	405.9	1.6%	5.3%
Motor	127.3	128.9	1.7%	-1.0%
Health and Accident	94.4	115.6	4.5%	20.2%
Property	79.1	82.1	4.2%	1.6%
General liability	32.8	33.9	3.8%	1.4%
MAT	12.9	12.2	-2.1%	-7.6%
Legal Expenses	5.9	6.5	5.7%	8.8%
Others	**24.4**	**26.7**	**11.8%**	**7.5%**
Total	**995.3**	**1065.1**	**6.4%**	**4.8%**

Source: CEA, Insurers of Europe Annual Report.

Collectively, European insurance markets grew by 4.8 percent in 2006 with premium income exceeding the €1 trillion mark to reach €1.065 trillion[24]. Life premiums continue to account for the majority of income at €659 billion, representing an annual growth rate of 4.4 percent. Product innovations in the areas of occupational pensions and unit-linked products with capital guarantees have proven to be key drivers of this growth. The European non-life sector experienced growth of 5.3 percent in 2006, however, a significant proportion of this growth was attributable to the privatisation of the health system in the Netherlands[25]. At a European level the insurance industry is likely to experience a significant period of change over the next two years as Solvency II requirements are implemented.

Tables 2.7 and 2.8 below show the top ten global life and non-life insurance companies in 2007 as ranked by revenues.[26]

Table 2.7 Top 10 global life insurance companies 2007

	Company	Revenues $m
1	ING Group	158,274.3
2	AXA	139,738.1
3	Assicurazioni Generali	101,810.7
4	Aviva	83,487.0
5	Prudential	66,133.5
6	Nippon Life	56,624.0
7	CNP Assurances	55,583.8
8	Met Life	53,275.0
9	Aegon	45,939.1
10	Dai-Chi Mutual Life	40,145.5

Source: Fortune Global 500.

Note: According to the Insurance Statistical Review 2006, several of the top 10 life companies such as Axa, Aviva (through Hibernian), Prudential, CNP Assurances and Aegon have established operations in Ireland.

24 CEA Insurers of Europe, Annual report 2006-2007.

25 CEA Insurers of Europe, Annual report 2006-2007.

26 Fortune Global 500 – July 23 2007.

Table 2.8 Top 10 global non-life insurance companies 2007

	Company	Revenues $m
1	Allianz	125,346.0
2	American International Group	113,194.0
3	Berkshire Hathaway	98,539.0
4	Zurich Financial Services	65.000.0
5	Munich Re Group	58,183.2
6	Millea Holdings	36,066.9
7	Allstate	35,796.0
8	Swiss Reinsurance	32,117.6
9	Hartford Financial Services	26,500.0
10	Travelers Co's	25,090.0

Source: Fortune Global 500.
Note: According to the Insurance Statistical Review 2006, several of the top 10 non-life companies such as Allianz, AIG, Zurich Financial Services have established operations in Ireland.

Industry reports suggest that strong demographic and social trends are expected to support continued growth in the life insurance sector, as maturing populations focus on savings and pensions products to provide for their future welfare. Whereas, the non-life sector is expected to experience sluggish rates of growth over the near-term in industrialised economies with the majority of growth coming from emerging markets.

2.2 International Financial Services Sector in Ireland

The international financial services sector in Ireland has grown dramatically over the past 20 years as outlined earlier. The rapid growth of this sector in Ireland and Ireland's emergence on the international stage as a financial centre is evidenced by the following statistics[27]:

- Banking assets have trebled from €422 billion in 2001 to €1.2 trillion in 2006;
- The value of fund assets under administration has trebled from $430 billion in 2002 to $1.3 trillion in March 2007[28];
- Ireland is now the largest exchange for funds listings with over 4,300 listed in 2006;
- Ireland is the number one centre for cross border life insurance in Europe. The international insurance market comprises 660 companies writing foreign risk insurance business with gross premium income in excess of €15 billion;
- Ireland has established a leadership in the global market for alternative investments with an estimated $600 billion of assets being serviced here in March 2007[29]; and
- Ireland is ranked second in Europe for money market funds with assets of $104.2 billion in September 2006.

27 *Finance Dublin Yearbook 2007.*
28 *Irish Funds Industry Annual Newsletter 2007.*
29 *Irish Funds Industry Annual Newsletter 2007.*

Employment

This section is based on secondary data, feedback from consultations and a series of assumptions. The basis for the calculations is outlined below. The calculation provides a basis for 'guestimating' the future demand for employees at senior and operational levels within each of the three sectors of the international financial services sector – banking, insurance and funds. Any interpretation of the data should reflect this.

International Financial Services Sector – Total Employment

There are a number of sources of estimated current employment levels identified for the international financial services sector. The composite figures for the three sectors of banking, investment management/funds, and insurance appear to fall within the range of 15,590, as noted in the Forfás Annual Employment Survey, to a figure of up to 24,000 quoted by the IDA[30]. The variances may be due to the data definitions used, each of which differs slightly. Other sources of employment figures, which fall within this range include the National Treasury Management Agency's Ireland Information Memorandum 2006 document which refers to a figure of 21,000, while the IBF (Irish Bankers Federation) pre-budget submission for 2006 refers to a figure of 19,000. Mid-way within this range is the figure provided by Finance Dublin Yearbook 2007, of 22,177, which is based on a census of the employees at each company listed in the Yearbook. This figure, broken down between the three sectors of banking, funds and insurance, is used as an estimate of the current employment levels in the international financial services sector.

These figures are provided in the table below for 2006 and 2005.

Table 2.9 Employment figures by sector 2005/2006

Sector	2006	2005	Change	% change
Banking	9,923	8,008	1,915	24%
Investment management/funds	9,227	8,144	1,083	13.3%
Insurance	3,027	2,943	84	3%
Total	**22,177**	**19,095**	**3,082**	**16.1%**

Source: Finance Dublin Yearbook 2007.

International Financial Services Sector – Employment in the Banking Sector

While employment figures for the composite banking sector are available, again there is a lack of data readily available on employment levels within the international banking sector. However, in a speech to the IBF Conference in September 2007, An Taoiseach indicated that there are 41,000 people employed in the Irish banking industry of which 32,000 are employed by the major retail banks. By and large the major retail banks are not typically categorised as being part of the International Financial Services Sector insofar as their primary area of focus is on the domestic market. Therefore, the balance of 9,000 employees provides an indication of the numbers employed in international banking activities. This is not significantly dissimilar to the figure in the table above of 9,923 employees in international banking for 2006.

30 In a commercial profile/advertisement in the Business Week publication.

International Financial Services Sector – Employment in the Funds Industry

The funds industry in Ireland is primarily international and therefore it is easier to isolate the employment figures for this sector. In a recent FÁS/SLMRU (Skills Labour Market Research Unit) report on the Future Skills Requirements of the Financial Services Sector, it was indicated that of the total number employed in financial occupations of 148,000, 41 percent or 61,000 are employed directly in the financial intermediation sector, which includes both the domestic and international elements of the banking, insurance and funds sectors. Further, the funds sector accounts for 12 percent of this figure, which equates to 7,300 people. This is broadly in line with an Irish Funds Industry Association Employment and Staffing Survey which indicated that the number of employees in funds industry companies in Ireland was 6,800 in January 2006. However, a recent Deloitte report – the 2007 Fund Administration Survey – put the number of people working directly in the fund administration business in Ireland at 9,000. In addition to the fund administration aspect of the funds industry, the asset management aspect incorporates approximately 2,500 people, according to industry sources. Therefore, employment within this sector ranges between 6,800 and 9,000 plus. Again, the figures in Dublin Finance Yearbook of 9,227 are within this range, and therefore it was decided to use these figures as the basis for further estimates.

International Financial Services Sector – Employment in Insurance

The IIF estimates that the domestic insurance sector employs in excess of 14,000 people, with the international insurance sector being comparatively smaller, with Finance Dublin estimating the number employed at 3,027 people. According to the Finance Dublin Yearbook, annual employment growth in the international sector was estimated to be 3 percent in 2006 (down from 8 percent in 2005). The Dublin International Insurance and Management Association is the largest representative body for this sector and undertakes a survey of the numbers employed by its member firms which it estimates to be just under 1,000 people. However, this only includes member firms and is does not typically include life insurance elements. As the Finance Dublin Yearbook figure is based on a census of all firms in the sector it was decided to use these figures as the basis for further estimates.

Regionalisation

One of the most notable features in recent years of the international financial services sector in Ireland has been the successful transition to a regionalised structure, with firms now dispersed beyond the original IFSC designated area of Dublin. This regionalisation offers firms the opportunity of doing business in a lower cost location, compared with Dublin. Major financial services operations have now been established in 10 counties outside of Dublin by firms such as State Street (Kilkenny), PFPC (Wexford), Sun Life (Waterford) and Daiwa (Dundalk), which has further boosted the strength of the sector, by providing access to new labour markets while also bringing substantial economic benefits to regional areas. An IFIA[31] survey for 2006 indicates that 950 people were employed in the funds industry outside Dublin at January 2006.

In conclusion, Ireland has successfully built internationally recognised competencies in the areas of international banking, funds and insurance. In particular, Ireland is now recognised as one of Europe's leading fund servicing centres and attracted the third highest inflow of new funds in Europe in 2006, and is also viewed as a leader in alternative investment products[32]. Ireland is also considered a leader in debt securities and was ranked as the ninth largest centre for issuers of international debt securities, by residence of issuer, by the Bank of International Settlements in 2006[33].

31 Irish Funds Industry Association (IFIA) Employment and Staffing Survey 2006.

32 Irish Funds Industry Annual Newsletter 2007, p5.

33 Bank of International Settlements – Quarterly Review, June 2007.

2.3 Ireland – Banking and Capital Markets Sector

Within the past twenty years, 25 of the top 50 international banks have established operations in Ireland, including international giants such as Citigroup, JP Morgan, BNP Paribas, Depfa and Merrill Lynch[34]. In December 2006, banking assets in Ireland stood at €1.2 trillion representing a 300 percent increase over 5 years. According to the Bank of International Settlements, Ireland was ranked as the 11th largest international market in the world based on the external or cross border positions of banks in 2006[35].

The key areas of international banking operations include:

- Investment banking;
- Structured finance;
- Wealth management;
- Debt issuance and securitisation;
- Treasury management; and
- Asset financing/leasing.

Although a full range of international banking services is provided from Ireland, specific competencies in this sector have been developed in the following key areas:

Table 2.10 Specific Irish competencies in the banking and capital markets sector

Area	Details
Debt products and Securitisation	Debt products is an area where Ireland has developed a strong proposition and is now ranked as one of the leading centres for issuers of international debt securities by residence of issuers. This Irish market has grown to €75bn in five years, placing Ireland as the 6th largest debt market worldwide. The issuance of Irish asset covered securities (ACS) totalled €9.6 billion in 2006[36]. Legislation introduced to support ACS transactions has proven successful in attracting large institutions such as Depfa and West LB, however, several countries have since replicated this structure, which may limit the pace of future growth. Ireland's securitisation sector has also continued to experience strong rates of growth during 2006. Management of asset backed securities (ABS) increased to €100 billion resulting in Ireland being the second largest centre for this activity in Europe outside of London[37]. The Irish Stock Exchange passed 1,750 debt approvals and has established an international reputation for its progressive listing regime. The Irish stock exchange has the capability to support listing Asset Backed Securities (ABS), Securitised Bonds, Warrants, ECPs and Asset Covered Securities (ACS).
Aircraft Leasing	Ireland has proven a particularly attractive location for aircraft leasing operations as evidenced by the setup and expansion of a number of large global operations such as Bank of America Leasing Ireland, AWAS, CIT Aerospace International and Volito Aviation AB. Ireland established a reputation as a centre for aviation financing expertise in the 1980's as a result of GPA's leading position, which resulted in the development of a deep pool of skilled arrangers, managers and advisors. The parallel development of the international financial services sector has provided a further basis for this sector to develop and flourish with front and back-office activities being undertaken here. The Finance Act 2006 also introduced some provisions for the leasing sector which relaxed restrictions on the use of capital allowances, thus making Irish based leasing activities more attractive.

34 Federation of International Bankers of Ireland.

35 The Finance Dublin Yearbook, 2007, IBF article.

36 Federation of International Bankers of Ireland, Annual Address, April 2007.

37 The Finance Dublin Yearbook, 2007.

2.4 Ireland – Investment Management Sector

Table 2.11 provides a breakdown of the Net Assets of the European investment fund industry in 2006 (geographical breakdown, UCITS and non-UCITS):[38]

Table 2.11 Net assets of the European investment fund industry 2006 by geography

Country	Assets €m	Percentage
Luxembourg	1,844,850	24.4
France	1,494,400	19.7
Germany	1,017,699	13.4
UK	776,650	10.3
Ireland	717,718	9.5
Italy	383,435	5.1
Spain	287,793	3.8
Other	-	13.8
Total	**-**	**100%**

Source: EFAMA Trends in the European Investment Fund Industry, March 2007.

Table 2.11 shows that Ireland has become an established centre for the European investment funds industry, accounting for almost 10 percent of net assets. Luxembourg remains the clear market leader with a 24.4 percent share of funds, followed by France 19.7 percent and Germany 13.4 percent[39].

As of March 2007, a total of 4,204 funds/sub-funds were registered in Ireland with an additional 3,000 alternative investment funds being serviced from Ireland[40].

The growth in the value of Irish registered collective investment schemes from 1991 to 2007 is shown in the table 2.12 below[41].

38 EFAMA, Trends in the European Investment Fund Industry, March 2007.

39 EFAMA, Trends in the European Investment Fund Industry, March 2007.

40 Irish Funds Industry Annual Newsletter 2007.

41 Irish Funds Industry Annual Newsletter 2007.

Table 2.12 Net assets of the European investment fund industry 2006 by geography

Year end	Total net asset value (€ million)	Annual % growth
1991	2,506.85	-
1992	4,665.22	86%
1993	11,315.45	143%
1994	13,032.74	15%
1995	18,801.33	44%
1996	25,950.16	38%
1997	43,216.20	67%
1998	70,946.14	64%
1999	149,857.90	111%
2000	208,337.10	39%
2001	284,177.60	36%
2002	303,881.30	7%
2003	361,760.33	19%
2004	434,589.40	20%
2005	584,509.20	35%
2006	729,552.90	25%
Q1 2007	769,145.24	5.4% ytd

Source: IFIA Annual Newsletter 2007.

The value of Irish domiciled funds stood at €769 billion, of which €617 billion were in UCITS structures, representing an annual growth rate of 25 percent[42]. The funds industry in Ireland is estimated to employ in excess of 9,000 people with fund operations dispersed across eleven counties.

Irish Funds Industry Association (IFIA) estimates that an additional $600 billion in alternative investments are serviced from Ireland, resulting in the total value of funds being serviced of €1.3 trillion[43]. Ireland has firmly established a reputation as one of Europe's leading funds centres, capable of competing with more established hubs and has successfully attracted over 300 of the leading international fund promoters.

2.5 Ireland – Insurance Sector

The international insurance sector in Ireland has shown a steady rate of growth in life and non-life business. Ireland's cross border life insurers wrote approximately €15.8 billion in premiums in 2006, representing an annual increase of 25 percent, making Dublin Europe's largest cross-border life centre ahead of Luxembourg and the Isle of Man[44]. Gross premium income for foreign risk non-life business remained relatively flat at €3.27 billion in 2006[45]. The numbers employed directly in the international insurance sector in 2006 were estimated to be 3,027, representing an annual increase of 3 percent when compared to 2005[46].

42 Irish Funds Industry Annual Newsletter 2007.
43 Irish Funds Industry Annual Newsletter 2007.
44 The Finance Dublin Yearbook, 2007, Insurance sector overview.
45 Financial Regulator, Insurance Statistical Review, 2006.
46 The Finance Dublin Yearbook, 2007, p.4.

The Irish and UK markets are seen as particularly sophisticated in terms of unit-linked products and the experience in operating the systems and processes to support these types of products is attractive to many continental insurance providers. This has resulted in many foreign insurers writing business through Irish operations.

The reinsurance sector has also experienced strong growth rates recently, spurred by the enactment of the European reinsurance directive in July 2006, which allowed reinsurance operations to passport between member states. Ireland was the first EU member to adopt the directive and this has led to recent investment decisions by companies such as XL Re Ltd to select Dublin as the centre for their European business. Ireland's position as a leading centre for securitisation has also provided a boost to the reinsurance sector where bonds are being issued on the back of insurance securitisation special purpose vehicles (SPVs).

2.6 Summary

In summary, the international financial services sector is growing on a global basis driven by economic and demographic trends which are likely to support continued growth in this sector over the medium term. The international financial services sector in Ireland has been a phenomenal success story over the past 20 years. Ireland has now successfully established itself as an internationally recognised financial centre with distinctive competencies in the areas of:

- Funds servicing;
- Debt products and securitisation;
- Aircraft Leasing; and
- Cross border life insurance.

It is forecast that further expansion is achievable within the international financial services sector, if the supporting infrastructure e.g. regulatory environment, taxation and cost base remain competitive on an international basis. However, paramount in underpinning the expected growth in such a knowledge intensive industry will be the availability of suitably skilled resources.

The following chapter profiles each sub-sector further and provides details of the key skills and experience requirements.

Chapter 3: Review of Irish Financial Services Skills and Research Demands

3.0 Introduction

The core research for this chapter was a targeted interview programme with domestic and international leaders from the international financial services industry. In total 29 interviews were conducted with 44 executives from a selection of leading financial services providers, which covered the areas of banking and capital markets, investment management and insurance.

The analysis is based on information provided as part of a consultation programme with: Senior management from financial services companies based in Ireland; Senior management from financial services companies based in the US and UK; and Industry representative bodies. The interview discussions with each of these companies covered areas such as:

- Investing in Ireland;
- Industry trends and drivers of change;
- Skills profiles and resourcing;
- Expected future skills requirements;
- Research and development; and
- Skills and research support structures.

The summary feedback from these interviews is presented in this section under the following headings:

3.1 Investing in Ireland;

3.2 Industry trends;

3.3 Skills demand – industry view;

3.4 Skills profile by sector;

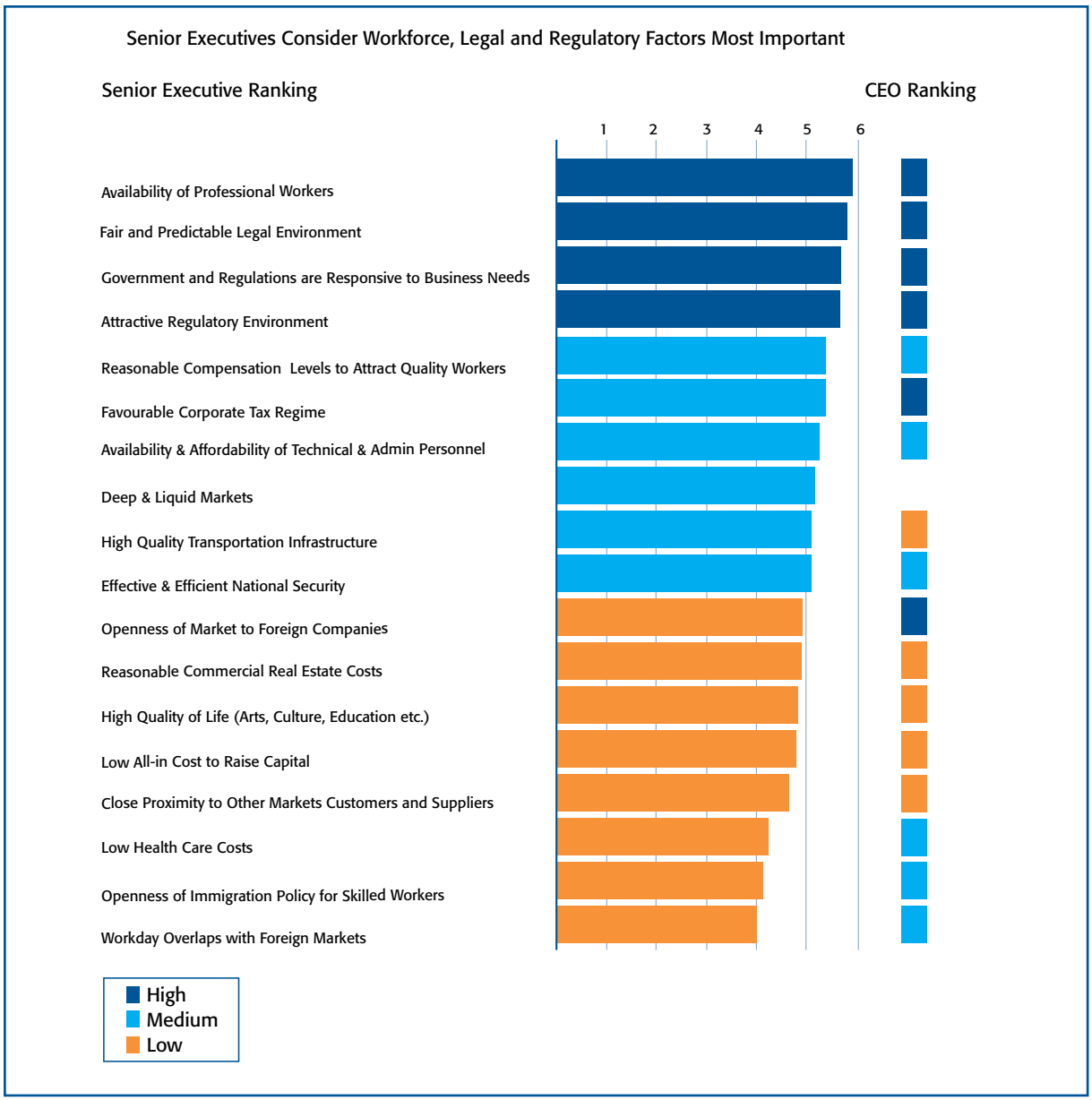
3.5 Expected future skills requirements; and

3.6 Supply side dynamics.

3.1 Investing in Ireland

The international financial services companies interviewed continue to view Ireland as an attractive base to conduct their financial services activities. Over the past twenty years the regulatory and taxation environments have provided a solid foundation for businesses to locate here and the experience and "know-how" associated with the creation of this positive business environment has provided a "knowledge based" basis for differentiation relative to other financial centres. This has ensured that Ireland has had a strong offering in terms of its workforce, legal and regulatory environments which reportedly form the key decision criteria for senior financial services executives (see figure below).

Figure 3.1 Decision factors impacting investment decisions



Source: McKinsey- Sustaining New York's Global Financial Leadership, 2007.
Global Survey of Senior Executives, scored on a 7-point scale.

Allied to this, Ireland possesses several "natural" advantages based on our location and culture. Our location provides a natural bridge in time zones between market centres in Asia and the US. This provides a strategic advantage which has similarly supported London's development as an international market centre. The increasing reliance on technology as an enabler of the sector has created additional emphasis on our location, as Ireland is ideally located between time-zones in the US and India to form a bridging point to support 24 hour clock technology development.

These location based advantages coupled with English as a first language and a culture/work ethic which is closely aligned with US and European values ensures that Ireland has many fixed advantages when it comes to competing for mobile investment. Industry representatives interviewed expect that these factors will continue to provide a platform for the on-going development and expansion of the financial services sector in Ireland, resulting in increasing levels of employment and demand for skilled resources. The availability of key staff with specialist skills will be essential if Ireland is to secure investment in high-value activities going forward – the consultation process confirmed that many firms are making investment and location decisions based on the availability of a small number of specialists.

However, Ireland's proposition in financial services has also evolved in the last 20 years, as the economy has experienced rates of rapid growth. Originally positioned as a "low cost and low tax location", economic development has resulted in substantial changes to the Irish cost base. Metropolitan centres such as Dublin have risen up the international cost base scales, and while our taxation regime still remains attractive, our ranking as one of the more expensive cities in the world in international studies presents cost challenges[47]. The cost environment outside of Dublin, however, remains significantly more attractive as evidenced by the growing numbers of IFS companies locating in the regions.

This change in cost base dynamics has not gone unnoticed by international companies, who now find it less attractive to base certain administrative and less specialised operational activities in Ireland. Despite these changes, however, Ireland and particularly locations outside Dublin, still offer some cost advantages over other financial centres such us Boston, London and New York. However, these cost factors may continue to present a challenge for Ireland, and therefore, skills based differentiation will take on renewed importance.

47 Mercer Cost of Living Index 2007 – Ireland ranked 16th most expensive city in the world, up from 18th in 2006.

3.2 Industry Trends

During the course of our consultations with industry representatives a number of trends were articulated which are expected to impact upon future skills and resourcing strategies. A summary of the key trends is provided in the table below, with a selection of key drivers of change from an Irish perspective outlined in further detail.

Table 3.1 Summary of key industry trends

Area	Trends
Banking and Capital Markets	**Operations:** ■ **Industry is consolidating towards** a smaller number of truly global providers, and in streamlining their offerings these global providers have relocated elements of their operations to centralised locations or "centres of efficiency". ■ Organisations are focusing on technology enabled process innovation to achieve increased efficiencies. ■ Risk management and regulation are key focus areas. ■ Ireland has established a reputation for expertise in debt products and securitisation. **Products:** ■ The product set is relatively stable but pricing mechanisms are becoming more complex.
Investment Management	**Industry Growth:** ■ Strong growth in funds flows into Irish listed funds. ■ Ireland has established a reputation for listing and administration of funds. **Staff:** ■ Some **less specialised tasks are being transitioned** out of Ireland as they no longer align with the cost base. This trend is freeing up some capacity to take on higher value middle-office functions. ■ Staff turnover is providing a challenge to the cost base and service levels. ■ Ireland needs more graduates equipped with the skills to operate in front-office activities. In addition, the education needs to provide more graduates with specialist skills in emerging areas e.g. derivative structures and hedge funds. **Products:** ■ Strong growth in the popularity of derivative and hedge fund products has increased the levels of product complexity which has fed through the value chain of support functions. ■ Growth in some front-office operations is being constrained by a lack of suitably skilled and experienced resources.
Insurance	■ Sales in pan-European and cross-border life products are increasing. ■ Ireland is establishing a reputation for capabilities in servicing pan-European products. ■ The reinsurance market is showing strong potential for growth.

Details of a number of trends which have particular relevance for Ireland and which are already impacting on the skills requirements of the sector are outlined below:

Industry Consolidation

Consolidation is driving change across all sectors of the financial services industry. However, in the banking sector in particular, competition to obtain a place as one of the major "global banks" has spurred initiatives to obtain greater efficiencies in operations. This has forced many of the leading organisations to re-examine their structures to identify areas which can be served more efficiently by alternative means or locations. Failure to engage in this process increases the risk of being acquired by a more efficient competitor who is willing to seek out these efficiencies. A number of the organisations interviewed were actively engaged in a process to review the location of their operational and IT facilities to identify the most efficient locations to support future expansion or relocation of existing operations. India and Singapore were frequently cited as preferred locations for securing this investment. The availability of appropriately skilled resources and expertise in technology were cited as key factors in the selection of these locations.

Pace of Product Innovation

All companies across the Financial Services Sector interviewed believed that the pace of innovation in the industry is increasing and that investment in processes, education and technology innovation will be vital in maintaining competitive advantage. The main focus of innovation initiatives for the companies interviewed was product innovation. This was seen as a key element of competition in an industry where products rapidly become commoditized. In areas where there was a requirement for continuous innovation, product innovation was incorporated into operational functions.

Efforts to improve process efficiency to achieve superior levels of service to support meeting customer needs were also attracting significant focus among senior managers as the quality of the client relationships is increasingly viewed as a key differentiator and area of potential competitive advantage. Finally, at the front-end of customer delivery, changes in web technologies have resulted in new mechanisms for customers to access and exchange information. This has had the effect of raising customer expectations for the speed and quality of information delivery, which has driven companies to invest in technological innovation to ensure that they keep pace with their competitors.

Fund Servicing – Some Servicing Tasks Transitioning

While elements of the fund servicing business are highly specialised, some of the more resource intensive elements require less specialism, when considered across the financial services skills spectrum. As less specialised tasks do not align easily with a mid/high cost base, companies have begun to transition some of these tasks to lower cost centres such as India and Poland. The net effect of this appears to have been to free-up organisation capacity to undertake "higher value", more specialised, middle-office tasks, which are more aligned with the Irish cost base. This rotation of some functions is actively underway and is likely to strengthen Ireland's proposition as resources are deployed to support more advanced and complex products. There will however, be functions that funds, regulated in Ireland, will be required to undertake in Ireland, to comply with regulatory requirements, and therefore these will not transition from an Irish base.

In tandem with the above trend, there is a move towards increased levels of automation in standard servicing and reporting tasks. By reducing the level of human intervention required in standard trade processing and settlement, organisations can achieve greater efficiencies and reduced levels of errors. The use of service-oriented architectures (SOA) is allowing organisations to open elements of their systems directly to customers to support increased levels of self-service automation. This along with other similar forms of process innovation will likely change traditional distribution models and the nature of back-office activities in investment management and funds servicing firms from trade execution through to reporting.

Funds Servicing – Higher End Tasks Increasing in Complexity

Recent growth in the popularity of hedge funds, derivatives and alternative investment products has resulted in significant increases in the complexity of these product offerings. This has had a consequential impact throughout the value chain, in terms of the resources and systems required to support more complex product sets. From product development and structuring through to valuations and administration, increased complexity has increased the requirements for more advanced levels of product understanding and mathematical modelling capabilities.

3.3 Skills Demand – Industry View

Due to the scale and diversity of the international financial services sector and the range of functions undertaken, different challenges, issues, and skills requirements exist for each sub-sector of the industry. Resource requirements are further influenced by whether roles are classified as:

- Back-office (operational) e.g. administration, trade processing, reconciliations, settlements, valuations;
- Back-office (specialist) e.g. administration/troubleshooting for complex products, financial reporting;
- Middle-office e.g. client servicing;
- Front-office e.g. investment research and trading decisions;
- Support functions (general) e.g. human resources, training, general administration, finance; and
- Support functions (specialist) e.g. product marketing, PR, IT development, compliance.

Despite this, there was some consistency across the sectors in areas where Irish based companies are currently experiencing needs or difficulties in sourcing suitably skilled resources. The eight skills sets noted on a recurring basis were:

- Maths/Economics/Quantitative modelling;
- Accountancy (particularly with funds experience);
- Risk management;
- Compliance;
- Middle-Management with financial services experience;
- Project and change management;
- Funds servicing and back-office banking operations; and
- Actuary.

Maths/Economics/Quantitative Modelling

As a result of increasing product complexity, many occupations in IFS now require higher levels of advanced mathematical capabilities. This has been coupled with an increased focus on risk management across the industry, to both protect the organisations assets in leveraged environments and to ensure compliance with international regulations e.g. Basel II. The net effect of this has been an increased level of demand internationally for advanced mathematical and modelling skills.

In Ireland over recent years, there has been a steady decline in the numbers of students undertaking science and engineering based subjects, which traditionally provide the greatest source of individuals with advanced numeric skills. This has exacerbated the shortage in Ireland for this skill set, which is now in high demand across the entire international financial services sector. It was indicated that sufficient availability of resources with these skills will be an essential pre-requisite to the sector in Ireland advancing to higher value chain/front-office functions.

Accountants

A number of interviewees highlighted difficulties in securing "good accountants". Accountancy qualifications were viewed very favourably by the industry as these resources offer a very high degree of flexibility in terms of the range of roles and areas across banking, investment management and insurance into which they can be deployed. While significant numbers of business graduates in Ireland currently pursue an accountancy qualification, the perception that qualified accountants provide an automatic pool of numerate individuals who typically possess a good grounding in business principles ensures that demand for these skills exceeds supply in international financial services. Where accountants also have quality experience in a relevant financial services area e.g. funds or underwriting, these were particularly sought after.

Risk Management

Increased emphasis by regulatory authorities over recent years on effective risk management has shifted the burden of responsibility to financial services firms to ensure that they have suitable risk management procedures and qualified personnel in place to protect the assets of the organisation. This has generated significant growth in demand for specialist risk resources with strong mathematical or audit competencies that are capable of identifying and managing credit and market risks.

Compliance

As the emphasis placed on the importance of good corporate governance, and the penalties applied for non-compliance have increased, so too have the expected skills and qualifications required to fulfil senior compliance roles. This has contributed to an apparent shortage of suitably qualified candidates. As these roles require a combination of knowledge of the regulatory environment with good judgement and experience it is difficult to achieve significant organic increases in the supply of resources in the short term.

Middle-management

Creating a stable and experienced layer of middle management talent with approximately 5 to 7 years of relevant financial services experience was cited by several respondents as presenting a challenge. In certain areas of the financial services sector, in particular funds servicing, factors such as the small pool of labour with previous funds experience, high attrition levels and the rapid levels of growth in a relatively new sector has made this more difficult to achieve.

It was also suggested that there can be challenges with staff promoted into these roles as this is sometimes based on experience in specific technical skills. This can result in some staff being promoted into people and process management roles, without necessarily having received the appropriate training or experience to ensure that they are equipped with the "softer management skills" to operate effectively. If unaddressed this can result in further staff turnover.

Project/Change Management

The international financial services industry is very dynamic in nature and is constantly changing to adapt to customer/market demands, regulatory provisions and technological developments. This constant pace of change is resulting in a stream of discrete implementation projects e.g. Basle II, MiFID. The skill-set to effectively manage projects is emerging as an increasingly vital competency in order to ensure efficient

management of resources in achieving organisational goals. The resources for these roles require skills which combine knowledge of project management principles with detailed product and process understanding.

Back-office (Operational)

Several of the organisations interviewed cited problems in relation to sourcing and retaining back-office operations staff. Although the minimum competency requirements for many of these roles result in these being open to a very wide population, most organisations favoured recruiting third level business graduates, as these were viewed as offering the greatest potential to contribute immediately to operations and to progress from gateway roles to higher levels within the organisation.

However, attrition levels remain very high for this segment, particularly in the funds servicing sector, and these levels of turnover pose a significant HR challenge and recruitment cost. Some of the possible reasons suggested for this attrition included graduates being over qualified for the roles, negative peer perceptions of working in "back-office" functions, the mobile nature of young graduates (70 percent are under 30 years of age), and the emerging trend to avail of a gap year in the early stages of a career. The key competencies required for the majority of these roles were described as good levels of numeracy, attention to detail, ability to work to tight deadlines and communications/interpersonal skills. Finally, it should be noted that high turnover amongst back-office personnel results in a shortage at supervisory level as there are insufficient staff with extended industry experience.

Actuaries

Actuaries were described as the "engine room" of the insurance sector and play a pivotal role in the high value roles of product design and pricing. The availability of suitably qualified and experienced actuaries was cited as a constraint. Given the challenging professional qualification process for actuaries the supply of qualifying actuaries is likely to remain constrained which has the potential to limit growth in the product development area of the insurance sector. Increased emphasis and complexity in pricing, risk modelling and reporting requirements under Solvency II will ensure that these skills will remain in high demand.

3.4 Skills Profiles by Sector

Different skills requirements and competencies exist for the different sectors within the international financial services industry. Each sub-sector of the industry is profile in this section. However, as outlined previously, the lines of distinction between the various sub-sectors are converging as providers increasingly compete across a range of service areas. As a result, the skills requirements highlighted for a particular sub-sector should not be interpreted as being exclusive to just that particular sub-sector, as overlaps will increasingly exist between certain sub-sectors.

The following sections provide brief descriptions of each sub-sector in the industry, and where appropriate, a table detailing the qualifications, skills and experience required is also provided.

(i) Banking and Capital Markets

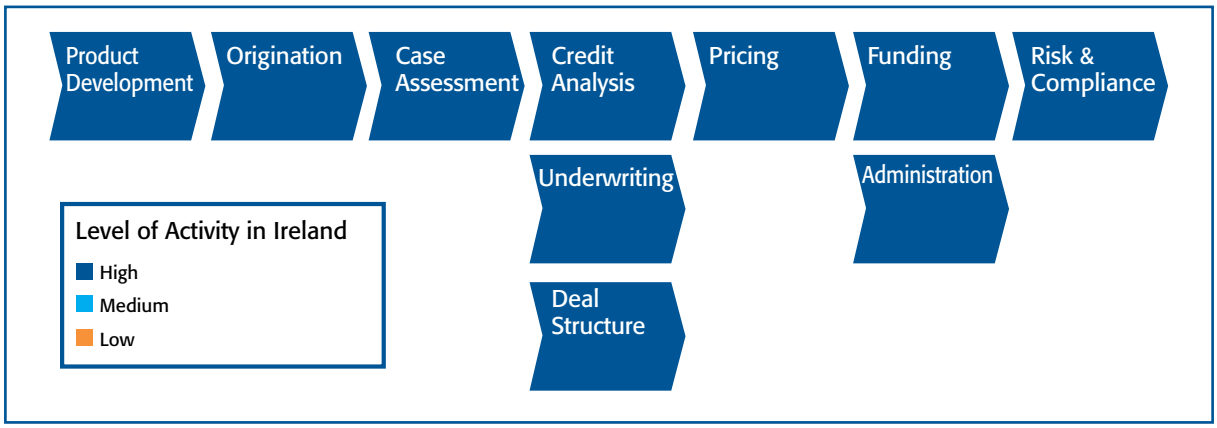
High-level summaries of the key value chain activities in the following sub-sectors of banking and capital markets operations are provided over the following pages:

- Structured finance;
- Securitisation;
- Treasury;
- Leasing;
- Corporate finance; and
- Investment banking.

Structured Finance

There are numerous different titles applied to the area of commercial/structured finance which are largely determined by the type of assets that a debt is secured against and the methods used to raise the required funding. In essence though, despite the variety in terminology, the principle activities undertaken as part of the process and the required skill-sets are broadly the same. The value chain below provides an outline of the principal activities undertaken by international banks in developing and issuing structured loan products, through to the support activities required to ensure that the risk is properly managed.

Figure 3.2 Value chain of structured finance activities



In delivering these activities a range of skill-sets is required to support execution. The table below provides a brief description of some of the key structured finance roles that would normally be engaged in supporting the delivery of the above activities and a list of probable qualifications, skills and experience required by individuals to operate effectively.

Table 3.2 Summary of structured finance role profiles

Roles	Qualifications	Skills/Requirements	Experience
Market research/ Product development support	■ Degree in business/ marketing/accounting related discipline	■ Strong client relationship and listening skills ■ Strong analytical and writing skills	■ 3+ years relevant financial services ■ Knowledge of international markets and trends
Underwriting	■ Degree in business/ finance related discipline ■ Qualified accountant	■ Highly numerate ■ Structured/logical thinker ■ Problem solver ■ Excellent communication/ interpersonal skills ■ Financial/scenario modelling	■ Commercial/project finance ■ Structured corporate credit products and markets
Credit analysis	■ Degree in business or accounting related discipline	■ Financial analysis techniques ■ Scenario modelling ■ Credit analysis and interpretation of credit ratings ■ Company research and analysis ■ Asset quality reviews	■ 3-5 years in a credit analysis role
Pricing (standard products)	■ Degree in business/ accountancy/maths related discipline	■ Strong analytical skills ■ Credit analysis ■ Financial Modelling ■ Scenario modelling	■ 2-3 years in risk management role ■ Underwriting experience
Pricing (complex products)	■ Degree in maths related subject ■ Masters level qualification for senior roles	■ Analytical skills ■ Programming languages (C++, VB, SQL) or database experience	■ Exposure to financial products or systems
Loan administration	■ Business qualification (not necessarily to degree level)	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal/communication skills	■ 1+ years in financial services environment
Risk management	■ Degree in business or legal discipline or relevant professional qualification	■ Strong analytical skills ■ Credit analysis ■ Knowledge of general operational control environments and ability to understand and document systems processes ■ Report writing and presentation skills	■ 5+ year's relevant experience in the area of risk management or an audit environment
Compliance and regulatory reporting	■ Degree in business, ideally with a legal emphasis ■ Audit experience	■ Attention to detail Problem solving ■ Communications/relationship management ■ Generating management reports	■ Audit/internal audit experience

Note: Research activities identified in value chains relate to product research rather than broader industry based RD&I activities which are not integral to specific value chains and are addressed separately in section 5.

Future Development and Skills Implications

Going forward, to expand Ireland's presence in this sub-sector, efforts should be made to:

- Market Ireland as an international centre for the administration and structuring of innovative debt based products; and
- Develop an internationally recognised distinctive competency in leading-edge risk based pricing and management techniques.

This will require greater availability of resources with:

- Advanced quantitative skills (Maths, Statistics, Engineering) to PhD level that have an understanding of financial instruments and markets;
- Financial engineering/Economics skills which incorporate market relevant experience;
- International compliance regulations; and
- Fluency in European languages.

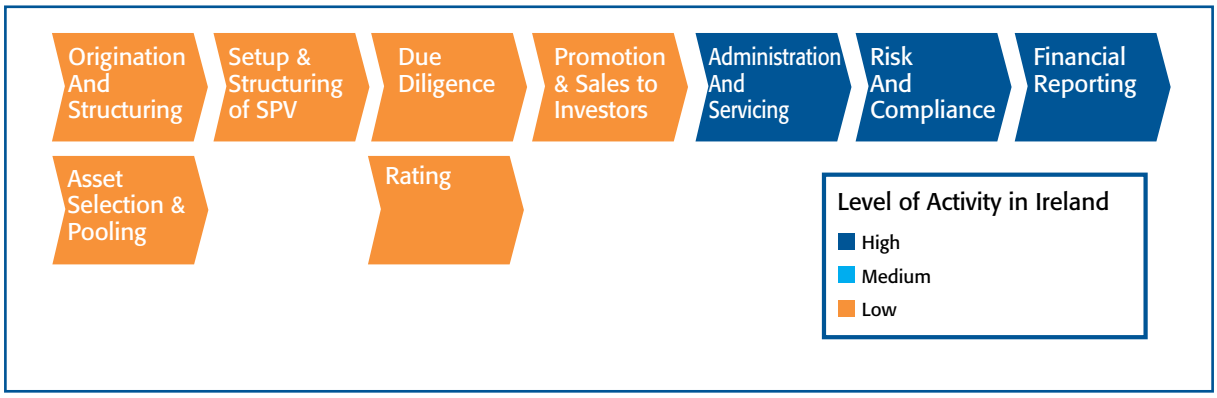
Additional Initiatives:

- Developing an international reputation for excellence in applied academic research in advanced quantitative finance which is accessible by industry.

Securitisation

Securitisation is one of the principle forms of structured finance and provides an effective mechanism to de-link the credit risk of the asset pool from the credit risk of the originator through the use of special purpose vehicles (SPVs). Ireland's regulatory and taxation regime have helped to create an environment which has proven conducive to capitalising on the growth in the securitisation sector. The key elements of the securitisation process are shown below.

Figure 3.3 Value chain of securitisation activities



A number of service providers have expanded their operations to support the 600+ securitisation vehicles which have been established in Ireland since 2003. The key functions which are typically performed in Ireland are mainly accounting and back-office administration for Special Purpose Vehicles (SPVs) with some amount of structuring and due diligence work being undertaken by professional advisors e.g. legal/ accountancy firms.

The table below provides a brief description of some of the key securitisation roles and the qualifications, skills and experience typically required to support the delivery of the activities outlined above.

Table 3.3 Summary of structured finance role profiles

Roles	Qualifications	Skills/Requirements	Experience
Structured credit analyst	■ Degree in business/ finance/accounting or quantitative discipline ■ Qualified accountant	■ Highly numerate ■ Ability to analyse legal documents ■ Knowledge of ratings process ■ Cash flow modelling	■ 3-5 years in originating and structuring securitisation transactions ■ Previous experience in investment banking/law firm/ratings agency
Portfolio administrator	■ Degree in business/ finance/accounting or quantitative discipline ■ European languages	■ Detailed knowledge of financial markets and dynamics ■ Highly numerate ■ Communication skills to support liaison with administrators, ratings agencies and first loss providers ■ Negotiation skills ■ Structured/Logical thinker ■ Problem solver ■ Financial/Scenario modelling	■ 7+ years in originating and structuring securitisation transactions ■ Previous experience in investment banking/law firm/ratings agency
Legal and tax specialists	■ Degree in business or law ■ Relevant professional qualifications e.g. tax exams ■ European languages	■ Knowledge of financial markets and instruments ■ Company formation, listing and preparation of legal documents ■ European regulations and taxation ■ Interpersonal/ Communication skills	■ 3 years PQE in financial services environment
SPV accountant	■ Degree in business/ accounting related discipline ■ Qualified accountant	■ Strong analytical skills ■ Knowledge of financial markets and financial reporting systems ■ Financial Modelling ■ Advanced Excel	■ 2-3 years in financial services
Pricing administrator	■ Degree in accounting/ finance or economics	■ Numerate ■ Attention to detail ■ Problem resolution ■ News services e.g. Reuters	■ 2+years in pricing/ valuations role
General administration	■ Business or accounting related qualification (not necessarily to degree level)	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal/ Communication skills	■ 1+ years in financial services

Future Development and Skills Implications

Going forward, it is unlikely that Ireland can obtain a significant proportion of origination or structuring activities as these are typically undertaken in international market centres e.g. London, Hong Kong. Therefore, ensuring that the infrastructure to support back-office activities remains internationally competitive is likely to present the greatest opportunities to take advantage of the continued industry growth in this sub-sector.

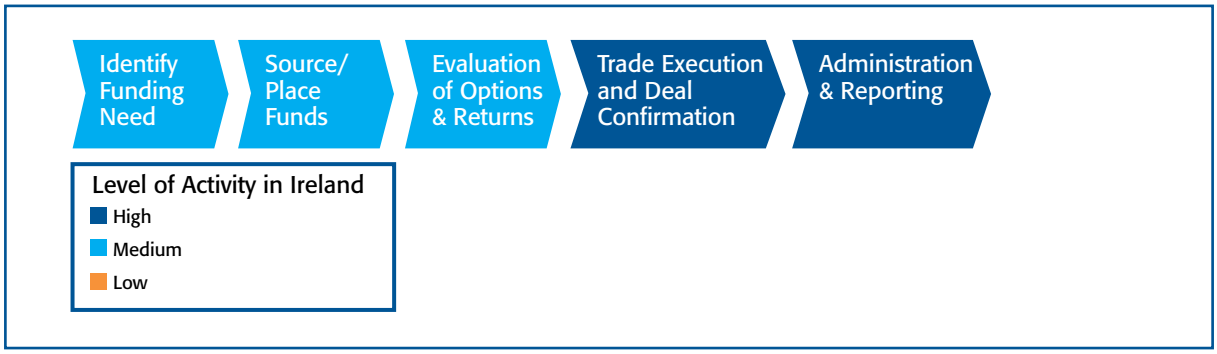
Maintaining competitiveness will require a greater availability of resources with:

- Professional legal and tax qualifications;
- Business/Finance qualifications which incorporate detailed elements on debt products and markets;
- Client servicing;
- Fluency in European languages; and
- Credit analysis skills.

Treasury

Treasury services are mainly provided by the larger banks who will also provide solutions on a third party basis to customers who may not require a full treasury function or to those wishing to outsource aspects of it. A range of treasury products and services are used to manage the impact of volatile market movements in exchange rates, interest rates, inflation or commodity costs on a business's cash flow. The specific value chain of activities will be determined by the nature of the transaction e.g. corporate, institutional, trade finance. The chart below provides a very high-level summary of the functions involved.

Figure 3.4 Value chain of treasury activities



The table below provides a brief description of some of the key roles that would generally be required to support treasury operations. The breakdown of roles required would be further determined by the kind of treasury activities being undertaken e.g. banking or corporate.

Table 3.4 Summary of structured finance role profiles

Roles	Qualifications	Skills/Requirements	Experience
Treasury manager	■ Degree in business/finance ■ Qualified accountant ■ MBA	■ Detailed understanding of financial markets and instruments ■ Highly numerate ■ Sales skills ■ Interpersonal skills ■ Financial risk assessment ■ Financial analysis	■ 7+ years experience in corporate treasury ■ Treasury systems
Treasury analyst	■ Part/fully qualified accountant with 2+ years treasury experience	■ Highly numerate ■ Financial analysis ■ Interpersonal skills ■ Problem solving ■ Report writing	■ Knowledge of FX and interest rate markets ■ Cash flow forecasting
Treasury dealer	■ Masters in Maths/ Economics/Finance ■ Chartered Financial Analyst (CFA)	■ Client/relationship management ■ Extensive knowledge of international financial markets ■ Strong mathematical and analytical skills ■ Bloomberg/Reuters	■ 5+ years in investment analysis/dealing support
Treasury dealer (corporate)	■ Degree in business/ finance related discipline	■ Sales skills ■ Interpersonal skills ■ Financial risk assessment ■ Financial accounts interpretation	■ 3 years experience in a treasury environment or dealing desk
Treasury MIS	■ General business qualification	■ Numerate ■ Report writing and presentation skills	■ Valuations or reporting role
Credit risk analyst	■ Business/finance/ quantitative degree ■ Masters in a finance qualification	■ Research and analytical skills ■ Ability to interpret financial data ■ Report writing ■ Interpersonal skills	■ Risk analysis
Market risk analyst	■ Degree in maths related subject or quantitative finance	■ Analytical skills ■ Programming languages (C++, VB, SQL) or database experience	■ Risk management functions ■ Financial markets and instruments ■ Exposure to financial systems
Treasury Accountant	■ Business/finance degree ■ Qualified accountant	■ Analytical approach to problem solving ■ Highly numerate ■ Financial analysis ■ Knowledge of capital markets and financial instruments ■ Presentation skills	■ 2+ years in a financial services or treasury environment
Customer Services	■ General business graduate (not necessarily to degree level) ■ European Languages	■ Relationship Management ■ Problem resolution ■ Numerate ■ Attention to detail ■ Ability to work to deadlines ■ Communication skills	■ Experience of customer services or administrative function in relevant financial services area

Future Development and Skills Implications

Going forward, expansion of Ireland's position as a leading provider of treasury functions will require sustained efforts to ensure that the environmental factors which have underpinned the establishment of multinational corporate treasury functions in Ireland remain. In particular, measures to ensure a sufficient supply of skilled front-office resources to limit labour cost inflation will be vital in maintaining international competitiveness.

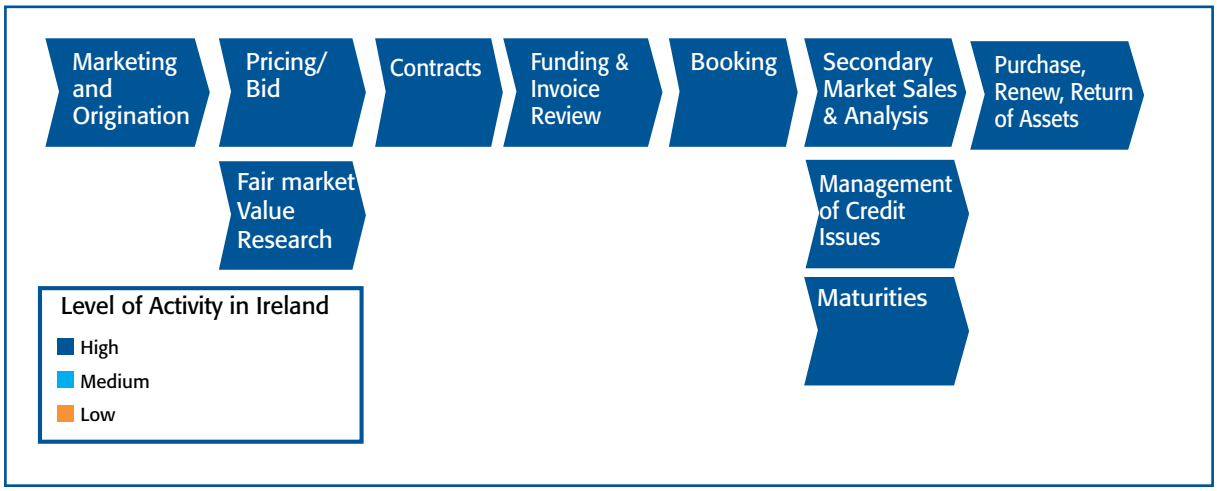
This will require greater availability of resources with:

- Accountancy qualifications;
- Specialist postgraduate qualifications in treasury;
- Advanced quantitative skills (Maths, Statistics) with an understanding of financial instruments and markets; and
- European languages.

Leasing

The leasing sector, in contrast to some of the other sub-sectors within banking and capital markets appears to place a greater emphasis on relevant industry experience gained whilst operating within the sector e.g. aviation leasing, ahead of academic or professional qualifications. The following high-level diagram provides a summary of the key functional areas typically required to support asset-leasing operations.

Figure 3.5 Value chain of leasing activities



Given the importance of relevant experience in this sub-sector, leasing roles typically require longer periods of prior service and exposure to the sector. The table below provides a brief description of some of the general leasing roles, however, in circumstances where increased levels of responsibility attach to a role, greater periods of previous industry experience would likely be required.

Table 3.5 Summary of leasing role profiles

Roles	Qualifications	Skills/Requirements	Experience
Marketing	■ Degree qualified in business/ marketing area ■ European languages	■ Understanding of standard lease terms and language ■ Ability to identify and interpret technical requirements ■ Contract negotiation skills ■ Interpersonal and relationship management skills	■ 2+ years relevant sector experience
Portfolio management	■ Degree qualified in a relevant business/ accountancy discipline ■ MBA	■ Financial analysis ■ Funding options and implications ■ Highly numerate ■ Communications and interpersonal skills	■ 5+ years in commercial finance/leasing ■ Knowledge of Aerospace finance
Credit analyst	■ Degree qualified in business or accounting related discipline	■ Financial analysis techniques ■ Scenario modelling ■ Credit analysis and interpretation of credit ratings ■ Company research and analysis ■ Asset quality reviews	■ 3-5 years in a credit analysis role
Financial control	■ Qualified accountant	■ Financial analysis ■ Highly numerate ■ Attention to detail ■ Good interpersonal skills	■ 3-5+ years in financial reporting role ■ Previous audit experience ■ IFRS accounting standards
Legal services	■ Degree in Law/ International law	■ Analytical skills ■ Interpersonal/ Communication skills ■ Report writing	■ Negotiating and documenting high value international contracts

Future Development and Skills Implications

Ireland has established a significant presence in the leasing market, but as in most areas of international financial services, intense competition exists from other countries who are seeking to grow their economy and the proportion of high value services jobs. Measures to expand Ireland's international presence in this sub-sector should:

- Ensure that the existing tax, legal and regulatory provisions which have led to the development of our leading position are maintained; and
- Support developing deep industry experience which is a key differentiator in this sector.

To achieve the objectives above will require greater availability of resources with:

- Relevant experience in aviation leasing. Given that significant increases in the native population with these resources cannot be achieved in the short term, measures to attract high skilled migrants (such as the recently introduced Green Card system) are of vital importance;
- Qualified accountants with credit analysis and corporate finance skills;

- International tax skills; and
- International legal skills.

Corporate Finance and Investment Banking

Investment banking is the term typically used to describe corporate finance advisory, sell and buy side brokerage and capital markets fund raising activities. The term corporate finance encapsulates a wide range of corporate activities including:

- Mergers;
- Acquisitions;
- Disposals;
- Fund raising; and
- Valuations.

As the value chain of activities is entirely dependent on the desired outcome e.g. merger/sale it is not practical to outline a standard value chain of activities. However, the resources and associated skill-sets that typically perform these activities remain relatively constant and these are outlined in the table below:

Table 3.6 Summary of leasing role profiles

Roles	Qualifications	Skills/Requirements	Experience
Accountants	■ Degree qualified in a business/finance/ economics discipline ■ Qualified accountant	■ Strong client relationship and listening skills ■ Financial modelling ■ Strong analytical and writing skills	■ 3+ years relevant financial services ■ Corporate finance/ credit structures ■ Knowledge of international markets and trends
Legal advisor	■ Degree in business or legal discipline ■ Qualified solicitor	■ Analytical skills ■ Interpersonal/ Communication skills ■ Report writing	■ 3+ years PQE in an advisory role, preferably in a financial services environment
Taxation specialist	■ Degree qualified in a business/finance/ legal discipline ■ Professional tax qualification ■ Qualified accountant	■ Analytical skills ■ Interpersonal/ Communication skills ■ Report writing	■ 3+ years relevant financial services ■ Knowledge of international tax regulations
Sector specialists	■ Degree in relevant topic ■ Industry relevant/ professional qualifications	■ Analytical skills ■ Interpersonal/ Communication skills ■ Report writing ■ Consulting skills	■ 5-10 years sector relevant experience

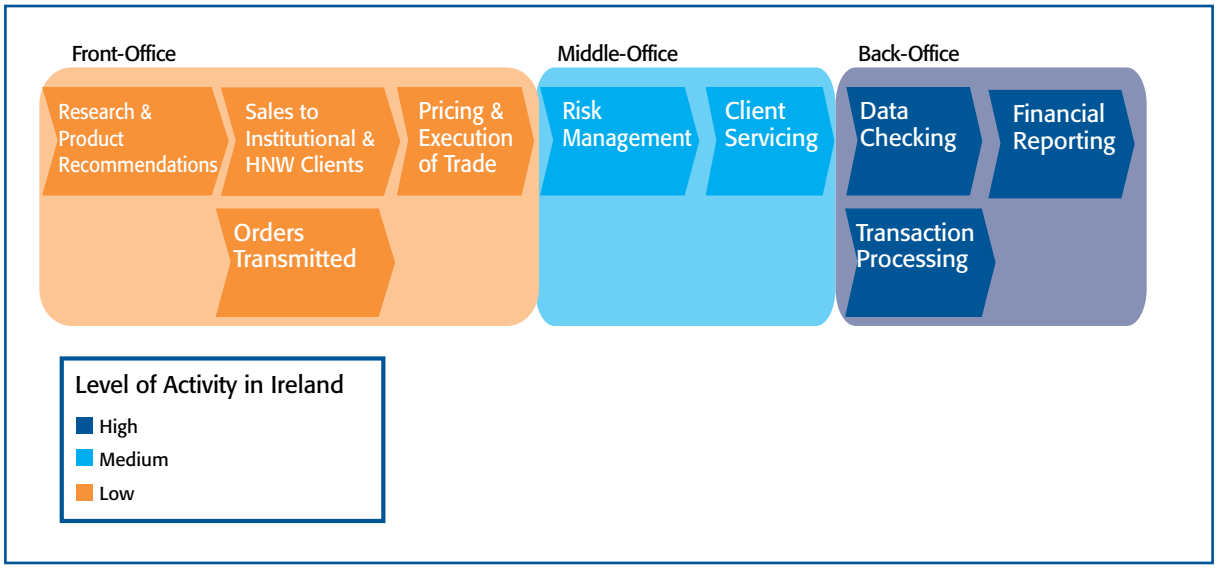
The remaining investment banking activities relate to brokerage and capital market activities. This involves trading debt, equities, fixed income, funds, foreign exchange, commodity and derivative instruments. There is a high degree of convergence between these activities and those of investment management sector, and as a result the required skill-sets are similar.

Trading functions are typically divided into three categories:

- Front-office (contact with customers and market makers);
- Middle-office (client servicing and control functions); and
- Back-office (processing and reporting functions).

The diagram below provides a high-level view of the value chain of activities required to support investment banking trading activities.

Figure 3.6 Value chain of investment banking activities



The qualifications, skills and experience required to support trading operations are covered in detail in the next section on investment management.

(ii) Investment Management

The investment management sector has been split into two sections, namely:

- Investment management; and
- Funds servicing.

Separate diagrams summarising the high-level value chain of activities required to support front-office and back-office trading operations are shown below.

Figure 3.7 Value chain of investment management activities (front-office)

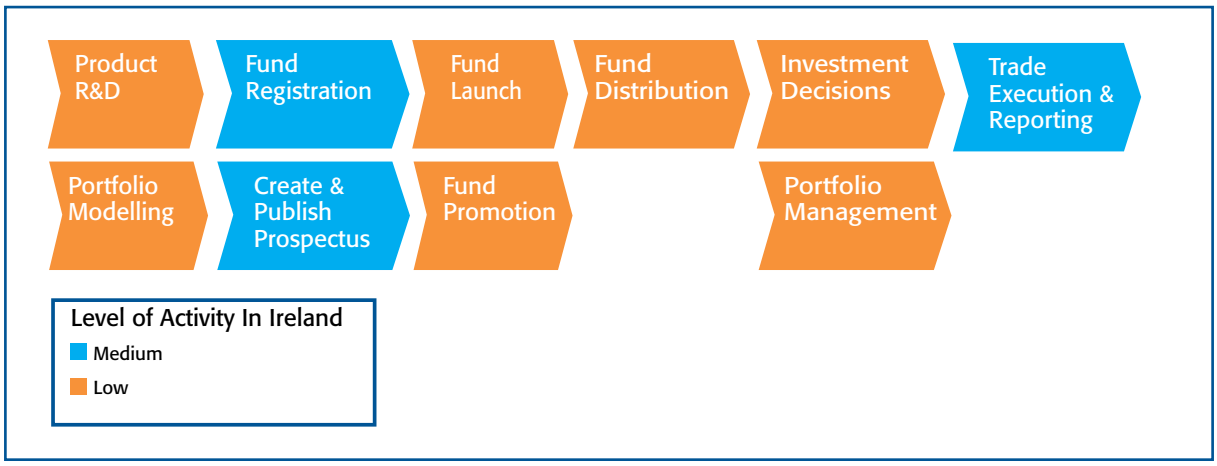
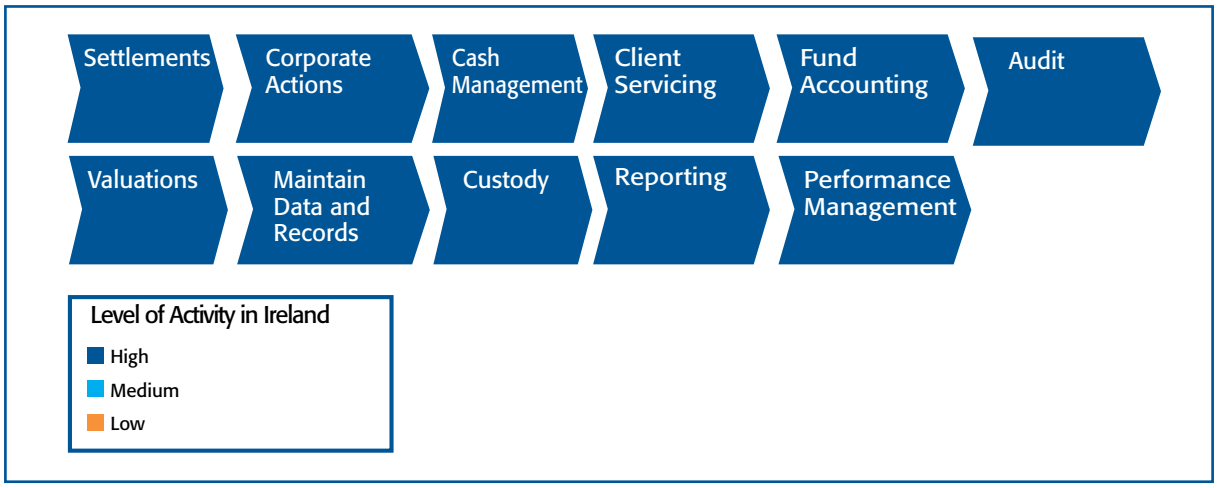


Figure 3.8 Value chain administration/servicing activities (back-office)



The tables that follow provide additional details on the qualifications, skills and experience requirements typically required to support investment management and servicing functions. Again these have been shown separately, however, depending on the operational structure and classification, there may be some overlapping elements.

Investment Management

The investment management sector is a crucial element in the long-term drive to move IFS in Ireland towards higher value functions. The employment profile in this sector features substantial numbers of well-paid, knowledge intensive roles, based primarily on high-level quantitative and mathematical skills. Ensuring a sufficient supply of such skills is vital in order to attract further investments into Ireland from this sector. Furthermore, a supply of personnel with other internationally recognised qualifications (such as the Chartered Financial Analyst qualification) is also a pre-requisite for continued growth. Front-office investment management roles are typically classified as "high value" as they require advanced skills and experience. Front-office roles have an employment multiplier effect, requiring approximately three support staff for each front-office role. London would have been the traditional location for the majority of these roles, but Ireland has begun to develop a growing presence in this sector with a number of key operators locating operations in Dublin. The table below provides a brief description of the key investment management roles.

Table 3.7 Summary of investment management role profiles

Roles	Qualifications	Skills/Requirements	Experience
Market research and product development support	■ Degree in business/ economics/marketing	■ Strong analytical and writing skills ■ Statistical analysis ■ Advanced Excel ■ Use of news services ■ Bloomberg/Reuters	■ 3+ years relevant financial services ■ Knowledge of international markets and trends
Product R&D – quant analyst	■ Degree/Masters/PhD in maths or statistics ■ Chartered financial analyst (CFA)	■ Statistical packages e.g. SAS ■ Programming languages (e.g. C++, VB) ■ Communications skills ■ Interpersonal skills	■ Relevant financial services experience
Product R&D – quant developer	■ Degree/Masters/PhD in maths or statistics	■ Programming languages (e.g. C++, VB) ■ Communications skills ■ Interpersonal skills	■ Relevant financial services experience
Quantitative analyst	■ Degree/Masters/PhD in maths or statistics	■ Statistical packages e.g. SAS ■ Programming languages (e.g. C++, VB) ■ Communications skills ■ Interpersonal skills	■ Relevant financial services experience
Equity analysis	■ Masters in business/ economics/finance ■ Degree in accounting or audit related ■ Chartered financial analyst (CFA)	■ Communications skills ■ Presentation skills ■ Report writing ■ Organisation and planning ■ Excel	■ 2-5 years in Equity research ■ Sector relevant experience

Roles	Qualifications	Skills/Requirements	Experience
Portfolio management	■ Masters in economics/ finance ■ Chartered financial analyst (CFA)	■ Client/Relationship management ■ Extensive knowledge of international financial markets ■ Strong mathematical and analytical skills ■ People management ■ News Services ■ Bloomberg/Reuters	■ 10+ years in investment analysis/portfolio management
Sales and distribution	■ Business degree	■ Client/Relationship management ■ Extensive knowledge of international financial products markets ■ International languages ■ International regulatory systems	■ Relevant financial services experience
Investment decision support/research analyst	■ Masters in business/ economics/finance ■ Degree in accounting or audit related ■ Chartered Financial Analyst (CFA)	■ Communications skills ■ Presentation skills ■ Report writing ■ Organisation and Planning ■ Excel	■ 2-5 years in Equity research ■ Sector relevant experience
Trade execution	■ Degree in business/ Economics/Finance	■ Attention to detail ■ Communication ■ Interpersonal skills ■ Negotiation skills ■ Bloomberg/Reuters and trading systems	■ Knowledge of the Fund management industry ■ 5+ years trading experience
Pricing	■ Business/Finance Degree	■ Strong mathematical background ■ Knowledge of securities classes ■ Stock reconciliations ■ Access/Excel ■ News services ■ Bloomberg/Reuters	■ 2-3 years relevant experience ■ Corporate actions
Risk Management	■ Degree in Maths related subject ■ Masters level qualification for senior roles	■ Analytical skills ■ Programming languages (e.g. C++, VB, SQL) or database experience	■ Exposure to financial products or systems
Trade Administration	■ Degree level education only required for certain areas	■ Attention to detail ■ Problem solving ■ Communications/ Relationship management ■ Generating management reports	■ Trade settlements/ client services

Roles	Qualifications	Skills/Requirements	Experience
Settlements	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal/ Communication skills	■ Crest/Euroclear experience ■ Other fund admin process areas
Compliance	■ Degree in legal or business and legal discipline	■ Attention to detail ■ Problem solving ■ Communications/ Relationship management ■ Generating management reports	■ Audit/Internal audit experience
Legal support	■ Qualified Solicitor/ Barrister with 1-3 years experience	■ Strong analytical and writing skills ■ Communications skills ■ Attention to detail ■ Planning and organisation	■ Financial services/ Funds experience ■ Company secretarial services
Risk Management	■ Degree in Maths related subject ■ Masters level qualification for senior roles	■ Analytical skills ■ Programming languages (C++, VB, SQL) or database experience	■ Exposure to financial products or systems
Performance Management/ Financial Statements	■ Qualified accountant	■ IFRS/GAAP standards	■ Investment Management industry
Credit Analyst	■ BSc in Statistics/ Applied Maths or Masters in Economics	■ Excellent analytical skills	■ Relevant financial services experience

Future Development and Skills Implications

Going forward, to expand Ireland's presence in this sub-sector, efforts should be made to:

- Foster and grow the high-value front-office operations which are involved in portfolio construction;
- Expand expertise in passive fund management; and
- Position Ireland as a support centre for the international distribution of products providing marketing and compliance services.

This will require greater availability of resources with:

- International investment management experience. This sector is heavily dependent on experts with international experience can make the transition into senior roles (these are not available in sufficient volumes locally in the short term). It is important, therefore that measure which facilitate the

movement of skilled workers from overseas (such as the Green Card system) work as efficiently and effectively as possible;

- Advanced quantitative skills (Maths, Statistics, Engineering) to PhD level that have an understanding of financial instruments and markets;
- Quantitative finance/Economics skills which incorporate market relevant experience;
- Advanced knowledge of specialist financial products e.g. derivatives and hedge funds; and
- IT/Software engineering and business analysis skills to support the development of automated trading platforms.

Additional Initiatives:

- Placements in investment management firms, either domestically or internationally, should be incorporated into relevant courses to increase graduates exposure to this sector and to improve their experience base.

Funds Servicing

The funds servicing sector has developed into a vital element of the international financial services sector in Ireland. Operations within this area are typically resource intensive, and as a result, funds servicing activities represent the vast majority of jobs within the investment management sector in Ireland. The qualifications, skills and experience required for the many of these roles are relatively homogeneous, with certain resources being interchangeable between functions given the requisite on-the-job training. The table below provides a brief description of some of the key funds servicing roles and the typical qualifications, skills and experience required to support the delivery of these activities.

Table 3.8 Summary of funds servicing role profiles

Roles	Qualifications	Skills/Requirements	Experience
Trade Processing	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Attention to detail ■ Ability to work to deadlines	
Fund Valuations	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Accounting knowledge ■ Accuracy and Attention to detail	■ NAV calculations
Settlements	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal/ Communication skills	■ Crest/Euroclear experience ■ Other fund admin process areas

Roles	Qualifications	Skills/Requirements	Experience
Maintain data and records Cash Management Custody	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal/ Communication skills	
Corporate Actions	■ General business graduate (not necessarily to degree level) ■ Specialist Cert in Investment Fund Services	■ Understanding of corporate actions theory, process and impact ■ Numerate ■ Attention to detail ■ Communication skills	■ Experience of trade flows and the impact of failing trades on the corporate actions process
Client Servicing	■ General business graduate (not necessarily to degree level) ■ European Languages ■ Specialist Cert in Investment Fund Services	■ Relationship Management ■ Problem resolution ■ Numerate ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal skills ■ Communication skills	■ Extensive experience in a range of Fund admin areas and detailed understanding of processes
Financial Reporting	■ Qualified/part-qualified accountant ■ General business graduate ■ Specialist Cert in Investment Fund Services	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal skills ■ Communication skills	■ Exposure to reporting functions in the funds industry
Fund Accounting	■ Qualified accountant	■ Numerate ■ Problem resolution ■ Attention to detail ■ Ability to work to deadlines ■ Interpersonal skills ■ Communication skills	■ NAV calculations Management reporting
Performance Management/ Financial Statements	■ Qualified accountant	■ IFRS/GAAP standards	■ Exposure to reporting functions in the funds industry
Audit	■ Qualified accountant	■ IFRS/GAAP standards ■ Problem solving ■ Analytical thinking ■ Interpersonal skills	■ Funds industry/ Financial services

Future Development and Skills Implications

Over the medium term the funds servicing sector is likely to remain one of the key drivers of employment growth in the international financial services sector. To secure the expected expansion in employment in this sub-sector the following initiatives should be considered to ensure a competitive proposition is maintained:

- Expand the proportion of middle-office and high value client servicing functions;
- Develop leading-edge solutions to support increased automation e.g. straight through processing; and
- Expand the pool of available skilled resources by targeting alternative populations to create additional capacity and reduce attrition levels.

This will require greater availability of resources with:

- Business/Finance qualifications which incorporate detailed elements on funds and complex products e.g. derivatives;
- Accountancy skills with funds experience;
- Certificates in funds servicing;
- Client servicing and international customer service skills;
- European languages;
- Middle-management experience; and
- Business and systems analysis skills to support process automation initiatives.

Additional Initiatives:

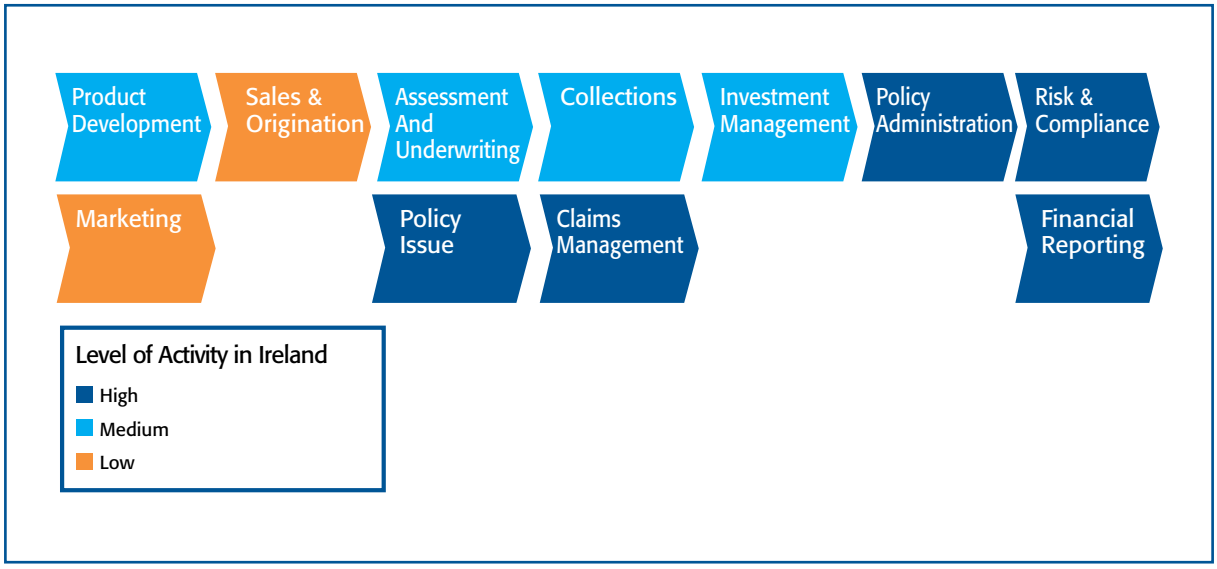
- Promotion of employment opportunities in this sector to alternative populations e.g. school leavers, parents returning to the workforce, migrants working in other sectors etc. to increase the available labour supply and reduce turnover levels; and
- Improved career guidance initiatives and work placement programmes for graduates to provide greater exposure to the sector, the key activities conducted and the employment opportunities available.

(iii) Insurance

Insurance – Life

The following high-level diagram provides a summary of the key functional areas typically required to support international insurance operations.

Figure 3.9 Value chain of life insurance activities (front-office)



The table below provides a brief description of some of the qualifications, skills and experience required for key international life insurance roles.

Table 3.9 Summary of life insurance role profiles

Roles	Qualifications	Skills/Requirements	Experience
Actuary	■ Qualified actuary with experience of Life products/environment	■ Understanding of key principles of financial reporting and accounting standards ■ Risk management methods ■ Knowledge of available product sets ■ Strong attention to detail ■ Audit mentality ■ Strong Excel/ Modelling skills	■ Life and pensions products and markets experience
Sales Support Admin	■ Completed a post-Leaving Certificate course ■ Completed relevant QFA modules	■ Good computer skills ■ Attention to detail	■ Will have 0–12 months industry experience

Roles	Qualifications	Skills/Requirements	Experience
Underwriter	■ Business or finance related qualification ■ Underwriting diploma, BLIA or ACII	■ Understand principles of Life, Disability and Critical Illness insurance and Pensions ■ Detailed product knowledge and qualifying criteria	■ 3-4 years underwriting or administration experience
Administration, Life Claims, Administrator, New Business	■ Completed Leaving Cert or equivalent and may have completed post-Leaving Cert course ■ Working towards relevant QFA modules	■ Knowledge of Life products and will know product range and distinguishing features of each ■ Understanding of basic principles of Life Assurance ■ Telephone skills ■ Computer skills	■ 1-2 years in life administration
Customer Services Representative	■ Leaving Cert or equivalent and may have completed a post-Leaving Cert course ■ Preferably will have an industry qualification	■ Communication skills – verbal and interpersonal	■ Experience within the industry commensurate with level
Risk and Compliance	■ Degree in legal or business discipline ■ Likely to be pursuing other industry qualifications, such as IIPM, AITI	■ Knowledge of life and pensions industry regulatory environment, in particular IFSRA compliance requirements ■ Detailed knowledge of the product range and sales process ■ Principles of sampling and quality assurance ■ Procedure writing	■ At least 5 years experience in Life and Pensions industry ■ Exposure to an internal audit environment ■ Strong understanding of business ■ Working knowledge of the key applicable pieces of legislation
Financial Reporting Accountant	■ Qualified Accountant	■ Knowledge of IFRS reporting standards ■ Experience of Sarbanes-Oxley ■ Report writing and presentation skills ■ High levels of numeracy and attention to detail ■ Interpersonal skills	■ 2+ years in financial control/reporting ■ Financial services experience
General Manager	■ Qualified Accountant or Actuary	■ Extensive knowledge of the insurance sector and the impact of decisions on concentration of risk ■ Knowledge of regulatory reporting obligations ■ Interpersonal/ Communication skills	■ 10+ years experience in an insurance environment

Future Development and Skills Implications

The international life insurance sector appears poised for continued growth over the medium term. Life operations based in Ireland generally involve smaller volumes of resources who are engaged in supporting management and reporting functions. Sales activities are based in the respective local markets and this is likely to always be the case so expansion into these elements of the value chain is not feasible.

Continuing to meet the growth demands of this sector will require a supply of resources with:

- Actuarial and risk assessment skills;
- Accountancy qualifications; and
- Business administration skills.

General Insurance

The value chain and role descriptions for general insurance are broadly similar to those shown previously for Life insurance. The table below provides a brief description of the key qualifications, skills and experience required for the key general insurance roles.

Table 3.10 Summary of general insurance role profiles

Roles	Qualifications	Skills/Requirements	Experience
Actuary	■ Qualified Actuary with experience of general insurance environment	■ Understanding of the key principles of financial reporting and accounting standards ■ Strong attention to detail ■ Audit mentality ■ Strong Excel/Financial modelling skills	■ General insurance experience
Customer Sales Advisor	■ Leaving Cert or equivalent and may have completed a post-Leaving Cert course	■ Understanding of basic principles of insurance, basic covers, package rating, and basic acceptance criteria of packages ■ Customer focused with good interpersonal skills ■ Ability to work to deadlines ■ Sales skills	■ 1-2 years sales or customer service experience
Underwriter – Private Lines/ Commercial Lines	■ Business or finance related qualification ■ Advancing towards an insurance related qualification	■ Broad/Extensive knowledge of relevant products, policy wordings, clauses and exclusions ■ Understands what drives risk and has the ability to identify and select complex risks and interpret information effectively ■ Aware of impact of assessing and writing risk ■ Aware of trends in the marketplace ■ Knowledge of competitor's products and awareness of the general market and ■ Working relationship with sales team and broker networks and schemes	■ Minimum of 2-3 years experience

Roles	Qualifications	Skills/Requirements	Experience
Underwriter – Product Specialist	■ Business or finance related qualification ■ Advancing towards an insurance related qualification ■ Specialist knowledge and company specific courses	■ In-depth knowledge of products in area of specialism and will be a technical reference point on that area ■ Corporate rating skills ■ Knowledge of specific product rating methodologies and company specific treaties, coinsurance arrangements and specialist insurance counterparts ■ Knowledge of economic trends on assessing and writing risk ■ Industry sector specialist, with an in-depth knowledge of a particular sector, e.g. property, liability, motor, etc.	■ At least 8 years underwriting experience
Risk Control Surveyor	■ Degree in related discipline ■ Insurance related qualification and/or may be certified in relevant area, such as, Health and Safety, environmental certification, etc.	■ Knowledge of underwriting and claims processes	■ Broad industrial base in respect of knowledge and experience of industrial processes, working practices and current legislation
Claims Specialist	■ Degree in business or legal discipline ■ Relevant insurance qualifications	■ Understanding of principles of legal liability ■ Knowledge of investigating liability, property and personal injury claims ■ Extensive knowledge of claims and the legal process ■ Knowledge of processing liability and personal injury claims	■ At least 10-12 years experience in claims settlements
Fraudulent Claims Specialist	■ ACII qualification or made substantial progress towards its attainment	■ Technical knowledge of claims and underwriting including basis for repudiation of claims ■ Knowledge of civil and criminal law as related to insurance along with a working knowledge of insurance claims practices and procedures ■ Detailed understanding of the insurance market, finance, and regulatory environment	■ 5 years of claims experience with some experience in fraud investigations
Risk Manager	■ Degree in business or legal discipline or relevant professional qualification	■ Knowledge of developing regulations in Ireland and Europe ■ Knowledge of general operational control environments and ability to understand and document systems processes ■ Excellent report writing and presentation skills ■ Cross-functional awareness and appreciation ■ Awareness of the overall compliance to Health and Safety, IT Security and all legislation/compliance in appropriate functions	■ 5+ year's relevant experience in the area of risk management or audit environment

Roles	Qualifications	Skills/Requirements	Experience
Compliance Officer/ Manager	■ Degree in business or legal discipline	■ Knowledge of life and pensions industry regulatory environment, in particular IFSRA compliance requirements ■ Detailed knowledge of the product range and sales process ■ Principles of sampling and quality assurance ■ Procedure writing ■ Strong written and verbal communication skills ■ Capable of motivating others towards delivering key compliance objectives across the organisation	■ Exposure to an internal audit environment ■ Strong understanding of business ■ Working knowledge of the key applicable pieces of legislation
In-house Legal Advisor	■ Qualified solicitor	■ Understand insurance company commercial dynamics and financials e.g. KPI's etc. ■ Knowledge of financial services environment ■ Principles of risk management, controller and compliance, particularly as they relate to the regulatory environment and brokers customer services	■ Will probably have 3-5 years experience within the industry

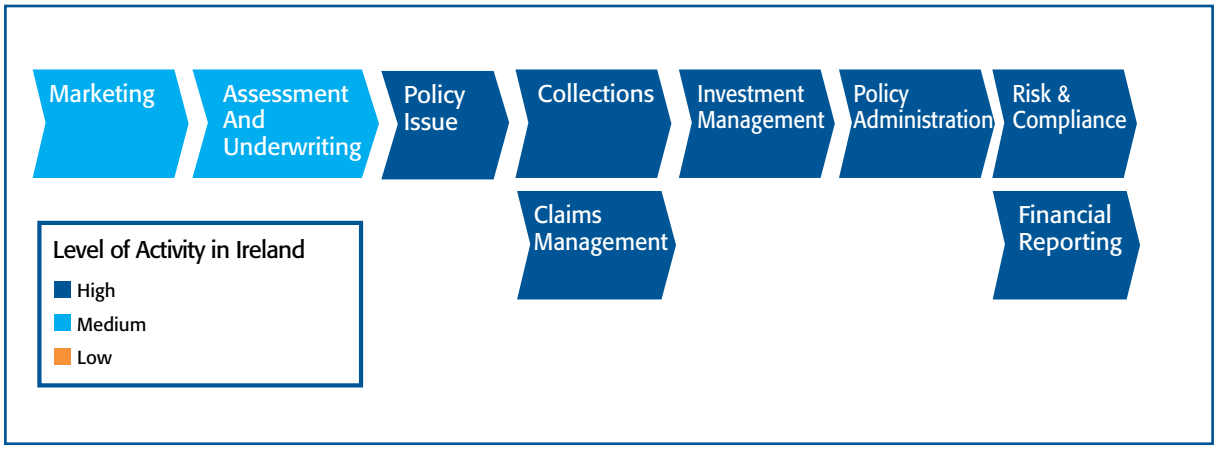
Future Development and Skills Implications

The international general insurance market has yet to develop to any significant scale, as outside of reinsurance of general insurance products, which is conducted on an international basis, the underwriting of general insurance risk is largely performed on a local market basis. Many general insurance firms have the capability to support pan-European products, however, the market preference appears to be towards local operations based in each market. Therefore, no specific skills or resource requirements have been identified for this sub-sector at this time.

Reinsurance

The following high-level diagram provides a summary of the value chain of activities generally required in reinsurance operations.

Figure 3.10 Value chain of reinsurance activities

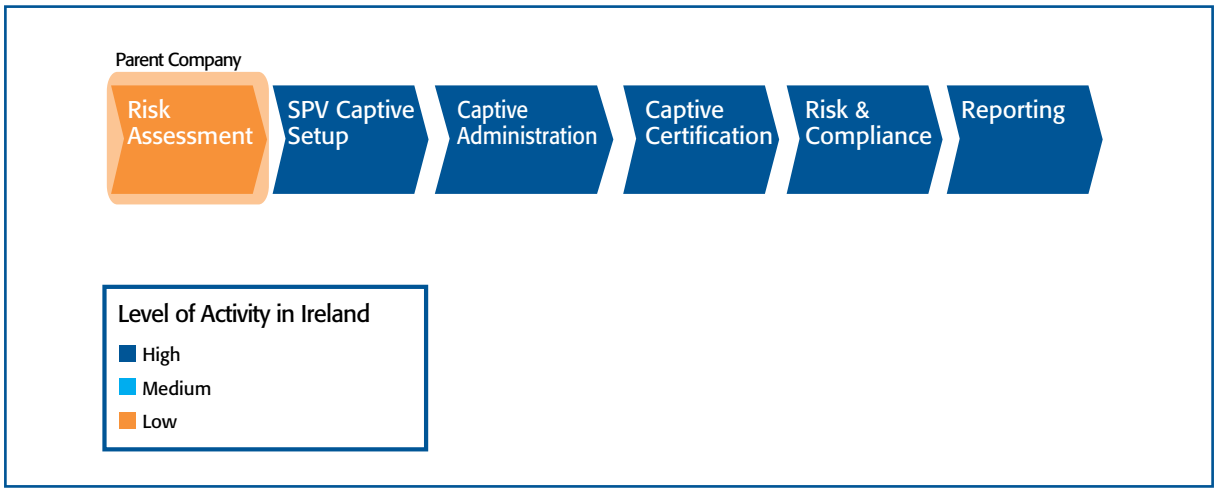


The roles required to support reinsurance operations are broadly similar to those for life insurance, however, there are increased levels of complexity associated with underwriting and risk management tasks, so resources with greater levels of experience would be required to support these roles.

Captive Insurance

The following high-level diagram provides a summary of the key functional areas typically involved in captive insurance operations. Captive insurers typically outsource functional operations to dedicated captive administrators who perform the main underwriting, administration and reporting functions.

Figure 3.11 Value chain of captive insurance activities



The roles required to support captive administrators are similar to those for general insurance and therefore are not described separately. The only substantial point of differentiation is that consulting actuaries are typically used to perform captive certifications, and these typically have higher levels of client relationship/communication skills relative to in-house actuaries.

Future Development and Skills Implications

Going forward, to expand Ireland's presence in insurance sub-sectors, efforts should be made to:

- Continue to support the growth in cross-border life sales; and
- Capitalise on regulatory changes in the reinsurance sector.

This will require greater availability of resources with:

- Actuarial and risk assessment skills;
- Accountancy qualifications;
- Marketing resources with European languages to support product development initiatives;
- International tax and legal skills; and
- Project management experience.

3.5 Expected Future Skills Needs

The overall range of skill-sets required by the sector is not expected to change significantly over the medium term, with the skill-sets listed in the current skills demand section likely to remain critical in supporting future growth.

However, international financial services is a knowledge intensive sector and recent developments which have seen changes in the way products are priced, structured, hedged, and regulated will increase the requirement for more specialised resources capable of dealing with more complex product sets. This race towards ever more complex products and pricing structures was articulated by one respondent as:

> "an intellectual arms race which has quantitative skills at its core"

Despite the difficulty in predicting future developments in such a dynamic market place, consultations with industry respondents suggested that the following roles and skill-sets will increasingly be in demand in the marketplace over the medium term.

Table 3.11 Summary of future skills

Role	Description/Skill-sets
Derivatives Specialists	■ Resources with deep knowledge of derivative products and markets which enables them to structure and create innovative derivative based product solutions. ■ Qualifications: Advanced quantitative skills (Maths/Statistics/Financial Engineering), Chartered Financial Analyst (CFA).
Quantitative Analysts	■ Resources with advanced numeric/quantitative skills (Maths/Economics/ Engineering/Actuary) which enables them to structure, price, risk and model complex products. ■ Qualifications: PhD/Masters in Maths/Statistics/Engineering/Economics, Chartered Financial Analyst (CFA).
Financial Control and Reporting	■ Resources with high levels of numeracy combined with an understanding of financing and taxation principles. ■ Qualifications: Qualified accountant, Finance degree.
Hybrid Technologists	■ Technologists with a background in business systems analysis which enables them to problem solve and use technology to deliver business solutions. ■ Qualifications: Business Systems Analysts.
Business Development	■ Resources with the interpersonal skills and deep product knowledge which enables them to understand client needs and sell complex products that are appropriate to client needs. In aviation leasing relevant industry exposure is a vital pre-requisite. ■ Qualifications: Business degree with financial specialism/Chartered Financial Analyst (CFA)/sector relevant sales certification.
Behavioural Economists	■ Economists with a background in the study of the impact of events on human financial behaviour. ■ Qualifications: Behavioural Economics.
Pan-European Tax/ Legal Specialists	■ Tax and legal specialist with cross-jurisdictional knowledge which enables them to advise on the structure and impacts of pan-European products. ■ Qualifications: Professional tax and legal qualifications.
Customer Support/ Business Development/ Tax and Legal Specialists	■ Fluency in European languages which enables reading and interpreting contracts in other European languages. ■ Qualifications: Business, law + languages.
Funds Servicing (complex products)	■ Business and finance qualifications with specific knowledge of funds, complex financial instruments and product sets. ■ Qualifications: Business/Finance degree.
Credit Analysis	■ Resources with high levels of numeracy and funding structures capable of evaluating the risks associated with financial proposals. ■ Qualifications: Qualified accountant or Finance related degree (aviation leasing requires additional levels of sector related experience).

The majority of companies interviewed did not have any plans other than internal training to ensure that they would have the necessary supply of skills over the medium term. This would suggest that improved levels of interaction and co-operation between industry and education providers may be advisable to ensure that the supply-side infrastructure produces sufficient supply of the skills required by industry.

In addition to the direct future skills requirements of the international financial services sector, growth in this sector will require an increase in the numbers employed in providing indirect services e.g. legal, audit, taxation and IT services. Therefore, overall demand requirements need to incorporate an element of excess capacity to facilitate catering for the needs of support services providers, who are an essential element of the industry.

Finally, effective and responsive regulation was identified in *Building on Success* as a key supporting pillar in developing a stable international financial services sector and, as shown previously, forms one of the key decision criteria for financial services investment. Therefore, skills development initiatives for the international financial service sector should ensure that there is an adequate supply of individuals with the appropriate level of regulatory skills.

In summary, the industry consultation process highlighted a number of areas where the industry is experiencing difficulties in sourcing suitably skilled personnel. These current skills needs are summarised in the table below.

In addition, the table also provides a summary of the future skills which industry representatives expect to be in demand over the medium term. These skill-sets are in addition to those listed under current skills which are expected to remain critical to future development of the sector.

Table 3.12 Summary of current and future skills needs

Current and future	Future
1. Maths/Economics/Quantitative Modelling 2. Accountancy (funds, audit and financial reporting) 3. Risk Management 4. Compliance 5. Middle-management with financial services experience 6. Project and change management 7. Funds servicing and banking back-office 8. Actuary	1. Derivatives structuring 2. Quantitative analysis 3. Credit analysis 4. Hybrid technologists – business analysis with IT/ systems skills 5. Business development with detailed product knowledge/industry qualifications 6. Pan-European tax/legal specialists 7. Behavioural economists 8. Funds servicing – client relationship management for complex products 9. Fluency in European languages 10. International compliance These needs are in addition to the current skills list opposite.

Investment in developing the skills listed above will provide the basis for growth in the overall financial services sector and further expansion of Ireland's areas of distinctive competence, which include:

- Funds servicing;
- Debt products and securitisation;
- Aircraft Leasing; and
- Cross border life insurance.

To consider how the skills requirements above translate into the demand for education and training courses and modules, the estimated demand for industry resources is reviewed with reference to the supply or potential satisfaction of this demand through the development of new or additional supporting courseware. These potential courseware developments are described below.

Demand Projections

This section is based on secondary data, feedback from consultations and a series of assumptions. The basis for the calculations is outlined below. The calculation provides a basis for 'guestimating' the future demand for employees at senior and operational levels within each of the three sectors of the international financial services sector – banking, insurance and funds. Any interpretation of the data should reflect this.

International financial services sector – total employment

Taking the number of employees in the Irish international financial services sector per the Finance Dublin Yearbook 2007, of 22,177 as a base, the allocation of these employees across senior management and operational roles is outlined below and are the estimated projections for growth in employee numbers in the sector over the period to 2012.

Estimated employment levels for 2012, by sector

Within each of the three sectors, there are two broad categories of skills and employees – employees involved in operational areas and those involved in more complex functional areas, middle management or senior management roles. Both groups require different skill sets and experience.

The only group for which some division between the two categories was available was the funds sector. However, an estimate of this allocation is provided for with regard to the other two sectors.

Funds sector	The Irish Funds Industry Association (IFIA) Employment and Staffing Survey for 2006 indicated that 77 percent of employees were in general or junior management grades, while the remaining 23 percent were at middle or senior management grades. This split was applied to the employment figure for the funds sector of 9,227, to obtain an estimate of employees in each category.
Banking sector	During the consultation process, some interviewees provided broad indications of the division of employees between management and operational roles. Broadly in the banking sector, this was in the region of 1:4 or 1:5 employees. Therefore it was assumed that 80 percent of employees in this sector were in operational roles and 20 percent were in management or senior roles.
Insurance sector	As with the banking sector, the estimate of 80 percent of employees having an operational role was applied.

Applying the above assumptions to the opening employment figures for 2006 yields the following table.

Table 3.13 Sectoral employment figures for 2006 – divided between senior management and operational roles

Sector	2006	
Banking		9,923
Specialist/Middle – senior management (20%)	1,985	
Operational (80%)	7,938	
Investment Management/Funds		9,227
Senior and mid management (23%) (approx)	2,108	
General and junior management (77%) (approx)	7,119	
Insurance		3,027
Specialist/Middle – senior management (20%)	605	
Operational (80%)	2,422	
Total		**22,177**

Source: Finance Dublin Yearbook 2007 and PwC derived allocations within the sectors.

The future demand for employees within the three sectors of banking, funds and insurance will comprise two components – the demand for people to replace employees that leave and the demand for skills to fulfil future growth.

Replacement demand

According to the FÁS/ESRI Manpower Forecasting Studies (Estimating Labour Force Flows, Job Openings and Human Resource Requirements, 1990-2005) the annual average labour force attrition rates that are most readily applicable to employees in the financial services sector are:

Business, legal and other professionals	2.8%
Other associate professionals	2.6%
Clerical	3.5%

While these rates are useful for the broader financial services sector, staff turnover levels in the funds industry have been historically high and in 2005, according to the IFIA Employment and Staffing Survey 1,627 employees left their jobs. This comprised a turnover rate of 27 percent at general and junior management staff levels and 15 percent at middle and senior management levels – albeit that these rates were based on a lower base number, of 6,800 employees, as mentioned earlier. Given that the estimates presented in this report are based on an employment figure of 9,227 for 2006, turnover rates of 21 percent and 12 percent would yield a figure of approximately 1,750 employees leaving their jobs.

Feedback from the industry representatives, during the consultation programme, would also point to higher levels of staff turnover at an operational level across all sectors of international financial services. Consequently, the assumed replacement rate for operational level employees within the banking and insurance sectors is estimated to be higher than the financial services sector average of 3.5 percent, but lower than the funds sector average of 27 percent. A rate of 10 percent has been assumed for 2006.

On that basis, replacement demand levels for 2006 are estimated as illustrated in the following table.

Table 3.14 Replacement rates In IFS employment in Ireland

	Replacement rate at	
Sector	**Operational level**	**Specialist/Middle – senior management level**
Banking	10%	3%
Funds	21%	12%
Insurance	10%	3 %

In subsequent years, it is assumed that the replacement rate will remain at a level of 3 percent for the senior management employees in the banking and insurance sectors. However, based on the introduction of initiatives aimed at reducing the turnover level in the operational areas of the international financial services sector, it is expected that the replacement rate for operational staff will reduce over time. This reduction is estimated at 0.5 percent per annum for the banking and insurance sectors and 1.2 percent per annum for the funds sector. The replacement rate in the funds sector at specialist/middle-senior manager level is also expected to reduce by 0.5 percent per annum. By 2012, the replacement rates in the funds sector would be 14 percent and 9 percent for operational and specialist/middle-senior management levels respectively.

In total, this results in the following level of replacement demand of just over 17,500 people from 2007 to 2012, as set out below.

Table 3.15 Estimated replacement demand 2007-2012

Sector	2007	2008	2009	2010	2011	2012
Banking	**887**	**911**	**925**	**928**	**918**	**906**
Specialist/Middle-senior management	65	70	75	80	83	88
Operational	822	841	850	848	835	818
Investment Management/Funds	**1,780**	**1,800**	**1,804**	**1,793**	**1,764**	**1,718**
Senior and mid management	265	277	287	295	301	305
General and junior management	1,515	1,523	1,517	1,498	1,463	1,413
Insurance	**256**	**250**	**245**	**238**	**232**	**224**
Specialist/Middle-senior management	19	19	20	20	21	22
Operational	237	231	225	218	211	202
Total	**2,923**	**2,961**	**2,974**	**2,958**	**2,914**	**2,848**

Source: PwC derived – based on various assumptions.

Growth Demand

From 1998 to 2006, the overall economy average employment growth rate was 3.8 percent[48], while the financial sector average employment growth rate was 5.4 percent[49]. Within this sector, the average annual employment growth rate for the banking sub-sector, over the same period, was 7.1 percent, and in the corresponding figure for the insurance sub-sector was 4 percent[50].

The Forfás Annual Employment Survey, indicated that the compound annual growth rate in the number of permanent full-time employees in agency assisted companies in the financial services sector was 10.5 percent for the period from 2002 to 2006, while the growth in the number of employees in the financial and other business services sector in the year to May 2007 was 7.6 percent, according to the CSO Labour Market Statistics.

At a sectoral level, Finance Dublin Yearbook indicated that the growth in the employment levels in the banking sector was 24 percent, insurance sector was 3 percent and the funds sector was 13 percent for 2006. This is in line with the findings from the IFIA Employment and Staffing Survey, which indicated that the funds industry grew by 13 percent in the year to January 2006, and was projected to grow by 16 percent in the year to January 2007.

During the consultation programme, the companies consulted indicated that they expected future growth in employment levels, albeit that the growth would not be at the levels experienced to date, due to the contracting economic environment and inflationary pressures.

48 *FÁS/SLMRU – A Study on the Future Skills Requirements of the Financial Services Sector.*
49 *FÁS/SLMRU – A Study on the Future Skills Requirements of the Financial Services Sector.*
50 *FÁS/SLMRU – A Study on the Future Skills Requirements of the Financial Services Sector.*

The growth rates applied to each sector are therefore:

- 10 percent for all banking roles;
- 3 percent for all insurance roles;
- 10 percent for specialist/middle-senior roles in the funds sector; and
- 8 percent for operational roles in the funds sector.

It is also assumed that the growth rate for the banking sector will reduce by approximately 1 percent per annum to 2011, levelling out at 5 percent growth rate thereafter. The growth rate assumption for the funds sector is based on a starting growth rate in 2006 of 10 percent for senior roles and 8 percent for operational roles, both of which are assumed to reduce by 0.5 percent per annum. This results in a growth rate of 7 percent for senior and mid management roles in the funds sector in 2012 and 5 percent for operational roles in this sector.

This yields a total growth in employee numbers of 9,700 over the period from 2007 to 2012, as outlined below.

Table 3.16 Estimated growth in employment levels for 2007-2012

Sector	2007	2008	2009	2010	2011	2012
Banking	**893**	**865**	**818**	**750**	**663**	**695**
Specialist/Middle-senior management	179	173	164	150	133	139
Operational	714	692	654	600	530	556
Investment Management/Funds	**734**	**744**	**746**	**741**	**729**	**710**
Senior and mid management	200	208	214	218	221	222
General and junior management	534	536	532	523	508	488
Insurance	**91**	**94**	**96**	**99**	**102**	**105**
Specialist/Middle-senior management	18	19	19	20	20	21
Operational	73	75	77	79	82	84
Total	**1,718**	**1,702**	**1,660**	**1,591**	**1,494**	**1,510**

Source: PwC derived – based on various assumptions

Table 3.17 illustrates total employment growth over the period, broken down by operation level and specialist/middle/senior management level.

Table 3.17 Forecast Employment Growth by Sector 2007-2012*

	Growth in employee numbers from 2006-2012	
Sector	**Operational level**	**Specialist/Middle-senior management level**
Banking	3,750	950
Funds	3,100	1,300
Insurance	500	100
Total	**7,350**	**2,350**

** Note figures in table 3.17 are rounded.*

This equates to an average growth level of approximately 1,600 additional resources per annum, approximately 400 at specialist/middle-senior management level and 1,200 at operational levels.

Recruitment Requirement

Combining the replacement requirement of just over 17,500 and the growth demand of under 10,000 yields a total recruitment requirement of just under 27,500, over the period from 2007 to 2012, or approximately 4,600 per annum.

Comparison of Supply and Demand Levels

The calculation of the level of skills supplied to the international financial services sector is complicated by the diverse pool from which resources can be drawn. However, by focussing on the main lines of supply, an estimate of relevant education outputs across financial fields per annum can be developed. This estimate is outlined the following table[51].

Table 3.18 Summary of estimated education output across financial fields

Field		Enrolments		Awards
Higher education	5,000		1,200[52]	
Professional institutions	15,000		1,800	
Accounting technician	5,500		4,300	
Accounting		25,500		7,300
Actuarial studies		600		40
Economics and statistics		1,400		400
Tax		1,300		300
Higher education undergraduate	1,500		600	
Higher education postgraduate	350		200	
Professional institutions			4,600	
CFA	300		50	
FÁS	100		100	
Finance and insurance		2,250		5,500
Risk		200		70
Total		**31,250**[53]		**13,610**

Source: SLMRU report, 2007 (PwC amended).
Note: figures are rounded.

The annual educational awards, in financial fields, amount to just over 13,500 awards per annum. However, of this potential supply only a portion opts to pursue a career in international financial services. Many of the graduates/awardees are already in employment (e.g. the actuarial and accountancy students) and many others go into employment in either domestic financial services or non-financial services sectors.

51 *FÁS/SLMRU – A Study on the Future Skills Requirements of the Financial Services Sector.*

52 *This figure was not in the SLMRU Report, but was subsequently provided to PwC by FÁS.*

53 *The enrolments figure for 'Finance and Insurance – professional institutions' was not available; hence the total figure for enrolments is understated in the table above.*

The industry consultations provided some insight into the nature and causes of the skills needs experienced in the sector.

- Specifically at operational levels, the lack of supply was primarily due to a shortage of personnel, but also personnel with qualifications in insurance, finance and/or accounting, with a particular international financial services dimension.
- Within the middle/senior management/specialist functional roles the lack of supply is due to:
  - The low number of graduates choosing a career in international financial services;
  - The lack of graduates with a specialist knowledge of international financial services;
  - The lack of graduates with specialist skills in areas such as: actuarial studies; economics; maths; statistics; and international taxation; and
  - In the case of some roles, the limited availability of personnel with these skills, but also with appropriate levels of experience e.g. middle management; risk management, etc.

In summary, the nature of the supply of educated personnel is not aligned to the education and skills demands of the international financial services sector.

To satisfy this demand, it is recommended that specific modules addressing these needs are added to existing course curricula and where needed that new courses are introduced addressing the demand for skills outlined in table 3.12. The nature and size of the courses recommended at foundation, graduate and postgraduate level are outlined in the table below. This table is indicative, and it is not intended to be exclusive or exhaustive. It provides guidance on course nature and content but it is up to the individual course developers to tailor the course in line with industry needs.

Table 3.19 Summary of the nature and content of new courseware

Skill demand	Course topics/contents	Course features (delivery, scale, etc)
	Foundation level	
Funds servicing and banking back-office	Introductory Funds Industry course with modules including: ■ Basic accounting; and ■ Principles of fund administration (Valuation, Settlements, Custody and Corporate Actions).	■ Short duration 8-12 weeks. ■ Flexible delivery mechanisms to include distance learning/web. ■ Simulated environments/ work experience. ■ Scaleable model to facilitate high volume and regional delivery up to 1,500/annum.
Funds servicing – client relationship management for complex products	Introductory Funds Industry course with modules including: ■ Basic accounting; ■ Principles of fund administration; ■ Effective communications; and ■ Client Relationship Management.	■ Short duration 8-12 weeks. ■ Flexible delivery mechanisms to include distance learning/web. ■ Simulated environments/ work experience. ■ Scaleable model to facilitate medium to high volume up to 200/annum.
Fluency in European languages	Inclusion of modules in general financial services courses, including: ■ Business and legal language training; and ■ International business finance.	■ Modular training incorporating. ■ Aural training. ■ Low volume (<50 per annum).
	Graduate level	
Maths/Economics/ Quantitative Modelling	General Mathematics and Economics degree programmes with a focus on higher level quantitative skills. Modules might include: ■ Econometrics; ■ Quantitative modelling in C++; ■ Product development; ■ Product modelling; ■ Asset pricing; and ■ Stochastic modelling.	■ Degree programme. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx. 20 per annum).
Accountancy with funds experience	Accounting courses with a focus on fund accounting (modular format).	■ Degree programme with professional exams. ■ Incorporating applied/case study elements from funds servicing environments. ■ Work experience. ■ Medium volume (300+ per annum).
Risk Management	General Risk Management courses with modules covering: ■ Risk management in financial institutions; ■ International risk management; ■ Risk modelling; ■ Regulation; and ■ Compliance. Reference course – BSc in Insurance and Risk Management offered by Penn State and BSc in Investment and Financial Risk Management offered by Cass.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (<50 per annum).

Skill demand	Course topics/contents	Course features (delivery, scale, etc)
Quantitative financial analysis	Quantitative finance/Mathematics courses with modules in the following areas: ■ Technical skills in quantitative financial analysis; ■ Quant asset management; ■ Financial engineering; ■ Quantitative strategic analysis; and ■ Quantitative strategy implementation.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx. 20 per annum).
Credit analysis	General Financial services degree programmes with modules in: ■ Financial analysis technology; ■ Scenario modelling; ■ Credit analysis and rating interpretation; ■ Company research; and ■ Asset quality/Forensic accounting.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx. 20 per annum).
Hybrid technologists – business analysis with IT/systems skills	IT Courses with a specific focus on financial services, including: ■ Applying IT to financial services; ■ Financial products; ■ Financial modelling; ■ Product development; and ■ Business systems analysis.	■ Degree programme or 6 month/1 year graduate diploma programme/ conversion course to provide graduates from IT courses with basic financial services skills. ■ Classroom based. ■ Medium volume (approx. 100 per annum).
Business development with detailed product knowledge/industry qualifications	Incorporation of financial services aspect into general Business/Marketing courses: Topics might include: ■ Introduction/background to international financial services; ■ Products, services and markets; and ■ Financial products and markets.	■ Certificate course/module providing business and marketing graduates with an understanding of financial products and instruments. ■ Medium volume (approx. 80 per annum).
Middle-management with financial services experience	Incorporation of following skills into financial services related courses: ■ General business skills; ■ Marketing skills; ■ Business development skills; and ■ Effective communication skills.	■ Certificate course/conversion course providing a basic understanding of financial products and instruments, the IFS sector and general management training. ■ Medium volume (approx. 80 per annum).
Postgraduate level		
Compliance/ International compliance	Provision of specialist programmes/research into the area of international regulation and compliance. Including modules in: ■ Audit principles; and ■ System controls. Reference course – MSc in Capital Markets, Regulation and Compliance.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 30 per annum).

Skill demand	Course topics/contents	Course features (delivery, scale, etc)
Risk Management	Provision of specialist programme/research in relation to: ■ Risk management in financial institutions; ■ Risk modelling; and ■ Added quantitative techniques. Reference course – MSc in Financial Risk Management as offered by Reading University.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 20 per annum).
Derivatives structuring	Specialist Derivative programme including modules in: ■ Financial engineering; ■ Dynamic asset pricing theory; ■ Portfolio risk analysis; ■ Credit risk and Derivative products; and ■ Stochastic modelling.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 20 per annum).
Behavioural economics	Economic specialist programme with a focus on: ■ Economic theory; ■ Behavioural science; ■ Rational theory; ■ Momentum investing; and ■ Arbitrage.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 20 per annum).
Project and change management	Certificate in Project Management incorporating modules such as: ■ Project management procedures and techniques; ■ Project planning and control; ■ Quality management; and ■ Earned value analysis.	■ Certificate course in project management best practices incorporating financial services case studies. ■ Medium volume (approx. 80 per annum).
Pan-European tax/ legal specialists	Specialist programme for tax and legal graduates to provide an international perspective.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 20 per annum).
Actuary	Specialist Actuarial programme with particular reference to the international financial service sector. For example – MSc in Actuarial Science and MSc in Actuarial Management as offered by Cass university.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 20 per annum).

The table above outlines the nature of the courses required, the broad course content and the features of the course format and capacity levels.

In essence, at **foundation level** the requirement is for short courses with flexible delivery mechanisms, aimed at bringing alternative populations of personnel (back) into the workforce in high numbers.

At **undergraduate – graduate level** the emphasis is on both: developing specialised modules which can be updated regularly to reflect industry trends and incorporated into existing degrees programmes; and developing new or updating existing degree programmes to provide greater focus on particular skills demands (e.g. tailored towards hybrid technologists or credit analysts). Where appropriate, applied or case study elements and work experience should be incorporated into these programmes.

The **postgraduate** proposition is for specialist programmes of varying length focused on particular specialist skills (e.g. international compliance, behavioural economics, etc.). Again these courses should incorporate applied or case study elements. The focus at this level is primarily on new courses, which are dynamic in nature, reflecting latest industry trends.

The key challenge for Ireland is to act with urgency to introduce new course materials that are innovative and industry-focused, and which are targeted at addressing the demands identified for the sector over the next five years. Given the time lag involved between introducing new courseware and producing graduates, it is imperative that timely solutions are considered as part of the skills provision mix in the short term, for example, by adding on tailored industry-specific modules to existing courses.

3.6 Supply Side Dynamics

This section is based on the views supplied during the industry consultations in addition to publicly available research and statistics. It examines the trends impacting the future skills supply to the international financial services sector, in particular:

1. Demographic profile;
2. Levels of mathematical proficiency; and
3. Availability of "industry-ready" graduates.

Ireland's young population (only 11 percent of the population over 65) relative to other European countries results in a large proportion of the population belonging to "working age" demographics[54]. Further population growth combined with continued investment in our educational system will be critical going forward to ensure there is a sufficient supply of skilled resources to support the projected growth in the finance and business sector of the labour market.

As can be seen from the skills demands highlighted previously, a strong emphasis is placed on the importance of mathematical and quantitative analysis skills by industry respondents as a pre-requisite to moving up the financial services value chain. In this regard the recent decline in scores for mathematical literacy and the overall numbers choosing higher-level maths and science subjects for the Leaving Certificate is a cause for concern. The data shows that the numbers opting for these subjects at higher level has dropped from 25 percent in 2001 to 18 percent in 2005.

A recent EGFSN report cited that Ireland is currently ranked 20th out of 40 countries by PISA for mathematical literacy of 15 year-olds. In terms of overall mathematical ability, 40 percent of Irish 15 year-olds were classed as being unable to 'select and apply simple problem-solving procedures' or even to 'execute clearly described procedures'. For the mathematical sub-category of spatial and geometric relationships this proportion increased to 52 percent[55].

Another area of concern, in terms of the future supply of resources, exists around the numbers of students who are choosing to study computers and technology related subjects, as this is a key enabler of the financial services sector. Technology related disciplines have experienced a decline in popularity amongst school leavers as illustrated in table 3.19 below. A decline has occurred in all disciplines within technology, excluding construction, with the most significant decline occurring in computing courses (down from 8.7 percent in 2000 to 3.5 percent percent in 2006)[56]. Engineering and computing courses have experienced a decline in both absolute figures and in the overall proportion of students accepting courses. This is largely attributed to only 7,000 students in 2007 achieving Grade C or above in higher-level maths, which is a minimum entry requirement for many of these courses[57].

54 Irish Times Report on CSO study – June 2007.

55 Tomorrow's Skills – Towards a national skills strategy – 5th report of the EGFSN.

56 CAO Acceptance Report, 2006.

57 Irish Times, August 24th, 2007.

Table 3.20 Total CAO acceptances by category 2000-2005

Discipline	Acceptance 2000	Acceptance 2005	Acceptance 2006
Engineering	1,664 (8.0%)	1,206 (4.8%)	1,192 (4.5%)
Construction	609 (2.9%)	1,116 (4.5%)	1,033 (3.9%)
Computing	1,809 (8.7%)	995 (4.0%)	927 (3.5%)
Science (non-healthcare)	2,495 (12.0%)	2,665 (10.7%)	2,490 (9.4%)
Agriculture and Veterinary	324 (1.6%)	284 (1.1%)	318 (1.2%)
Nursing	0 (0.0%)	1,822 (7.3%)	2,040 (7.7%)
Medicine	330 (1.6%)	306 (1.2%)	424 (1.6%)
Dentistry	66 (0.3%)	63 (0.3%)	66 (0.25%)
Other Healthcare	443 (2.1%)	1,175 (4.7%)	1,271 (4.8%)
Arts and Humanities	6,237 (30.1%)	7,359 (29.5%)	7,973 (30.1%)
Education	1,163 (5.6%)	2,083 (8.3%)	2,040 (7.7%)
Business and Law	4,847 (23.4%)	5,269 (21.1%)	5,986 (22.6%)
Social Services	78 (0.4%)	236 (0.9%)	397 (1.5%)
Services	311 (1.5%)	405 (1.6%)	344 (1.3%)
Total all	20,728 (100%)	24,984 (100%)	26,488 (100%)

Source: Tomorrow's Skills Towards a National Skills Strategy, EGFSN 2007 and CAO Acceptance Figures 2006.

Ireland's current performance for scientific and mathematical literacy poses a challenge to our objective of developing a "knowledge-based economy", and if left un-addressed, will prove particularly harmful to the future development of the international financial services sector.

While the Irish education system in seen as producing good quality graduates, a number of industry respondents highlighted that Irish graduates were perceived as "skilled generalists" and very rarely had specialised knowledge in a particular area of financial services, which would enable them to operate at a higher levels. This contrast was particularly marked when viewed against the US system, which facilitates students specialising in particular niches which ensures a higher level of proficiency upon course completion. This apparent lack of specialisation was also raised in the context of our market positioning and cost base. It was suggested that if graduates were expecting to command above average levels of remuneration then being a skilled generalist was not sufficient as many competing centres also have high volumes of "skilled generalists" available at lower labour cost rates. It was suggested that our education system should provide a greater focus on specialising in a number of selected areas which would support the development of an internationally distinctive competence which was more aligned with a mid to high cost base.

Availability of 'Industry Ready' Graduates

A number of respondents commented on the lack of relevant work experience that many graduates now have when seeking employment in the financial services sector. The increasing trend towards travelling during summer breaks to work in casual employment has resulted in a large number of graduates who, despite strong academic qualifications, lack experience of working in an office environment. This was termed as a lack of "industry readiness" in graduates. This contrast was particularly marked when viewed against continental European countries where undergraduates are required to participate in a number of internships as part of their educational studies. This ensures that they see the practical application of their education in a live work setting, and as graduates, that they can adapt and contribute immediately as they encounter less of a learning curve in entering the work environment.

The notable exceptions to this, were colleges which included work placements as part of their existing curriculum. This practice was viewed very favourably by industry with several respondents stating that quality work experience made these undergraduates instantly more employable and often placed them on a par with students who had pursued postgraduate level studies.

Future Skills Development Infrastructure

Entry level positions

For less specialised roles within the international financial services sector, companies expect that the educational system will supply graduates with business or general disciplines (not necessarily to degree standard) who have good levels of literacy and numeracy and who have the right attitude and interest to work in the industry. This was articulated as:

> "good generalists that are trainable".

For these roles companies expected that the specific skills required for job performance would be delivered by the company as part of internal on the job training programmes. This would be common for many entry-level positions in the sector.

Skills development

For the subsequent up-skilling of resources, companies preferred to use in-house training resources or specialist training providers. In-house skills development is typically achieved through a number of mechanisms:

- On the job training;
- Internally developed training courses;
- e-learning solutions (possibly produced at corporate level); and
- Mentoring.

For certain specialist skills e.g. regulation specialist external training companies are often used.

The financial services industry is differentiated by the level of sophistication that exists in terms of skills training delivery by industry professional bodies. Groups such as the Institute of Bankers, the Irish Insurance Federation, and the Irish Taxation Institute provide extensive specialised short-course education to support industry development needs. These modularised courses are flexible enough to scale between addressing specific skills gaps and achieving recognised industry certification standards. Many of these courses are delivered in formats which minimise time away from the job e.g. distance learning/home study supported by weekend tutorials.

The skills delivery infrastructure to support the future development of the international financial services sector needs to be capable of supporting the full range of roles and skills required e.g. administrative to high skill PhD level. This tiered system of skills delivery ensures a comprehensive infrastructure is available to address skills gaps.

Most companies were also supportive of staff who engaged in relevant postgraduate studies. This was typically used to support executive/general management skills development. Investment in training is increasingly viewed by companies as an effective tool to improve levels of staff retention and job satisfaction through improved career advancement opportunities.

The role of third level in skills development

International industry interviews suggested that there are limited formal linkages between universities and companies to address skills gaps through the co-development of courses/curricula. This would also appear to be the situation in Ireland as the consultations indicated that until recently the more traditional academic institutions (universities and colleges) have been viewed as quite removed from the specialist skills development requirements for financial services. A number of factors were cited for not using these institutions to support skills development, these were:

- Course length – too much time away from the job;
- Lack of relevant practical industry experience of lecturers;
- Delivery format – on campus delivery; and
- Cost.

There does, however, appear to be a change in this situation underway, with several institutions looking to establish closer linkages with industry to better understand their skills development requirements. This is evidenced by a number of recent announcements of initiatives such as the Global Finance Academy (UCD), the Financial Services Innovation Centre (UCC), and Pioneer Investments support in developing new Quantitative Finance programmes which will incorporate work placements.

3.7 Summary

Key conclusions from the industry consultations are listed below:

- Ireland has several natural advantages and foundations to support the development of a strong international financial services sector, which has the potential to become a significant European base for many international financial service organisations. The availability and stability of an appropriately skilled workforce is critical to this. There are, however, indications are that this is already presenting a limiting factor, which if left unaddressed will negatively impact upon the sector's future growth potential. A number of industry sources expressed the view that the sector is currently "capacity constrained" in terms of skills and until the issues of availability and stability are addressed it will be difficult to make a case for expanding existing operations or developing into higher value activities.
- To increase the supply of resources a tiered solution towards skills development is required. A mechanism for up-skilling non-graduates to enable them to fill administrative functions would increase the overall available resource pool and possibly provide a more stable resource base, thereby reducing attrition levels. In addition, this would free-up graduates to be deployed to tasks which are more aligned with their skills and education. A matrix of possible foundation level courses describing the content, duration and capacity for such courses is provided in this section.
- Promotion of the sector is perceived as being poor with universal acceptance that career guidance at school and college levels needs to be enhanced to provide candidates with improved quality of information on the range and scope of roles available within the sector.
- Improved linkages between industry and third level course providers (particularly at university level) are required to ensure that course content is relevant to current industry developments and incorporates "applied" elements which will help to improve the market readiness of students to take on roles within the sector. A matrix of possible graduate and postgraduate level courses describing the content, duration and capacity for such courses is provided in this section.
- A mechanism to assist undergraduates to avail of work placement opportunities in financial services should be examined and course developers should seek to increase the number of courses which incorporate placements.
- Advanced mathematical competencies are critical in underpinning the knowledge intensive elements of this sector. It will not be possible to attract the highest skill roles if the available pool of highly numerate resources is insufficient. Action is required to increase the numbers taking maths and science based courses at higher levels, along with measures to highlight the employment opportunities for people with these skills in the financial services sector.
- Technology is a key enabler of this sector e.g. straight through processing and passive fund management. Technology courses which incorporate an understanding of business processes and systems would facilitate technologists being deployed into higher value problem solving roles. Technology skills will be a critical requirement to the credibility of positioning Ireland as a financial services solutions centre.

- The key challenge for Ireland is to act with urgency to introduce new course materials that are innovative and industry-focused and which are targeted at addressing the demands identified for the sector over the next five years. Given the time lag involved between introducing new courseware and producing graduates, it is imperative that timely solutions are considered as part of the skills provision mix in the short term, for example, by adding on tailored industry-specific modules to existing courses.
- The mechanisms used to regulation skilled migration into Ireland (such as the Green Card system) and the range of programmes designed to attract skills migrants from abroad must remain competitive vis-a-vis other jurisdictions.

Chapter 4: Review of Irish Financial Services Skills and Research Providers

4.0 Introduction

This section of the report contains details of the development and delivery of educational, training and research programmes provided by Irish universities, institutes of technology and training bodies, in the financial services area. The analysis is based on information provided as part of a consultation programme with:

- Well-established leading Irish universities with tertiary level financial services programmes;
- Institutes of technology with tertiary level financial services programmes, including some niche finance courses; and
- Industry training bodies dedicated to training those in financial services.

In all, 15 education, training and research programme providers were consulted as part of this study, as listed in Table 4.1 below.

Table 4.1 Universities, institutes of technology, industry training bodies consulted

Universities	Institutes of Technology	Industry Training Bodies
University College Dublin (UCD)	Sligo Institute of Technology (SIT)	Institute of Bankers (IoB)
Trinity College Dublin (TCD)	Waterford Institute of Technology (WIT)	Insurance Institute of Ireland (III)
Dublin City University (DCU)	Letterkenny Institute of Technology (LYIT)	Chartered Financial Analyst Institute (CFA)
University of Limerick (UL)	Athlone Institute of Technology (AIT)	
University College Cork (UCC)		
National University of Ireland, Galway (NUIG)		
National University of Ireland, Maynooth (NUIM)		

The scope of this section is focused on the academic institutions provision of financial services education, training and research. It must be noted that teaching and research are inextricably linked. Research feeds into teaching and subject matter for curricula and graduates and researchers feed in from education into particular research areas. In all institutions interviewed, it was found that teaching and research are interdependent and any reference to 'research providers' throughout this section should be viewed in this light.

The information presented in this section of the report does not represent a census of financial services education and training in Ireland, but reflects the course provision by the interviewees listed above. All subsequent presentation of information in this section of the report relates solely to the education and training providers interviewed.

Each of the organisations consulted and listed above are involved in the provision of financial services courses. The nature and extent of the educational programmes, both undergraduate and postgraduate, are described in the following tables (Tables 4.2 to 4.4) and financial services research activities are described in Section 3, Research Activity.

In Tables 4.2 to 4.4, each of the financial services courses are categorised under the 'National Framework of Qualifications' (NFQ) established by the National Qualifications Authority of Ireland (NQAI) in 2003. The Framework consists of ten levels, as illustrated below.

Table 4.2 Explanation of the National Framework of Qualifications

	NQAI levels		NQAI levels
L 10	Doctoral Degree (PhD)	L 4/5	Leaving Certificate
L 9	Masters Degree and Postgraduate Diploma	L 4	Level 4 Certificate
L 8	Honours Bachelor Degree and Higher Diploma	L 3	Level 3 Certificate and Junior Certificate
L 7	Ordinary Bachelor Degree	L 2	Level 2 Certificate
L 6	Advanced Certificate and Higher Certificate	L 1	Level 1 Certificate
L 5	Level 5 Certificate	-	-

Absence of course NFQ level indicates that this has yet to be agreed/assigned by the provider and the NQAI).

Table 4.3 Financial services related courses delivered by Irish universities[1]

Institution	Classification	Undergraduate courses	Postgraduate courses
Trinity College Dublin	Financial Services	■ Business, Economics and Social Studies [Finance specialism] (L8)	■ MSc Finance** (L9)
	Mathematics	■ BSc Mathematics (L8)	■ Postgraduate Mathematical Study [PhD/ MSc by research] (L10/L9)
	Business/Other	■ Bachelor of Business Studies (L8) ■ Management Science and Information Systems Studies (L8) ■ BA Economics (L8)	■ Masters in Business Administration (L9) ■ MSc Economics (L9) ■ MSc Economic Policy Studies (L9) ■ PhD Economics (L10) ■ PhD Finance (L10)
University College Dublin	Financial Services	■ BA Actuarial and Financial Studies (L8) ■ BSc Economics and Finance Studies (L8) ■ B.Comm. [Banking and Finance/ Insurance specialism] (L8) ■ Bachelor of Financial Services [in association with IoB and III, LIA] (L8)	■ H. Dip. Actuarial Science (L8) ■ MSc Actuarial Science (L9) ■ MSc Quantitative Finance (L9) ■ MBS Financial Services (L9) ■ Executive Masters in Risk Management [delivered by IoB] (L9) ■ Structured PhD Programme in Finance* (L10) ■ Executive MBA in Regulation and Compliance (jointly delivered with IoB)* (L9) ■ MBA Financial Services (jointly delivered with IoB)* (L9) ■ Doctorate of Business Administration*** ■ MSc Equity Analysis** (L9) ■ MSc Capital Markets and International Finance** (L9)

1 *Table 4.3 excludes any Executive related courses. It also excludes any IT specific courses however it is noteworthy that some of these may be relevant for example UCD's PhD Management Information Systems.*

Institution	Classification	Undergraduate courses	Postgraduate courses
	Mathematics	■ BSc Mathematical Science (L8) ■ BA Mathematical Studies (L8) ■ BSc/BA Statistics (L8)	■ MSc Mathematical Science (L9) ■ H. Dip Mathematical Science (L8) ■ MSc Mathematics (L9) ■ MSc Statistics (L9) ■ H. Dip Statistics (L8) ■ PhD Mathematics (L10)
	Business/Other	■ Bachelor of Business and Legal Studies (L8) ■ BA Economics (L8) ■ BA International Economics (L8) ■ BA Economics and Politics (L8) ■ B. Comm. (Finance/International/ Business and Chinese Studies)	■ Masters of Accounting (L9) ■ Masters in Management (L9) ■ Master of Management Science (L9) ■ MA Economics (L9) ■ H. Dip. Economic Science (L8) ■ PhD Economics (L10) ■ PhD Accounting (L10)
Dublin College University	Financial Services	■ BA Accounting and Finance (L8) ■ BSc in Quantitative Finance (L8) ■ BA Business Studies (Finance specialism) (L8) ■ BSc Financial Mathematics* (L8) ■ *BSc Actuarial Mathematics** (L8) [previously BSc Financial and Actuarial Mathematics]	■ MSc Finance and Capital Markets (L9) ■ Grad. Cert. Corporate Treasury (awaiting NFQ classification) ■ MSc Investment and Treasury (L9) ■ Grad. Cert. Actuarial Science (awaiting NFQ classification)
	Mathematics	■ MSc Mathematical Science	■ MSc Financial and Industrial Mathematics (L9)
	Business/Other	■ BSc Business Studies (L8) ■ BA European Business (L8) ■ BA International Business and Languages (L8) ■ BA Economics, Politics and Law (L8)	■ MBS Accounting (L9) ■ Professional Diploma in Accounting (awaiting NFQ classification)
University College Cork	Financial Services	■ BSc Finance (L8) ■ BSc Financial Mathematics and Actuarial Science (first grads 2006) (L8)	■ MBS Corporate Finance and Accounting (L9) ■ H. Dip. Accounting and Corporate Finance (L8) ■ MSc Financial Economics (L9)

Institution	Classification	Undergraduate courses	Postgraduate courses
University College Cork cont../	Mathematics	■ BSc Mathematical Sciences (L8) ■ BSc Mathematics and Physics (L8) ■ BSc Applied Mathematics and Physics (L8) ■ BA Applied Mathematics and Economics (L8) ■ BA Mathematics and Economics (L8) ■ BA Mathematics and Applied Mathematics (L8) ■ BA Applied Mathematics and Mathematical Studies (L8) ■ BA Applied Mathematics (L8)* ■ BA Mathematics (L8)* ■ BA Mathematical Studies (L8)* * BA degrees involving mathematical subjects at UCC are joint honours degrees combining either two mathematical subjects or a mathematical subject and another Arts subject.	■ H Dip in Applied Science – Applied Statistics and Statistical Computing (L8) ■ Postgrad Dip in Applied Science – Modelling and Numerical Computing (L9) ■ MSc Mathematical Modelling and Scientific Computing (L9) ■ MSc Modelling and Numerical Computing (L9) ■ MSc Statistics (L9) ■ MSc Applied Mathematics (L9) ■ MSc Mathematical Physics (L9) ■ MSc Mathematics (L9) ■ MA Applied Mathematics (L9) ■ MA Mathematical Physics (L9) ■ MA Statistics (L9) ■ MA Mathematics (L9) ■ MPhil Applied Mathematics (L9) ■ MPhil Mathematical Physics (L9) ■ MPhil Statistics (L9) ■ MPhil Mathematics (L9) ■ MPhil Mathematical Studies (L9) ■ PhD Mathematics (L10) ■ PhD Applied Mathematics (L10) ■ PhD Mathematical Physics (L10) ■ PhD Statistics (L10)
	Business/Other	■ BSc Business Information Systems (L8) ■ BSc Accounting (L8) ■ B. Comm. (L8) ■ BA Economics (L8)	■ MBS Business information Systems (L9) ■ MBS Management Information and Managerial Accounting (L9) ■ H. Dip. Business and Financial Information Systems (L8) ■ MA/MEconSc Economics (L9) ■ H. Dip. Economics (L8) ■ Postgrad. Dip. Business Economics (L9) ■ MBS Business Economics (L9)

Institution	Classification	Undergraduate courses	Postgraduate courses
University of Limerick	Financial Services	■ BSc Financial Mathematics ■ Bachelor Business Studies [economics and finance/ accounting and finance/risk management and insurance] (L8) ■ BA International Insurance and European Studies (L8)	■ MSc Financial Services (L9) ■ MSc Computational Finance* (L9)
	Mathematics	■ BA Mathematical Sciences (L8) ■ BSc Economics and Mathematical Sciences (L8) ■ BSc Mathematical Sciences (L8)	-
	Business/Other	■ BA Law and Accounting (L8) ■ BA Economics and Sociology (L8)	-
NUI Galway	Financial Services	■ BSc Financial Mathematics and Economics (L8) ■ BA Economics and Mathematics	■ MEconSc International Finance* (L9) ■ MSc Quantitative Mathematics [two streams, actuarial studies and financial modelling]** (L9)
	Mathematics	■ BSc Computing Studies and Mathematics (L8) ■ BSc Mathematics (L8) ■ BSc Mathematics Physics (L8)	■ H. Dip. Mathematics (L8) ■ MSc Mathematics (L9) ■ MSc Mathematical Science (L9) ■ PhD Mathematics (L10)
	Business/Other	■ B. Comm. (L8) ■ B.Comm. International (L8) ■ BSc Business Information Systems (L8) ■ BA Economic and Social Studies (L8)	■ MA Accounting (L9) ■ MSc Business Information System (L9) ■ PhD Commerce/Economics (L10) ■ MEconSc Economic Policy and Planning (L9) ■ MEconSc Economic and Environmental Modelling (L9) ■ H. Dip. Economic Science (L8)
NUI Maynooth	Financial Services	■ BA Finance (L8) ■ BA Finance and Venture Management (L8) ■ BA Finance and Accounting (L8)	■ H. Dip. Mathematics (L8) ■ H. Dip. Mathematical Science (L8) ■ H. Dip Mathematical Studies (L8) ■ MA/MSc Mathematics (L9) ■ MA/MSc Mathematical Science (L9) ■ H. Dip Statistics (L8) ■ MSc Statistics (L9) ■ PhD Mathematics/Statistics (L10)
	Mathematics	■ BSc/BA Mathematics (L8) ■ BSc/BA Statistics (L8) ■ BA Mathematical Studies (L8)	■ H. Dip. Mathematics (L8) ■ H. Dip. Mathematical Science (L8) ■ H. Dip Mathematical Studies (L8) ■ MA/MSc Mathematics (L9) ■ MA/MSc Mathematical Science (L9) ■ H. Dip Statistics (L8) ■ MSc Statistics (L9) ■ PhD Mathematics/Statistics (L10)
	Business/Other	■ *BA Business and Management* (L8)* ■ *BA Economics (L8)*	■ MA Accounting** (L9) ■ MA Economics (L9) ■ H. Dip. Economic Science (L8)

** Programme beginning in academic year 2007/2008. ** Programme beginning in academic year 2008/2009.*
**** start date unknown. Source: PwC derived.*

Table 4.4 Financial services related courses delivered by Irish Institutes of Technology

Institution	Classification	Undergraduate courses	Postgraduate courses
Waterford IT	Financial Services	■ BA Financial Services [two-year, add-on] (L8) ■ Bachelor of Business Studies (Economics and Finance) (L8) ■ BA Finance and Investment* (L8)	■ MBS [Economics and Finance] (L9) ■ PhD Finance (L10)
	Business/ Other	■ BA Accounting (L8) ■ BA General and Corporate Administration (L8) ■ BA International Business (L8) ■ Higher Cert. in Business Studies (L6) ■ Bachelor of Business Studies [Accounting] (L8) ■ Business Information Systems [2 year add-on] (L8)	■ MA Accounting (L9) ■ MBA International Business (L9)
Athlone IT	Financial Services	■ BA Accounting and Finance [one-year, add-on] (L8) ■ Higher Cert. in Business in Financial Services (L6) ■ Bachelor of Business in Financial Services [one-year, add-on] (L7)	-
	Business/ Other	■ Higher Cert in Business (L6) ■ Bachelor of Business [one-year, add-on and four-year course] (L7/8) ■ Bachelor of Business in European Business Management (L7) ■ Higher Cert. in Business and Office Management (L6) ■ BA in Accounting (L8) ■ BBS Applied Accounting (L8)	■ Master of Business (L9) ■ Master of Business Administration (L9) ■ H. Dip. in Business Analysis and Information Systems (L8) ■ MA Accounting (L9)
Sligo IT	Financial Services	■ *BBS Financial Services* (L7)* ■ *Bachelor of Business [Financial stream] (L8)*	-
	Business/ Other	■ Higher Cert. in Business in Office Administration (L6) ■ Bachelor of Business in Office Management [one-year, add-on] (L7) ■ Bachelor of Business Administration [one-year, add-on] (L8) ■ Bachelor of Business [add-on and full-time] (L8) ■ Higher Cert. in Business in Accounting (L6) ■ Bachelor of Business in Accounting [one-year, add-on] (L7) ■ Higher Cert. in Business (L6)	■ Master of Arts by Research (L9) ■ Master of Business Administration (L9) ■ Graduate Diploma in Business (L9)
Letterkenny IT	Financial Services	-	■ H. Dip Financial Services Technologies (L8)
	Business/ Other	■ Bachelor of Business (L7) ■ Bachelor of Business [one-year, add-on] (L8) ■ BA Administrative Management [one-year, add-on] (L8)	■ MA Accounting (L9)

Note: All courses listed are degree level and above.

** Programme beginning in academic year 2007/2008.*

Source: PwC derived.

Tables 4.3 and 4.4 above classify the financial services courses delivered by the universities and IoTs into three areas, namely: financial services; mathematics; and business/other.

- **Financial services** courses include programmes that are dedicated to finance, actuarial science, banking, and investment management. This category also includes joint degrees which combine finance with a broader business subject (e.g. BA Accounting and Finance, BSc Economics and Finance) and business degrees with a finance specialism (e.g. Bachelor of Business [finance stream], Bachelor Business Studies [economics and finance, accounting and finance, risk management and insurance streams]);
- **Mathematics courses** include programmes that cover mathematics, mathematical science, statistics and other related mathematical based courses; and
- **Business/other courses** include broad business degrees and other finance related courses which provide skills relevant to working in the finance sector, such as accounting, economics and business information systems.

Table 4.5 below contains a list of the financial services related courses delivered by the three training bodies that we consulted during the interview programme. As the Insurance Institute of Ireland have not gone through the formal process of rating courses under the NQF framework, their courses are not assigned an NQF rating.

Table 4.5 Financial services related courses delivered by industry training bodies

Institution	Programmes offered
Institute of Bankers Ireland**	Recognised Qualifications: CP14 – Minimum Competency Requirements: ■ Foundation Cert. in Consumer Credit (L7) ■ Cert. in Mortgage Practice (L7) ■ QFA Diploma (L7) Other Specialist Qualifications: ■ Foundation Cert. in Pensions (L7) ■ Foundation Cert. in Consumer Credit (L7) ■ *Foundation Cert. in Stock Broking** (L7) ■ *Foundation Cert. in Investment Management** (L7) ■ Foundation Cert. in International Cash Management (L7) ■ Foundation Cert. and Professional Diploma in Compliance (L7) ■ Specialist Cert. in Treasury Operations (L7) ■ Specialist Cert. in Selling Financial Services (L7) ■ Specialist Cert. in Business Banking (L7) ■ Specialist Cert. in Investment Fund Services (L7) ■ Specialist Cert. in Banking Operations (L7) ■ Specialist Cert. in Asset Finance and Leasing (L7) ■ Specialist Cert. in Direct Banking Services (L7) ■ Specialist Cert. in Credit and Lending (L7) ■ Specialist Cert. in Customer Relationship and Service (L7) ■ Specialist Cert. in Front Line Management (L7) ■ Specialist Diploma in Mortgage Practice* (L7) ■ Specialist Diploma in Front Line Management (L7) ■ Specialist Diploma in Corporate Banking (L7) ■ Specialist Diploma in Wealth Management (L7) ■ Specialist Diploma in Investment Fund Services (L7) ■ Certificate in General Insurance for QFAs* (L7) The Professional Programme: ■ Joint Financial Services Diploma (joint qualification established by III, LIA and IoB) (L7) ■ Bachelor of Financial Services (L8) ■ Admitting Exam to Certified Banker (L8) ■ Executive Masters in Risk Management (jointly delivered with UCD) (L9) ■ MBA Financial Services (jointly delivered with UCD)* (L9) ■ Executive MBA Regulation and Compliance (jointly delivered with UCD)* (L9)

Institution	Programmes offered
The Insurance Institute of Ireland	■ Insurance Foundation Cert. ■ Life Administration Certificate ■ Certified Insurance Practitioner Life/General Diploma in Life Administration ■ Certified Insurance Practitioner – General and Personal Medical Insurance ■ Diploma in Loss Adjusting ■ Diploma in Life Disability Underwriting ■ Diploma in Life and Disability Claims ■ Joint Financial Services Diploma (joint qualification established by III, LIA and IoB) ■ Advanced Diploma in Insurance ■ Bachelor of Financial Services (jointly delivered with UCD and IoB) (L8) ■ Professional Diploma in Compliance ■ Cert. in IT for Insurance Professionals ■ Fellowship (FCII) and Chartered Status ■ QFA Diploma ■ Diploma of Insurance Practice
Chartered Financial Analyst Institute	■ Chartered Financial Analyst Programme ■ Cert. in Investment Performance Measurement

** Programme beginning in academic year 2007/2008.*

*** NOTE: In 2006, the Institute of Bankers School of Professional Finance became a recognised school of University College Dublin.*

Source: PwC derived.

Index		Index	
BA	Bachelor of Arts	BBS	Bachelor of Business Studies
B. Comm	Bachelor of Commerce	Cert	Certificate
MA	Master of Arts	MBA	Master of Business Administration
H. Dip.	Higher Diploma	PhD	Doctor of Philosophy
MEconSc	Masters of Economic Science	QFA	Qualified Financial Advisor

The tables on the previous pages provide a summary of the education and training programmes hosted by the universities, IoTs of technology and industry training bodies that were consulted during this study.

To review the provision of financial services education, training and research by the education and research providers, both in Ireland and internationally, a key step comprised the development of a "framework" for evaluation of education, training and research. The framework comprises four key criteria to present our findings on financial services education, training and research, namely: course provision; course development and update; research activity; and industry linkages.

Each area of the framework comprises several sub-criteria under which information on financial services education, training and research providers is presented. A high-level description of the framework is provided in the following table, Table 4.6.

Table 4.6 Framework for review of financial services related education, training and research (Irish and International)

Criteria	Aspects reviewed	Description
Course Provision	Number of financial services related courses	Number of financial services dedicated courses and modules; Number of general/related courses such as business, mathematics, etc; number of faculties/ departments through which courses are delivered; and level of cross- faculty collaboration.
	Accreditation/certification	Level of accreditation of courses: Diploma, Degree, Post-Grad, PhD, other.
	Sector focused courses	Courses dedicated to specific financial services sectors, e.g. banking, insurance, investment management, etc; and modules within courses dedicated to financial sectors/ sub-sectors.
	Core course focus	Course focus on specific core areas of financial services, e.g. general management/business; product development; financial processes; back-office/administration; and customer-facing role/operations.
	National and international recognition	Recognition of financial services courses (internationally and nationally), recognised quality standards and measurement framework.
Course Development and Update	Flexibility of course/module	Extent of flexibility/process of introducing new financial services related courses/modules; and the extent of flexibility/process of updating/changing existing course modules.
	Frequency of course/ module update	Frequency of course/module review – informal and formal; and drivers of course/module update, e.g. industry trends; industry feedback; research; quality of graduates; etc.
	Mechanisms in place to ensure industry relevance	Methods used to ensure course content is relevant to industry requirements/trends and developments, e.g. internal review of industry trends; informal linkages with industry; formal industry input.
	Cross faculty coordination	Level of cross-faculty collaboration in the design and update of course content, e.g. course development committees/ boards; informal linkages, etc.
	Inter-Institutional collaboration	Level of inter-institutional collaboration in the development and update of courses/course content.
Research Activity	Drivers of research activity	Key drivers of research activity, e.g. industry trends, industry requests, general research interests, etc.
	R&D funding	Source of financial services R&D funding.
	Level/nature of research activity	Size/level of financial services related research undertaken; specific focus of the research, e.g. sector, product, etc; and inter-institutional research activity (national and international).
	Financial services research centres	Number of dedicated financial services research centres; scale, focus and funding of research activity; inter-institution involvement in research centres.
	Linking research to course content	Extent and method by which research findings are linked to course content/development.
	Linking research to industry	Extent and method by which research findings are linked into industry.

Criteria	Aspects reviewed	Description
Industry Linkages percent Collaboration	Design of course content	Extent of industry input into course/module design, e.g. members of course boards, industry boards, etc; mechanisms used by colleges/universities to ensure structured industry input.
	Delivery of course content	Nature and frequency of delivery of courses/ course modules.
	Internships/work placements	Level and nature of internships/work placements with industry.
	Joint research programmes	Extent to which research programmes are undertaken with industry; nature/extent to which they are jointly funded; nature of research undertaken; and use of research outputs.
	Funding from industry	Level of funding from industry, e.g. research, sponsorship of facilities, student sponsorship, etc.
	Other	Incubation centres; industry mentoring and sponsorship; development of executive education courses; and any other linkages/participation by industry.

In line with the analysis framework presented in table 4.6, feedback from the Irish academic consultations is provided under the following four headings:

4.1 Course Provision;

4.2 Course Development and Update;

4.3 Research Activity; and

4.4 Industry Linkages/Collaboration

4.1 Course Provision

Table 4.7 below contains details on: the total number of existing courses delivered by the universities, IoTs and industry bodies interviewed in 2006/2007; the total number of new courses expected to be introduced between 2007 and 2009; and a breakdown of the broad financial services related courses (e.g. covering business, accounting, economics, maths, statistics, etc) versus dedicated financial services courses (e.g. covering finance, actuarial science, insurance, banking, etc) for each category.

Following this overview table, a detailed description of the financial services course provision is presented under the following headings: the number of courses provided; the extent to which these courses are accredited or certified; the level of financial services sectoral focus contained within the course content; the nature of the core focus of the courses; and the level of national and international recognition attained by the courses. Details of each of these are detailed in aggregate for the education institutions and providers consulted.

Table 4.7 Number of existing and proposed courses delivered by the universities, IoTs and industry training bodies

	Existing financial services courses '06/'07			Proposed financial services courses '07-'09			Total financial services courses		
Education provider	Total	Broad	Dedicated	Total	Broad	Dedicated	Total	Total broad	Total dedicated
Universities	148	113	34	14	2	12	161	115	46
IoTs	42	33	9	2	-	2	4	33	11
Total Uni./IoT	189	146	43	16	2	14	205	148	57
Industry bodies	*42	-	42	6	-	6	48	-	48
Total	231	146	85	22	2	20	253	148	105

** Three courses are jointly delivered between IoB and III*

(i) Number of financial services related courses

The following points summarise the key findings from the consultations with the Irish education providers, relating to the *number of financial services related courses* (refer to Table 4.7 and Table 4.8 for further detail):

- A large number of courses that are either specific to, or relevant for, financial services were delivered by the universities/IoTs/industry bodies interviewed over 2006/2007. A total of 231 courses are available, of which 147 were delivered by the universities, 42 by the IoTs and 42 by the industry training bodies;
- The vast majority of the courses in the universities and IoTs (146 out of 189 courses or 77 percent) are broad in nature, covering areas such as business, economics, accounting, statistics and mathematics. Similar proportions of courses in the IoTs (33 of 42 courses or 79 percent) are broad in nature compared with the universities (113 of 147 or 77 percent);
- The remaining 43 courses in the universities/IoTs are specific financial services courses covering areas such as finance, financial mathematics, insurance, banking, corporate finance and actuarial science. A greater number of dedicated financial services courses are delivered by the universities interviewed (34 out of 43 courses) than the IoTs;
- Each of the 42 courses delivered by the industry training bodies are dedicated financial services courses, focusing on the insurance, banking, investment management and capital markets sectors; and
- Over the 2007/2008 and 2008/2009 academic years, 22 additional courses are expected to be introduced by the universities/IoTs/industry bodies interviewed (14 from the universities, 2 from IoTs and 6 from industry bodies) bringing the total number of financial services related courses from 231 to 253; 105 of which will be dedicated financial services courses.

Table 4.8 Course provision by Irish financial services education and training providers – financial services related courses

Skills/ research provider	Number of financial services related courses
Universities	Of the seven universities consulted, each university typically provides anything between nine and 47 courses that are either specific to, or relevant for, the financial services sector. A total of 147 financial services related programmes were delivered across the universities interviewed over the 2006/2007 academic year. The majority of these courses (113 programmes) are broad in nature, covering areas such as: i. Business studies; ii. Accounting; iii. Economics; iv. Statistics; and v. Mathematics. Examples include: ■ Bachelor of Business and Legal Studies (UCD); ■ Management Science and Information Systems Studies (TCD); ■ BA European Business (DCU); ■ BSc Mathematics (NUIG, NUIM); ■ BA Mathematical Sciences (UCC, UL); ■ BA Mathematics (UCC); ■ BA Mathematical Studies (UCC); ■ BSc Statistics (NUIM, UCD); ■ MSc Management Information and Managerial Accounting (UCC); ■ MA/MBS Accounting (NUIG, DCU); ■ MSc Modelling and Numerical Computing (UCC); ■ MSc Mathematical Science (UCD, NUIG); ■ MSc Statistics (UCD); and ■ PhD Economics. The remaining 34 courses are specific financial services courses covering areas such as: vi. Finance; vii. Financial mathematics; viii. Actuarial science; ix. Insurance; x. Banking; xi. Capital markets; xii. Investment and treasury; and xiii. Corporate finance. Examples include: ■ BA Actuarial and Financial Studies (UCD); ■ BA Accounting and Finance (DCU); ■ BSc Economics and Finance Studies (UCD); ■ Bachelor of Commerce – banking and finance/insurance (UCD); ■ BA Business Studies – finance (DCU); ■ Business, Economics and Social Studies – finance (TCD); ■ BSc Finance (UCC);

Skills/ research provider	Number of financial services related courses
Universities cont../	■ Bsc Financial Mathematics and Actuarial Science (UCC); ■ H. Dip Actuarial Science (UCD); ■ H. Dip Accounting and Corporate Finance (UCC); ■ Masters in Risk Management (UCD); ■ MSc Finance and Capital Markets (DCU); ■ Grad. Cert. Corporate Treasury (DCU); ■ MSc Investment and Treasury; ■ MBS Corporate Finance and Accounting (UCC); ■ MSc Financial Services (UL); ■ MSc Actuarial Science (UCD); and ■ MA Economics and Finance. Over 2007 to 2009, 14 new courses are expected to be introduced by the universities consulted, bringing the total number of financial services related courses delivered by the universities up to 161. Seven of these courses are expected to be introduced in late 2007, of which three are undergraduate and four are postgraduate programmes. Six of the seven courses are dedicated financial services courses, namely: xiv. MSc Computational Finance (UL); xv. MEconSc International Finance (NUI Galway); xvi. BSc Financial Mathematics/BSc Actuarial Mathematics (DCU) [this was previously the BSc Financial and Actuarial Mathematics and is now delivered as two courses]; xvii. Executive MBA in Regulation and Compliance (UCD) [jointly delivered between UCD Smurfit School of Business and IoB]; xviii. MBA Financial Services (UCD) [jointly delivered with IoB]; and xix. Structured PhD Programme in Finance (planned Global Finance Academy (GFA), UCD). The remaining course, an undergraduate programme (BA Business and Management) in NUI Maynooth is a broad business course. In 2008, five additional postgraduate courses are expected to be introduced by the universities, four of which are dedicated financial services courses – the new courses are: xx. MSc Finance (TCD); xxi. MSc Quantitative Mathematics (two streams in actuarial studies and financial modelling) (NUI Galway); xxii. MSc Equity Analysis (planned GFA, UCD); and xxiii. MSc Capital Markets and International Finance (planned GFA, UCD). In addition, NUI Maynooth is developing an MA Accounting programme. UCD are currently developing the 'Global Finance Academy', in partnership with the Institute of Bankers in Ireland. As a result, four additional programmes are proposed as part of the planned centre, of which details of three are listed above. A number of these will be jointly delivered with the Institute of Bankers. The fourth course, a Doctor of Business Administration is currently in development.

Skills/ research provider	Number of financial services related courses
Institutes of Technology	The institutes consulted, deliver anything between five and 12 undergraduate and postgraduate courses each that are either dedicated to, or related to, financial services. With a total of 44 courses delivered by the IoTs in 2006/2007, a smaller number of financial services courses are provided by the institutes than the universities. Similar to the universities consulted, the majority of programmes (33 out of 44 programmes) are broad in nature, covering areas such as: accounting; business; and office management/administration. Examples include: ■ BA Accounting (WIT); ■ BA International Business (WIT); ■ Bachelor of Business Studies (WIT, AIT, SIT, LYIT); ■ BA Administrative Management (LYIT); ■ Higher Cert. in Business and Office Management (AIT); and ■ BA General and Corporate Administration (WIT). The remaining nine courses are specific financial services programmes. The nine courses are: ■ BA Financial Services (WIT); ■ Bachelor of Business Studies (Economics and Finance) (WIT); ■ BA Accounting and Finance (AIT); ■ Higher Cert. in Business in Financial Services (AIT); ■ Bachelor of Business in Financial Services (AIT); ■ Bachelor of Business (Financial stream) (SIT); ■ MBS (Economics and Finance) (WIT); ■ PhD Finance (WIT); and ■ H. Dip Financial Services Technologies (LYIT). Compared with the universities, there are a much smaller number of financial services related courses planned to come on stream in the near future. Only two colleges interviewed reported plans to introduce new courses in the 2007/2008 academic year, both of which are specific financial services programmes, namely: ■ BA in Finance and Investment (Waterford IT); and ■ BBS Financial Services (Sligo IT).
Industry Training Bodies	Over 2006/2007, the industry training bodies consulted delivered a total of 42 courses, delivering anything between two and 25 programmes each. Each of these courses are dedicated/specific financial services courses. Three of these programmes are delivered both by the Institute of Bankers (IoB) and the Insurance Institute of Ireland (III), namely: xxiv. QFA Diploma; xxv. Bachelor of Financial Services (delivered in conjunction with UCD); and xxvi. Joint Financial Services Diploma. The III and the IoB however, have developed different streams within these qualifications, with one focused on insurance and the other on banking. Over 2006/2007, the IoB offered 25 individual courses, ranging from certificate to degree. These include a number of specialist and professional programmes designed for those working in banking and financial services. In 2006, the IoB School of Professional Finance became a recognised school of UCD, with all IoB courses to be delivered through this School in future.

Skills/ research provider	Number of financial services related courses
Industry Training Bodies cont../	In late 2007, IoB are introducing six new courses, bringing their total course offering up to 31 programmes, including: xxvii. Certificate in Investment Management; xxviii. Certificate in Stock Broking; xxix. Specialist Diploma in Mortgage Practice; xxx. Certificate in General Insurance for QFAs; xxxi. MBA Financial Services; and xxxii. MBA in Regulation and Compliance. In particular, the two MBA programmes will be delivered in conjunction with UCD through the proposed 'Global Finance Academy'. The MBA in Regulation and Compliance will be delivered in the IFSC by UCD Smurfit School of Business in partnership with the IoB's School of Professional Finance and the MBA Finance will be delivered out of the School of Professional Finance. The III delivers 15 courses, ranging from certificate and diploma to degree courses. The Institute works in partnership with the Chartered Insurance Institute, which fulfils the same remit in the UK, to deliver their courses. The Institute does not have plans to introduce any new courses in the immediate future. The Chartered Financial Analyst (CFA) Institute is the global, not-for-profit association of investment professionals that awards the CFA and CIPM designations. It delivers two programmes/ qualifications, namely: xxxiii. The CFA Programme, which is the global standard for measuring portfolio management and investment analysis competence. When one signs up for the CFA Program, you become a candidate. As a candidate, one studies for three exams using an assigned curriculum and take the three levels of exams sequentially. If one passes all three exams and meets the professional and ethical requirements, one becomes a CFA charter-holder; and xxxiv. The Certificate in Investment Performance Measurement (CIPM) program is an education and credentialising program for investment professionals working in performance evaluation and presentation, and covers: professional ethics; performance measurement, attribution, and evaluation; and the Global Investment Performance Standards (GIPS) It is a relatively new course, introduced in 2006. The CFA Institute has sole responsibility for organising the CFA exams in over 200 countries worldwide. The course is delivered by distance learning and exams are held locally either once or twice a year. There are a number of societies worldwide who represent and support CFA candidates. The Society of Investment Analysts in Ireland (SIAI) is the Irish professional body for those engaged in investment analysis and portfolio management. The society supports the efforts of CFA candidates by sponsoring a variety of CFA exam preparation and review opportunities. The society employs FTC Kaplan, a training firm that specialises in exam preparatory courses for the CFA exam program, to deliver such review courses, which are typically held in one week blocks. Currently there are 168 qualified CFA candidates in Ireland. As the CIPM programme was launched in 2006, there are no qualified CIPM candidates as of yet in Ireland. It was reported however, that some interest has been shown in the programme.

(ii) Accreditation/Certification

The key findings in relation to the level to which financial services related education and training is certified in the Irish universities/IoTs/training bodies interviewed, are summarised in the points below (refer to Table 4.9 for further detail):

- Of the financial services related courses reviewed in the universities/IoTs/industry bodies, the majority (137 of 253 courses) are accredited as undergraduate programmes, with the remaining 116 courses being postgraduate programmes and professional qualifications (includes both existing and proposed courses for 2007-2009);
- The universities interviewed offer a greater number of financial services related postgraduate programmes than the IoTs and industry bodies – universities offer 98 (of 166) postgraduate programmes, whereas 12 (of 42) are available in the IoTs and six are delivered by the industry bodies;
- Each financial services related undergraduate course in the universities is accredited to an Honours Bachelors Degree. By contrast the IoTs and industry bodies have a number of courses accredited as higher certificates, certificates and diplomas; and
- Of the dedicated financial services courses delivered by the universities and IoTs, 28 of the 58 are undergraduate courses, with the remaining 30 courses delivered at postgraduate level – the majority of postgraduate courses are offered by the universities (27 of 30 courses).

Table 4.9 Course provision by Irish financial services education and training providers – accreditation/certification

Skills/ research provider	Accreditation/certification
Universities	Across the universities interviewed, the financial services related courses consist of undergraduate honours bachelor degree courses and postgraduate programmes including a small number of PhD programmes. Specifically: xxxv. 98 of the 161 financial services related programmes are postgraduate and PhD programmes (consists of existing and proposed courses 2007-2009); and xxxvi. The remaining 63 courses are accredited as undergraduate bachelor degrees. Typically, a similar number of postgraduate and undergraduate courses are delivered in each of the universities consulted. UL is an exception however, as six financial services related undergraduate courses are offered, compared with one postgraduate programme. Undergraduate programmes are typically three to four years in length, with postgraduate programmes ranging from one to two years and PhDs from three to five years. Of the 37 dedicated financial services courses delivered by the universities in 2006/2007 (as described in the previous section (Section (i), number of financial services related courses), 19 are undergraduate and 18 postgraduate programmes.
Institutes of Technology	The majority of financial services related courses in the colleges interviewed comprise undergraduate courses, including Higher Certificate and Bachelor Degree programmes. Specifically: xxxvii. 30 of the 44 financial services related programmes are accredited as undergraduate courses including pass and honours degrees and higher Certificate qualifications (consists of existing and proposed courses 2007-2009); and xxxviii. The remaining 14 programmes are postgraduate courses, including 10 Masters, one PhD and three Higher Diploma programmes. In contrast with the universities, the majority of courses delivered across the colleges are undergraduate programmes. For example, AIT and WIT deliver nine undergraduate and two postgraduate courses each, and Sligo IT delivers five undergraduate and two postgraduate courses. Undergraduate programmes range from two to five years, e.g. Higher Certificates are typically two years, ordinary degrees three years and honours degrees over three to four years. Postgraduate courses are typically delivered over one year and PhDs over three to four years. In contrast to the universities, of the eleven dedicated financial services courses delivered by the IoTs in 2006/2007 (as detailed in the previous section (Section (i), number of financial services related courses)), the majority of programmes (eight) are accredited as undergraduate courses.
Industry Training Bodies	The 48 courses delivered by the three industry training bodies consulted cover a range of qualifications, including certificates, diplomas, degrees, masters, etc (consists of existing and proposed courses in late 2007). Specifically: xxxix. 41 of the 48 courses are accredited as Certificates and Diplomas; xl. One Bachelor degree is delivered by III and IoB (i.e. Bachelor of Financial Services); xli. Three Masters qualifications are delivered by IoB in conjunction with UCD (i.e. Executive Masters in Risk Management; MBA Financial Services; and MBA Regulation and Compliance); and xlii. Remaining programmes comprise chartered qualifications (e.g. chartered financial analysts, chartered insurance qualification).

(iii) Sector Focused Courses

In this section, the **dedicated financial services courses** (50 university, 11 IoT, and 48 industry body programmes, including existing and proposed courses over 2007-2009) (see Table 4.7 for further detail) as discussed in section (i), are examined, with a view to highlighting the *financial services sector focus* (i.e. investment management, banking and capital markets and/or insurance) of each of these courses. This analysis is detailed in Table 4.10.

- Of the 205 courses delivered by the universities and IoTs, 61 of these are dedicated financial services courses (including existing and new courses expected in 2007/2008 and 2008/2009). A small number of these courses (16 of 56 or 29 percent) are dedicated to one or more specific financial services sectors;
- Seven of the sector focused courses are focused on the insurance sector only (e.g. BA Actuarial and Financial Studies [UCD], Grad. Cert Actuarial Science [DCU], BA International Insurance and European Studies [UL]) and seven on the banking and capital markets sector only (e.g. MSc Finance and Capital Markets [DCU], Grad. Cert Corporate Treasury [DCU]). One course covers all sectors (e.g. Executive MBA Regulation and Compliance [UCD, starting 2007]) and one course covers the investment management sector only (i.e. MSc Equity Analysis [UCD]);
- Despite the low level of sector dedicated programmes, the remaining broad finance programmes (delivered by both the universities and IoTs and covering areas such as finance, business with a finance specialism and quantitative finance) provide students with the skills to work across almost all financial services sectors at some level; and
- The courses provided by the industry bodies interviewed have a high sector focus (e.g. III and IoB deliver courses focused towards the insurance and banking sectors respectively). The CFA programme, although offering more general skills, is focused towards the skills needs of the banking and capital markets sectors.

Table 4.10 Course provision by Irish financial services education and training providers – sector focused courses

Skills/research provider	Sector focused courses
Universities	Of the 161 financial services related courses delivered by the universities interviewed, 46 of these are dedicated financial services courses (this figure includes existing and new courses expected in the academic year 2007/2008 and 2008/2009, see Table 4.7 for further detail). The following table highlights the sector focus of each of these courses (i.e. focus on investment management, banking and capital markets and/or insurance). These insights were obtained, both from consultations with universities and from a review of course curricula. The majority (30 courses) of the 46 programmes are broad finance courses (covering areas such as finance, financial mathematics, business degrees with a finance specialism and quantitative finance) and provide skills that are relevant to one or more financial services sectors, for example: xliii. All programmes provide skills which are relevant for the banking and capital markets sector; xliv. All bar six courses are relevant for investment management; and xlv. A smaller number (15) are relevant for insurance. The remaining 16 courses are dedicated to one or more specific financial services sectors (e.g. investment management, banking and capital markets and insurance). For example: ■ Insurance (BA Actuarial and Financial Studies [UCD]; BSc Financial Mathematics and Actuarial Science [UCC]; BA International Insurance and European Studies [UL]); ■ Banking and Capital Markets (MSc Finance and Capital Markets [DCU]; Grad. Cert. Corporate Treasury [DCU]; MBS Corporate Finance and Accounting [UCC]); and ■ Investment Management (MSc Equity Analysis [UCD]). Across all of the sector focused courses, the following was observed: xlvi. One course covers all three sectors; xlvii. One programme solely covers the investment management sector; xlviii. Seven are solely focused on banking and capital markets; and xlix. Seven are dedicated to the insurance sector.

Dedicated Financial Services Courses	IM	BCM	INS
Finance Courses:			
1. Business, Economics and Social Studies [Finance] (TCD)			
2. BSc Economics and Finance (UCD)			
3. B. Comm. [Banking and Finance/Insurance] (UCD)			
4. Bachelor Finance Services (UCD with IoB, III)			
5. BA Accounting and Finance (DCU)			
6. BSc Quantitative Finance (DCU)			
7. BA Business Studies [Finance] (DCU)			
8. BSc Finance (UCC)			
9. BSc Financial Mathematics (UL)			
10. BBS [Economics and finance/accounting and finance/risk management and insurance] (UL)			
11. BSc Financial Mathematics and Economics (NUIG)			
12. BA Finance and Venture Management (NUIM)			
13. BA Finance and Accounting (NUIM)			
14. BA Finance (NUIM)			
15. MBS Financial Services (UCD)			
16. MSc Quantitative Finance (UCD)			
17. MSc Financial Economics			
18. MSc Financial Services (UL)			
19. H. Dip. Finance (NUIM)			
20. MA Financial Engineering (NUIM)			

Skills/research provider	Sector focused courses

Universities cont.../

Dedicated Financial Services Courses	IM	BCM	INS
Finance Courses:			
21. MA Economics and Finance (NUIM)			
22. PhD Financial Economics (NUIM)			
23. BSc Financial Mathematics* (DCU)			
24. MSc Finance** (TCD)			
25. MBA Financial Services (joint between UCD and IoB)*			
26. Structured PhD Programme in Finance (UCD)*			
27. Doctor of Business Administration (UCD)***			
28. MSc Computational Finance (UL)*			
29. MEconSc International Finance (NUIG)*			
30. MSc Quantitative Mathematics [stream in Actuarial studies and financial modelling] (NUIG)**			
Sector Focused Courses:			
1. BA Actuarial and Financial Studies (UCD)			
2. BSc Financial Mathematics and Actuarial Science (UCC)			
3. H. Dip. Actuarial Science (UCD)			
4. MSc. Actuarial Science (UCD)			
5. Executive Masters in Risk Management (UCD with IoB)			
6. MSc Finance and Capital Markets (DCU)			
7. Grad. Cert. Corporate Treasury (DCU)			
8. MSc Investment and Treasury (DCU)			
9. Grad. Cert. Actuarial Science (DCU)			
10. MBS Corporate Finance and Accounting (UCC)			
11. H. Dip Corporate Finance and Accounting (UCC)			
12. BA International Insurance and European Studies (UL)			
13. BSc Actuarial Mathematics* (DCU)			
14. Executive MBA Regulation and Compliance (UCD and IoB)*			
15. MSc Capital Markets and International Finance (UCD)**			
16. MSc Equity Analysis (UCD)**			

** Programme beginning in academic year 2007/2008.*

*** Programme beginning in academic year 2008/2009.*

**** Start date unknown.*

IM = Investment Management, BCM = Banking and Capital Markets, INS = Insurance.

<table>
<tr><th>Skills/research provider</th><th>Sector focused courses</th></tr>
<tr><td>Institutes of Technology</td><td>
Of the 44 financial services related courses delivered by the IoTs interviewed, 11 of these are dedicated financial services courses (including 2 new courses expected in 2007, see Table 4.7 for further detail). As per the universities, the following table highlights the sector focus of each of these courses.

Each of the 11 programmes are broad finance courses (covering areas such as finance, financial services, and business degrees with a finance specialism), without any specific sector focus.

Alternatively, based on feedback from consultations with the IoTs and on a review of course curricula, such broad finance courses can provide students with a good grounding in skills applicable to all areas of financial services [i.e. investment management, banking and capital markets and insurance], as highlighted in the following table.
<table>
<tr><th>Dedicated Financial Services Courses</th><th>IM</th><th>BCM</th><th>INS</th></tr>
<tr><td>Finance Courses:</td><td></td><td></td><td></td></tr>
<tr><td>1. BA Financial Services (WIT)</td><td></td><td></td><td></td></tr>
<tr><td>2. BBS [economics and finance] (WIT)</td><td></td><td></td><td></td></tr>
<tr><td>3. BA Accounting and Finance (AIT)</td><td></td><td></td><td></td></tr>
<tr><td>4. Higher Cert. Business in Financial Services (AIT)</td><td></td><td></td><td></td></tr>
<tr><td>5. Bachelor of Business in Financial Services (AIT)</td><td></td><td></td><td></td></tr>
<tr><td>6. Bachelor of Business [finance] (SIT)</td><td></td><td></td><td></td></tr>
<tr><td>7. MBS [economics and finance] (WIT)</td><td></td><td></td><td></td></tr>
<tr><td>8. PhD Finance (WIT)</td><td></td><td></td><td></td></tr>
<tr><td>9. H. Dip. Financial Services Technologies (LYIT)</td><td></td><td></td><td></td></tr>
<tr><td>10. BBS Financial Services (SIT)*</td><td></td><td></td><td></td></tr>
<tr><td>11. BA Finance and Investment (WIT)*</td><td></td><td></td><td></td></tr>
<tr><td>Sector Focused Courses:</td><td></td><td></td><td></td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>-</td></tr>
</table>
* Programme beginning in academic year 2007/2008.
IM = Investment Management, BCM = Banking and Capital Markets, INS = Insurance.
</td></tr>
<tr><td>Industry Training Bodies</td><td>
The courses provided by the IoB and III are typically geared towards the skills needs of the banking and insurance sectors respectively.

Although the programmes provided by CFA provide more general financial services skills, they are more focused towards the capital markets and investment management sectors than banking and insurance.
</td></tr>
</table>

(iv) Core Course Focus

Feedback on the **focus of their financial services related courses** was also obtained from the Irish education and training providers. This was assessed against the skills areas of: general management/business; back-office/administration; customer facing/operations; product development; and financial processes. A summary of the key findings are provided below with detailed findings presented in Table 4.11.

- General business courses delivered by the universities and IoTs have a high focus on the provision of general management/business skills and were also considered to have a high focus on providing skills to work in both customer facing/operations and back-office/administration roles.
- Most of the maths and statistics courses (which are offered only by the universities) are viewed as having a low focus on the above areas.
- Postgraduate/masters courses delivered by the universities (covering areas such as quantitative maths, financial modelling, actuary and risk management) were viewed as having a high focus on product development and financial processes. In contrast, some of the IoTs considered their undergraduate finance and business courses to have a medium to high focus on both product development and financial processes.

Table 4.11 Course provision by Irish financial services education and training providers – core course focus

Skills/research provider	Core course focus
Universities	As part of the interviews we asked the universities to rate their financial services related courses (as high, medium or low) against the provision of a number of skills sets/criteria, namely: ■ General management/business; ■ Back-office/administration; ■ Customer-facing/operations; ■ Product development; and ■ Financial processes. It was found that most of the general business courses have a high focus on general management/business skills. In addition, most of the general business courses were viewed by the universities interviewed as having a high focus on providing students with skills to work in both customer facing/operations and back-office/administration roles. In contrast, most of the maths and statistics courses are viewed as having a low focus on each of these areas. Postgraduate/masters courses covering areas such as quantitative maths, financial modelling, actuary and risk management, primarily have a high focus on product development and financial processes.
Institutes of Technology	Similar to the universities, we asked the IoTs to rate their financial services related courses against the same criteria. As per the universities, it was found that the general business courses have a high focus on general management/business, customer facing/operations and back-office/administration. Some of the IoTs interviewed considered some of their undergraduate finance and business courses to have a medium to high focus on both product development and financial processes. The IoTs interviewed do not deliver any statistical or mathematical courses.
Industry Training Bodies	The industry training bodies interviewed were not asked to review their courses based on this criteria.

(v) National and International Recognition

In terms of the **national and international recognition** of financial services courses provided by the Irish education providers interviewed, the following keys trends were highlighted (refer to Table 4.12 below for further detail):

- The universities and IoTs consulted typically do not have formal processes in place to assess how courses are ranked national or internationally;
- To rank undergraduate courses nationally, they primarily rely on course demand via the CAO course application levels, department ranking and/or graduate employment rates as an indication of their popularity; and
- Furthermore, the universities also rely on formal external rankings of universities (e.g. Financial Times review) to rate the popularity of their courses.

Table 4.12 Course provision by Irish financial services education and training providers – national/ international recognition

Skills/research provider	Core course focus
Universities	The universities consulted do not have formal processes in place to assess how courses are ranked national or internationally. To rank undergraduate courses nationally, the universities primarily rely on course demand via the CAO course application levels, department ranking and/or graduate employment rates as an indication of their popularity. In terms of how the institutions as a whole are ranked, the universities rely on formal external rankings of universities globally. For example, according to the latest Financial Times Full-Time MBA 2007 ranking, the TCD MBA programme was ranked 70th globally (the highest ranking achieved by an Irish MBA programme in 2007). The MBA also features in three of the FT Top Ten List categories, namely: ■ Ranked 2nd globally for Value for Money; ■ Ranked 7th globally for International Mobility; and ■ Ranked 7th in Europe for Alumni Salary Levels. According to the same survey, Smurfit Business School in UCD was ranked 98th overall.
Institutes of Technology	As per the universities, the IoTs do not rank courses nationally or internationally. The colleges typically rely on CAO application levels and graduate employment rates to indicate national popularity.
Industry Training Bodies	Based on feedback from our consultations, the industry training bodies interviewed do not formally rank their courses nationally and/or internationally.

4.2 Course Development and Update

The second aspect of programme profile relates to the **development and update of courses** and incorporates details of: the mechanisms used to update course materials; the level of industry involvement in determining course content; the extent of collaboration both within and across institutions; and the ability of the courses to reflect content changes on a timely basis. Each of these aspects is considered below, based on the feedback provided from the consultations with education, training and research providers.

(i) Flexibility of Course/Modules

The consultations highlighted a number of key trends in relation to the Irish education provider's **flexibility to change courses/modules**, or introduce new courses/modules. A summary of these key findings are presented below with further detail available in Table 4.13:

- The introduction of a new course is typically a complex and lengthy process across the universities and IoTs interviewed. The development and accreditation process for a new course involves a formal process, requiring approval from several Councils/Boards. The IoTs however, reported a quicker timeframe for the introduction of a new course, taking between six and 18 months, compared with one to three years in the universities;
- The universities reported that they are more inclined to introduce a postgraduate course over an undergraduate, as they can be developed in a shorter timeframe;
- Industry training bodies appear to have a less onerous process around new course development – the development of a programme usually takes between 6 to 9 months; and
- In terms of modifying existing course content, the universities and colleges reported that minor changes or 'tweaking' can be made as required without seeking formal approval – minor modifications however, tend to be driven and implemented by the individual lecturer rather than the university/college.

Table 4.13 Course update by Irish financial services education and training providers – flexibility of course/modules

Skills/research provider	Flexibility of course/modules
Universities	**Introduction of a New Course** The universities consulted indicated that a new course can usually take between one and three years to develop and introduce, and usually requires both internal and external approval. Undergraduate courses usually require two to three years, whereas postgraduate courses can be introduced in a shorter timeframe, between one to two years. Many of the universities reported that they would be more inclined to introduce a new postgraduate course, rather than an undergraduate, due to these timescales. This also reflects the government's plan to focus on the development of a fourth level, embracing both teaching and research. For example, the new MSc Computational Finance in UL was designed and approved over a two year period. At one university the process of introducing a new course involves several stages of approval, including internal validation, external accreditation and CAO notice. At another university the process requires initial 'Outline Approval' and subsequent 'Full Approval', from the Department, Faculty and Academic Council. While it is recognised that the course approval process can be time consuming, a further factor to the speed and likelihood of introducing a new course is the "availability of staff to deliver the course". **Modification of Existing Courses/Modules** Many of the universities consulted indicated that minor changes or "tweaking" of existing course content/modules can be made as required, without seeking formal approval from the university. Minor modifications tend to be driven and implemented by the individual lecturer rather than the department as a whole and can happen relatively quickly. Whereas, on the other hand, major modifications of course content must undergo a formal approval process. For example, DCU is currently awaiting accreditation on two new courses, BSc in Financial Mathematics and BSc in Actuarial Mathematics (creating two courses from the original BSc in Financial and Actuarial Mathematics). The process involved both internal validation and external accreditation and will be offered to students in the latter part of 2007.

Skills/research provider	Flexibility of course/modules
Institute of Technology	**Introduction of a New Course** At the IoTs, the introduction of a new course takes in the region of between six and 18 months from development to introduction. For example Sligo IT, recently developed a new course starting in 2007 (BBS Financial Services). The process involved four different stages, namely: ■ Course development group established within the School of Business; ■ Review by Department of Business and Humanities; ■ External Boards; and ■ Accreditation. However, some IoTs, including Letterkenny IT, indicated that new courses can be developed and introduced within six months, if there is sufficient demand for the course. **Modification of Existing Courses/Modules** It was noted that minor changes can be made to course content without formal institute approval. Such changes would typically take between three and four months. For example, Sligo IT can modify up to 20 percent of course content without having to go through the full formal approval process. Another example is Waterford IT which continually changes and update their courses to reflect industry needs and developments, particularly those of the funds industry. Furthermore, they view it to be a "relatively easy" process to introduce a new module, which requires approval from the Faculty, using a peer review mechanism and a review of the module by a panel which includes industry experts.
Industry Training Bodies	**Introduction of a New Course** Industry training bodies appear to have a less onerous process around new course development. Indications from consultations suggest that the development of a programme from the formation of the initial idea to the provision of a new programme usually takes between 6 to 9 months (and rarely exceeds 12 months). This process involves identification of the requirement and assessment of demand, development of the course, sourcing of staff, and gaining committee approval. **Modification of Existing Courses/Modules** The **IoB** reported that 'tweaking' of existing programmes can occur as a result of the 3 year formal review process. During this phase the IoB may also decide to add or drop a programme.

(ii) Frequency of Course/Module Update

As a result of consultations with Irish education, training and research providers, the following points in relation to the **frequency of course and/or module update** by the Irish financial services education providers were highlighted (refer to table 4.14 for further detail):

- Across the universities and the IoTs interviewed, there appears to be four main mechanisms adopted to ensure course materials remain relevant and up-to-date, including: periodic university-wide reviews; formal annual reviews; informal annual reviews; and an on-going review of course content;
- The periodic university-wide review is usually conducted every three to five years and consists of a review of all courses/modules offered by a university/IoT – this presents an opportunity to fundamentally re-appraise the programme and make major modifications as necessary;
- Thereafter, universities/IoTs can review course content formally and/or informally on an annual basis. The formal annual review typically involves a review of content by Course Boards and course materials can also be informally reviewed as a result of feedback from External Examiners, industry placements and/or the students themselves;

- A range of review mechanisms are adopted by the industry training bodies also, however these appear to be primarily centred around reviewing course content annually in conjunction with industry, to ensure course material remains relevant to industry skills requirements; and
- New financial services related modules or changes to existing course content are primarily introduced in response to staff research projects/interests and industry developments and/or skills requirements. Changing course content in response to industry requirements is particularly strong in the IoTs interviewed, as changes to course content are made frequently in response to new skills requirements of the local financial services industry. Industry trends and developments are also the predominant driver of course/module change in the industry training bodies consulted.

Table 4.14 Course update by Irish financial services education and training providers – frequency of course/module update

Skills/research provider	Frequency of course/module update
Universities	**Review Processes** Across the university sector a number of mechanisms are adopted to ensure course materials remain relevant and up-to-date. These mechanisms include: ■ Periodic university-wide review; ■ Formal annual review; ■ Informal annual review; and ■ On-going review of course content. The periodic university-wide review is usually conducted every three to five years and consists of a review of all courses/modules offered by a university. This presents an opportunity to fundamentally re-appraise the programme and make major modifications as necessary. For example in NUI Maynooth, a formal external audit is undertaken every 5 years which involves academics reviewing course content and reporting findings back to the University President. Thereafter, universities typically review financial services related course content formally and/or informally on an annual basis. The formal annual review involves a review of content by Course Boards. Course content may also be informally reviewed as a result of feedback from External Examiners, industry placements and/or the students themselves. For example in NUI Galway, courses are formally updated/reviewed every five years. In addition, individual Course Boards review course content annually and external examiners offer feedback and suggestions on course material. Individual lecturers also change/'tweak' course content as needed. **Drivers of Module/Course Change** New financial services related modules or changes to course content are primarily introduced in response to staff research projects/interests and industry developments and/or skills requirements. The feedback received from industry is both formal and informal. In particular, UCD indicated that "industry needs are at the forefront of course development". In support of this, DCU noted course development is driven by the needs and trends of the market and specific industry requirements. Furthermore, UL stated that after the first year of their MSc Financial Services, course content was updated immediately based on student feedback and recent industry developments. Other factors requiring course changes, identified by the universities, include new education standards/provision, exam results and regulatory and policy trends. In addition, changes to professional exams (e.g. accounting and actuarial) may require changes to related course content.

Skills/research provider	Frequency of course/module update
Institute of Technology	**Review Processes** Across the IoTs interviewed, similar review mechanisms were noted. As with the universities, they included: ■ Periodic institute-wide reviews; and ■ Formal and informal annual reviews. The colleges typically conduct the periodic formal review every four/five years. For example, the 'Quality Assurance' scheme in Sligo IT involves both rigorous internal and external evaluation across all courses and also of the structure and facilities of the institute. They also conduct a formal programme review every three to four years. As per Sligo IT, the entire institute in Athlone IT is reviewed under the 'Quality Assurance' process. Thereafter, courses are formally reviewed every five years. Waterford IT formally reviews all courses every four years, which involves an external review in addition to industry involvement in updating course content. Letterkenny IT formally reviews all courses every five years under a 'Periodic Programme Review' – all courses were re-evaluated/validated over the past year under this system. Thereafter, universities typically review financial services related course content formally and/or informally on an annual basis. For example, in Sligo IT, each course has a 'Course Board' which comprises lecturers, the course co-ordinator and students. The board meets regularly throughout the College year. In Waterford IT, course content is also reviewed annually based on feedback from students and work placements. An 'Industry Advisory Board' informs the Business School on current industry skills requirements and trends. Courses are reviewed annually thereafter, as a result of feedback from external examiners and informal discussions with industry. In Athlone IT, courses are reviewed on an annual basis either formally and/or informally, through feedback from graduate surveys, course committees and recent industry developments. **Drivers of Module/Course Change** The key drivers of module/course change are industry skills requirements, trends and developments. For example, one of the main drivers of change for the financial services courses offered by Waterford IT is the growing fund administration industry in South East Ireland. Working collaboratively with industry, Waterford IT have developed and tailored their course to meet the local industry's skills requirements.

Skills/research provider	Frequency of course/module update
Industry Training Bodies	**Review Processes** Across the industry training bodies reviewed a range of different mechanisms are adopted to ensure course materials remain relevant and up-to-date, including: ■ Formal periodic reviews; ■ Annual review; and ■ Ongoing informal reviews. Some of the industry bodies conduct a periodic formal review. For example, the IoB conducts a formal 3 year review of all qualifications offered. Thereafter, industry training bodies can review course content on an annual basis. For example, in the CFA Institute, the CFA Program curriculum is updated annually on a global level and is based on a rigorous practice analysis process, which involved the following steps: ■ The Institute solicits input from and surveys current investment practitioners and other experts in order to maintain a Global Body of Knowledge™ (GBOK) that is the comprehensive outline of mainstream knowledge for the investment profession; ■ This body of knowledge is further distilled to determine the body of knowledge for a new charterholder (termed the Candidate Body of Knowledge (CBOK)), which is a subset of the GBOK. The CBOK represents the knowledge required for a relatively new generalist practitioner in the investment profession; and ■ Based on the CBOK the CFA Institute staff and volunteers find best-in-class readings or commission the writing of such readings. In addition, the III formally reviews all modules annually. Each module (approximately 25/30 modules across the 15 courses delivered by III) has a dedicated industry advisory panel, comprising circa ten industry representatives who review module contact annually – feedback from the industry panel is incorporated by the textbook writers into course material. Industry training bodies can also conduct informal reviews of course content continuously throughout the year. For example, the IoB hold regular informal meetings with chief executives of financial institutions to discuss industry needs/gaps and review course content and also have continuous informal collaboration with the Irish Bankers Federation and the Regulator. **Drivers of Module/Course Change** The key drivers of module/course change are industry skills requirements and recent trends and developments. For example, the IoB receives corporate input into the development of their programmes through its Council, which includes domestic and international industry representatives. Programme additions and modifications are made in response to market trends or issues. The Qualified Financial Advisor (QFA) programme for example, was developed in response to a requirement by the Regulator for people working in certain aspects of the financial services sector to meet minimum competency levels.

(iii) Mechanisms in Place to ensure Industry Relevance

A number of key processes to keep **courses in line with industry trends and developments** were identified in the universities/IoTs/industry bodies interviewed (refer to Table 4.15 for further detail):

- The mechanisms for ensuring courses are kept up-to-date with industry developments are predominantly informal in nature for both the universities and IoTs – however, a small number of education providers utilise formal mechanisms for ensuring courses remain relevant to industry requirements;

- Informal mechanisms consist of: informal contact through individual personal networks; university alumni; and linkages with industry through student work placements, industry conferences and informal discussions/meetings with industry. In particular, a number of the IoTs interviewed, hold regular discussions with industry to ensure the course content of a number of their financial services courses meet the skills requirements of the local industry;
- To a lesser degree, some evidence of formal mechanisms was found in two of the universities/IoTs interviewed, which involves the inclusion of industry representatives on course/department boards, thus receiving direct input from industry in the design/review of course content; and
- Conversely, the industry training bodies appear to meet with industry on a formal basis more regularly than the universities and IoTs – this can involve formal feedback from industry on course content through meetings, industry advice and periodic industry surveys.

Table 4.15 Course update for Irish financial services education and training providers – mechanisms for industry relevance

Skills/research provider	Mechanisms in place to ensure industry relevance
Universities	The universities consulted reported varying levels of contact with industry to inform course content. This contact can be categorised into: ■ Informal contact through individual personal networks, student work placements and industry conferences, etc; and ■ Formal contact through industry involvement on course boards, face-to-face meetings, etc. The university sector predominantly relies on informal linkages with industry to keep courses up-to-date with financial services trends and developments. This contact includes informal discussions/meetings and liaison with personal contacts in the sector. In particular, some universities cited contacts with university alumni as a frequent source of industry liaison. For example, in TCD, they have developed informal links with a number of leading financial services institutions, e.g. Pioneer, Irish Life and Allianz. NUI Galway also reported that they informally meet with industry at various financial services related conferences. In UCC, during the design of the 'BSc Financial Mathematics and Actuarial Science', UCC met with a number of actuary firms (e.g. Mercer, Irish Life) to discuss industry relevance of course content. Some universities however, formally include industry representatives on course boards or in some cases, have developed Industry Advisory boards for the university. In UCC for example, the Business Information Systems Department has an 'Advisory Business Board' which advises the Department on important industry trends and makes suggestions on future course content. This Board includes representatives of Bank of Ireland and government departments, amongst others. Many of the universities commented that although some level of collaboration with industry is apparent, there is a need for a more formal collaboration to synchronise course content with industry developments. In addition, time was cited as being a major constraint in the strengthening of industry linkages. For example, DCU believed there is potential to collaborate with industry further, however it requires effort from both industry and academia to ensure this happens.

Skills/research provider	Mechanisms in place to ensure industry relevance
Institutes of Technology	Similar to the universities, the IoTs interviewed primarily use both informal linkages with industry as a means to synchronise course content with recent industry developments. For example, it appears from consultations with IoTs that they hold regular informal discussions with local industry to ensure that their financial services courses meet their skills requirements. For example, the finance courses in Waterford IT are geared towards the skills needs of the funds administration industry in the South East. Furthermore, the H. Dip in Financial Services Technologies in Letterkenny IT was developed specifically in response to a demand by Primerica and Northbrook Technologies for students with skills in mainframe programming. Although primarily informal in nature, some evidence of formal processes to include industry on course boards was found. In Waterford IT for example, an industry advisory board or the 'Advisory Forum for Management Education' advises the Business School on industry developments and future course content.
Industry Training Bodies	In contrast to the universities and IoTs, the industry training bodies appear to meet with industry on a more formal basis more regularly to ensure industry relevance of course content – this can involve formal feedback from industry on course content through meetings and periodic surveys. For example, the IoB regularly consults with industry to ensure that their education offering is relevant and up-to-date. This is conducted through both the informal meetings with Chief Executives as well as feedback from their members the majority of which are employed within the financial services sector. In addition, the IoB has 50 Corporate members including the major domestic and international banks and Irish Building Societies – this helps ensure the programmes are addressing the needs of the sector. In addition, the CFA Institute annually solicits input from and surveys current investment practitioners and other experts in order to maintain a Global Body of Knowledge that is the comprehensive outline of mainstream knowledge for the investment profession. Furthermore to ensure industry relevance of course content, each module delivered by the III is reviewed annually by an industry advisory panel, comprising circa ten industry representatives. Feedback from the industry panel on course content is then incorporated by the textbook writers into course material (as outlined in Section (ii) above).

(iv) Cross Faculty Coordination

The following points summarise the feedback gathered in relation to the **level of cross-faculty coordination** in the design and delivery of courses by the Irish education and training providers interviewed. Further detail and examples are provided in Table 4.16.

- The universities and IoTs interviewed typically have a relatively low level of, or no, structured cross-faculty coordination.
- Informal contacts between faculties/departments are more commonplace and regular, consisting of ad-hoc discussions between Faculties/Departments – albeit such discussions can be general in nature and may not be specifically related to course development.
- Although not as common, some evidence of formal collaboration to promote cross-faculty coordination was found in three of the universities interviewed. This primarily consists of the inclusion of a cross-selection of staff from the mathematics, finance, and/or economics department as members of a course board.
- There was little evidence of formal cross-faculty coordination in the IoTs consulted – this is predominantly due to the fact that financial services programmes are delivered by the School/ Department of Business only (as the IoTs interviewed do not offer mathematical or statistical based courses).

Table 4.16 Course update for Irish financial services education and training providers – cross faculty coordination

Skills/research provider	Cross-faculty coordination
Universities	Cross-faculty coordination in the design and delivery of financial services courses/modules is both formal and informal in nature across the universities consulted. Formal collaboration is evident during the development and/or design of a cross-faculty delivered course. For example, in DCU, the School of Mathematics and the School of Business are jointly involved in the design and delivery of the BSc Quantitative Finance. A selection of course boards in UL are interdisciplinary, including representatives from the Economics and Mathematics Departments, which have responsibility for reviewing course content annually. Lecturers in UCD can be selected from outside a Faculty to deliver certain modules based on their area of specialism/skills. In respect of informal collaboration, this consists of ad-hoc discussions between Faculties/ Departments – these discussions can be general in nature and may not be specifically related to course development.
Institute of Technology	There was no evidence of formal cross-faculty coordination in the IoTs consulted. This is typically due to the fact that financial services programmes delivered across the IoTs interviewed are business based (e.g. Bachelor of Business Studies, BA Finance, etc), and don't include mathematical or statistical based courses, which are typically delivered by a School of Mathematics in the universities. As a result, the School/Department of Business in the IoTs consulted are responsible for designing and delivering course content.
Industry Training Bodies	This area was not applicable to the industry training bodies interviewed.

(v) Inter-institutional Collaboration

The key findings in terms of the level of **inter-institutional collaboration** in the design and delivery of courses are summarised in the points below:

- Of the universities and IoTs consulted, there were no reports of inter-institutional collaboration in relation to the design and/or delivery of financial services related courses/course content; and
- In contrast, it was found that the industry training bodies collaborate with several universities when designing and delivering course content (refer to Table 4.17 for further detail).

Table 4.17 Course update for Irish financial services education and training providers – inter-institutional collaboration

Skills/research provider	Inter-institutional collaboration
Universities	Of the universities consulted, there were no reports of inter-institutional collaboration in relation to the design and/or delivery of financial services related courses/course content. However there was evidence of collaboration between universities on financial services research activity – this will be discussed in greater detail in Section 3 of this chapter.
Institute of Technology	As found in the universities, there were no reports of inter-institutional collaboration in the design and/or delivery of course content in the IoTs consulted.
Industry Training Bodies	There is strong evidence in the industry training bodies interviewed, of the design and delivery of course content with other institutions. For example, the IoB collaborate extensively with UCD in the development of a number of Diplomas, Masters and MBA programmes. The III is also partnering with the IoB and UCD in the delivery of the Bachelor of Financial Services. Furthermore, the IoB has recently established the 'School of Professional Finance' which is a recognised school of UCD. Through this relationship UCD will award Degrees, Postgraduates and Doctorates to IoB's members. The IoB are also partnering with UCD in the development of the planned 'Global Finance Academy' (GFA). IoBs role will be to assist in the development of 'high-level, world-class' programmes as a result of research undertaken within the Academy and also to ensure that findings are fed back into industry. Universities around the world have integrated CFA Institute's CBOK into their courses and use curriculum materials developed by the CFA Institute. The CFA Institute assists universities that desire to use the CBOK or GBOK by providing copies of the curriculum material, examples of textbooks covering CBOK topics and examples of course syllabi and programs developed. The Institute also has a 'Program Partners Initiative', which is a partnership with leading universities around the world who integrate their body of knowledge (including Ethics and Professional Standards), and serve as role models for other universities (e.g. Oxford and LBS).

4.3 Research Activity

Table 4.18 overleaf contains: an overview of the number of faculty members involved in finance research; details of financial services research centres; and the nature of the research focus of each of the universities interviewed. The IoTs are not included in this table as apart from Waterford IT, the IoTs consulted are not active in financial services research.

Following this overview table, a detailed description of the financial services **research activity** is presented under the following six headings: drivers of research activity; sources of R&D funding; the level and nature of research activity; financial services research centres; linking research back into course content; and linking research back into industry. Details of these aspects of financial services research activity are outlined for each of the education and training providers consulted.

Table 4.18 Summary of research activity in the universities and IoTs interviewed

College	Number of full-time academics involved in finance research	Research centres	
		Centre	Research focus/Research themes
Trinity College Dublin	4	International Financial Integration Project (INFINITI)	Research areas are the following: ■ Dynamics of international financial integration. ■ Role and nature of multinational companies in international integration. ■ Globalisation of both financial product markets and the influences on financial products. ■ Role of national socioeconomic conditions on portfolio investment. ■ International MandA.
		Centre of Dynamics of Global Business* [launch date not known]	Research will be focused on the process side of business – one element of this will be financial services process management.
University College Dublin	15	Centre for Financial Markets	■ Risk management. ■ Asset pricing. ■ Asset/wealth management. ■ Finance for SMEs and VCs. ■ Corporate finance.
		National Computing Research and Application Group	■ Asset management. ■ Risk management.
		Centre of Insurance Studies	■ Private medical insurance. ■ Actuarial studies. ■ Pension fund performance evaluation. ■ Ageing populations.
		Global Finance Academy* [in final stages of development]	GFA research is proposed to be developed around six broad research themes, namely: ■ Asset management; ■ Risk management; ■ Insurance and risk; ■ Corporate finance; ■ Behavioural finance; and ■ Policy (including regulation and taxation).
Dublin City University	8	Centre for Quantitative Finance (Launching November 2007)	■ Econometrics, i.e. financial markets. ■ Statistical analysis. ■ Inefficient market – liquidity/credit risk.

Dublin City University		Centre for Investment Research (delivered jointly with, and based in, UCC)	Research areas include: ■ Asset management (performance and risk measurement in national and international hedge funds, mutual funds and pension funds); and ■ Asset pricing, investment strategies, global market integration and risk management. The Centre also aims to make an important contribution to the current policy issue in Ireland of future pension funding.
		Centre for Financial Mathematics* (virtual centre delivered jointly with UCC) [provided funding is obtained, launch expected early 2008]	Proposed areas of research include: ■ Financial mathematical modelling; ■ Option pricing; ■ Quantitative Risk Management; ■ Hedging; and ■ Financials and actuarial product development.
UCC	Not available	Financial Services Innovation Centre (launched in February 2007)	The Centre aims to: ■ Provide a resource for global financial services companies to participate in innovation and the development of leading software solutions; and ■ Allow participants to share information and expertise, while also keeping in touch with the latest development in the financial services software market. Key research areas identified to date are: ■ Regulation and compliance; ■ Knowledge management/decision support; ■ Financial services for the elderly; ■ Risk management; ■ Delivery strategy; ■ Security and fraud; and ■ Straight through processing.
		Centre for Investment Research (based in UCC – delivered in conjunction with DCU)	See DCU
		Centre for Financial Mathematics* (virtual centre delivered jointly with DCU) [provided funding is obtained, launch expected early 2008]	See DCU
UL	8	-	■ Quantitative Finance. ■ Credit Risk/Compliance. ■ Derivatives.
NUIG	5	-	■ International Finance. ■ Computation Finance. ■ Financial Econometrics.
NUIM	5	-	Specific to the individual researcher
WIT	8	-	■ Mergers and acquisitions. ■ Small firm finance. ■ Relationship banking. ■ Pensions funds investment and management. ■ Financial economics. ■ Corporate governance.

** Financial Services Research Centre not yet established. Note: Information is limited to the universities and one IoT, as research is not undertaken by any other of the IoTs interviewed.*

Examples of research papers under the research areas outlined in Table 4.18 above are provided in Table 4.21 later in this section.

(i) Drivers of Research Activity

A summary of the **key drivers of research activity** are presented below with further detail found in Table 4.19 below:

- The main drivers of research activity across the universities consulted are: individual lecturer research interests; and industry developments/issues; and
- Only one of the industry bodies consulted is research active at present. The key driver of this research activity is industry trends and developments.

Table 4.19 Research activity by the Irish financial services education and training providers – drivers of research activity

Skills/research provider	Drivers of research activity
Universities	As a result of consultations with the universities, there appears to be two key drivers of research activity, namely: ■ Personal interests; and ■ Industry developments/issues. The universities with financial services research centres are typically conducting research which is more industry driven. For example, the research conducted in the 'Centre for Financial Markets' in UCD is undertaken in response to industry research requirements/needs – research areas include: risk management; asset pricing; wealth management; finance for SMEs and VCs; and Corporate Finance. In contrast, it appears that in some universities research topics are determined by an individual area of personal interest, however industry relevance is always a consideration: "Personal interests largely drive research. It is not purely driven by industry, however all research is applicable to industry interests... the two are very much intertwined" [source: university interviews] However, it was noted that regardless of what drives individual research projects, it is important that a high focus on academic rigour is maintained: "Although research is primarily industry driven, it is very important to retain the academic focus of the research" "To compete with the top Universities, it is essential to have a focus on academically respected research" [source: university interviews]
Institutes of Technology	Of the IoTs interviewed, Waterford IT is the only IoT conducting financial services research at present. As per the universities, Waterford IT noted that personal research interests were a strong driver of financial services research activity.
Industry Training Bodies	Of the three industry bodies interviewed, the CFA Institute is the only body which conducts research. However, this research which in conducted through two research centres is primarily conducted in the US (both Centres are located in Charlottesville) and not in Ireland. However, in relation to the drivers of this research activity, ideas are generated by practising members and advisory boards consisting of practising investment professionals. Although the IoB is not currently involved in any research activities, through their association with the proposed UCD 'Global Finance Academy', which will be heavily focused on conducting 'world class' research, they hope to become more active in this area in the future.

(ii) R&D Funding

Funding for financial services research and development is received from a combination of different sources, as outlined below:

- Universities reported receiving funding from a combination of different sources, including: Irish Government/State Bodies (e.g. PRTLI, SFI, EI, IDA); the EU (e.g. FP7 Brussels); the University (including inter-institutional funding); and Industry – however, funding from industry was found to be limited;
- It was the opinion of a number of the universities interviewed that the growth of financial services research has been hugely limited by the lack of available funding;
- In particular, the cost of purchasing data for financial services research is considered an enormous expense for Irish research providers;
- It was also considered that there is a "disconnect" between the importance that the Irish Government attaches to financial services research and the actual funding that its makes available; and
- Research conducted by the industry training body interviewed, is primarily funded by the students themselves and the corporate members of the body (further detail in Table 4.20 below).

Table 4.20 Research activity by the Irish financial services education and training providers – R&D funding

Skills/research provider	R&D funding
Universities	Universities reported receiving funding from a combination of different sources of funding, including the following: ■ Irish Government/State Bodies (e.g. PRTLI, SFI, EI, IDA); ■ EU (e.g. FP7 Brussels); ■ University (including inter-institutional funding); and ■ Industry. It is difficult however, to quantify the level of financial services funding awarded to a university, as research funding can be obtained from multiple sources by several Departments/lecturers. It was reported that the cost of conducting financial services research is typically lower than other sectors such as science and technology. The primary cost associated with financial services research is the purchase of/access to data, and is viewed as a considerable expense for universities. For example, UL stated that a licence to data may cost circa €25,000 per year, while TCD reported that access to the particular data they required was $280,000 per annum. It was the opinion of a number of the universities interviewed that the growth of financial services research has been hugely "frustrated"/limited by the lack of available funding, with one university stating that "we have ambitions to grow PhD numbers but it is impossible without funding" [source: university interviews]. It was also considered that there is a "disconnect" between the importance that the Irish Government attaches to financial services research and the actual funding that its makes available: "There is a big disconnect between what the Government say about providing finance to support the sector and what is actually provided" [source: university interviews]
Institutes of Technology	Waterford IT cited they receive a small amount of funding from industry.

Skills/research provider	R&D funding
Industry Training Bodies	The CFA Institute indicated that projects are funded from revenue from the students themselves and the corporate members of the Institute. Research Foundation funding also comes from contributions from industry. The CFA Institute Centre budget is proposed annually by Management and endorsed by the Board of Governors. The Research Foundation of CFA Institute receives ongoing funding support from two sources, CFA Institute and an annual distribution from the Research Foundation Endowment. The Endowment comes from donations made by investment professionals to support research. The IoB envisage that finance for joint industry/academia research projects undertaken within the 'Global Finance Academy' will be part-funded by industry. "...findings of research conducted will be of benefit to the financial services industry and therefore you would expect a level of funding from them" [source: industry body interviews]

(iii) Level and Nature of Research Activity

A summary of the **level and nature of research activity** undertaken by the Irish education providers interviewed is presented below:

- The universities and the one IoT involved in research have between five and 15 faculty members who are involved in undertaking financial services related research;
- Specific research areas were found to vary across the universities and IoTs. However, a number of broad research themes emerged, covering the three areas of: risk management; asset management; and corporate finance;
- In addition, different forms of financial modelling appear regularly as research themes in the universities interviewed, including: asset pricing; econometrics; option pricing; and derivatives; and
- There has recently been an increase in processing and systems research, with two universities planning to launch/have launched a research centre with a focus on these research areas (refer to Table 4.21 for further detail).

Table 4.21 Research activity by the Irish financial services education and training providers – level/ nature of research activity

Skills/research provider	Level and nature of research activity
Universities	Table 4.18 (summary of research activity in the universities and IoTs interviewed) provides an overview of the level and nature of financial services research activity in each of the universities interviewed. The universities consulted have between five and 15 faculty members who are involved in undertaking financial services related research. UCD has the largest compliment with 15 full-time faculty members, almost twice that of DCU and UL, both of which have 8 faculty members. All remaining universities indicated that they have five full-time faculty members who are involved in undertaking financial services research. A number of the universities reported that it was difficult to scale up the level of research activity as the majority of graduates tend to go into industry and not continue in academia. As a result industry is reportedly conducting its own credible research, for which they have "the time and money to do so" [source: university interviews]. Consequently, academia is competing with industry in this respect. The level of research activity is primarily dependent on the scale and research capacity of the university. For example, universities with a larger research capacity were more likely to have dedicated financial services research centres (further detail on research centres found in the following section (iv) Financial Services Research Centres). In addition to dedicated research centres, research that is specific to individual researchers is also conducted across the universities interviewed. For example, in UL and NUI Maynooth research themes vary by individual lecturers (e.g. one lecturer focuses on portfolio selection models and financial integration). In UL, financial services research is centred around three main areas. Specific research areas were found to vary across the universities. However, based on a review of the financial services research activities of the universities interviewed, a number of broad research themes emerged, covering three key areas, namely: ■ Risk management (e.g. "Developing ways of measuring risk, and comparing these risk measures", DCU; "Computational simulation of theoretical models of pricing, markets and risk", DCU; "Extreme Spectral Risk Measures: an Application to Futures Clearinghouse Margin Requirements", UCD); ■ Asset management (e.g. "The Case for REITs in the Mixed-Asset Portfolio in the Short and Long Run", UCD; "Empirical asset return distributions. Is chaos the culprit?" UCD); and ■ Corporate Finance (e.g. "UK Stock Returns and the Impact of Domestic Monetary Policy Shocks", UCD; "Dynamics of equity market integration in Europe: impact of political-economy events", UCD; "Risk, Strategy, and Optimal Timing of MandA Activity", TCD; "Europe's External Monetary and Financial Relations since the Euro: A Reconnaissance and a Proposal", NUIG). In addition, different forms of financial modelling appear regularly as research themes in the universities interviewed, including: ■ Asset pricing; ■ Econometrics; ■ Option pricing; and ■ Derivatives. UCC have a particular focus on processing and systems research through their 'Financial Services Innovation Centre' – this is also an emerging theme which is proposed for the upcoming 'Centre of Dynamics for Global Business' in TCD.

Skills/research provider	Level and nature of research activity
Institutes of Technology	Details on the level and nature of research activity for each institute are limited to Waterford IT. The college has eight lecturers/researchers dedicated to finance. In addition, they are hoping to set up a centre in financial services by developing their course offering (new BA Finance and Investment in 2007) and existing research capacity going forward. Research areas include: ■ Mergers and acquisitions; ■ Small firm finance; ■ Relationship banking; ■ Pensions funds investment and management; ■ Financial economics; and ■ Corporate governance.
Industry Training Bodies	As mentioned previously, the only industry training body conducting research at present is the CFA Institute, through the establishment of two research centres, namely: ■ The CFA Institute Centre for Financial Market Integrity and; ■ The CFA Institute Research Foundation. Firstly, the mission of the CFA Centre for Financial Market Integrity is to be a leading voice on issues of fairness, efficiency, and investor protection in global capital markets and to promote high standards of ethics, integrity and professional excellence within the investment community. The Centre consists of over 20 staff members supported by numerous volunteer committees around the world. The Research Foundation's mission is to encourage education for investment practitioners worldwide and to fund, publish, and distribute relevant research. The Foundation emphasizes research of practical value to investment professionals, while exploring new topics that provide a unique perspective in the rapidly evolving profession of investment management. Products include monographs, literature reviews, webcasts and papers. Although not currently in place, the IoB have plans to introduce a number of Doctoral programmes for individuals working in industry. The research undertaken as part of these programmes will be driven by industry and the IoB have already initiated discussions with various banks in relation to this.

(iv) Financial Services Research Centres

Some of the education and training providers have established **dedicated financial services research centres**. The nature of these centres and the research activities undertaken at each centre is described below, with further detail available in Tables 4.22 and 4.18:

- Five of the seven universities interviewed have established dedicated financial services research centres;
- Further to the existing centres, some universities are planning the introduction of a number of new financial services research centres, including the 'Global Finance Academy' in UCD, a joint initiative between UCC and DCU in the establishment of the 'Centre for Financial Mathematics' and a 'Centre of Dynamics of Global Business' in TCD; and
- At industry training body level, one of the training bodies is research active and has established two research centres in the USA through which all research is conducted.

Table 4.22 Research activity by the Irish financial services education and training providers – research centres

Skills/research provider	Financial services research centres
Universities	Five of the seven universities interviewed have established dedicated financial services research centres. A selection of these include the following: ■ UCD has a number of research centres/groups dedicated to financial services, including 'Centre for Financial Markets' and 'Centre for Insurance Studies'; ■ DCU recently developed the 'Centre for Quantitative Finance' – a joint initiative between the School of Business and School of Mathematics; ■ UL recently launched the 'Financial Services Innovation Centre' – which focuses on developing and producing new innovative products and services and actively engaging with companies. Although the Centre will initially focus on IT/IS perspectives, colleagues from Economics, Finance, Electrical Engineering, Law and Financial Maths will also be included; and ■ The 'Centre for Investment Research' was established in January 2007 and comprises researchers from UCC, Cass Business School and DCU. The aim of the centre is to be a focal point for international investment research – which is of direct relevance to industry. Further details on the financial services research centres can be found in Table 4.18. In addition to the existing centres, some universities plan to introduce of a number of new financial services research centres. For example, UCD are in the process of developing the 'Global Finance Academy' in association with the Institute of Bankers, which will focus on both finance-related training and research. The Centre will comprise some thirty faculty members and aims to have strong links to industry and universities in Ireland and in other countries. In addition to covering the primary areas of finance education and research, it will focus on niche areas of relevance to the development of the financial services industry in Ireland. Furthermore, UCC and DCU are co-developing the 'Centre for Financial Mathematics'. This will be a 'virtual centre' operating from both universities. Provided funding is successfully obtained from SFI, the Centre should be operational in early 2008. TCD are in the process of developing a 'Centre of Dynamics of Global Business' – research will be focused on the process side of business of which one element will be financial services process management.
Institutes of Technology	At present, none of the IoTs interviewed have established any dedicated financial services research centres.
Industry Training Bodies	This section is not applicable for the IoB and III. However, as described in Section (iii) above, the CFA has two research centres based in Charlottesville in the US. They are: ■ The CFA Institute Centre for Financial Market Integrity; and ■ The CFA Institute Research Foundation.

(v) Linking Research to Course Content

In terms of the Irish industry bodies and research providers consulted **linking research to course content**, the following was found:

- Both universities and IoTs reported that research is typically fed back to students through course content/material and class discussions, however the frequency and use of research material in specific modules is largely left up to the individual lecturer;
- The universities noted that the incorporation of research into class material/discussions is more likely to happen at postgraduate level due to the often complex nature and more specific focus of the research; and
- One of the industry bodies reported that research is incorporated into course content if the topics researched are relevant to the course content in their educational programmes (refer to Table 4.23 for further detail).

Table 4.23 Research activity by the Irish financial services education and training providers – linking research to courses

Skills/research provider	Linking research to course content
Universities	Universities reported that research conducted is fed back to students through course content/ material and class discussions. However it was found that it is more likely for this to occur at postgraduate level than undergraduate due to the complex nature and more specific focus of the research.
Institutes of Technology	As little to no research is being conducted within the IoTs reviewed, linking research to course content is not relevant in this instance. However, similar to the universities, Waterford IT reported that some research can be fed back to students through class material; however this is dependent on the individual lecturer.
Industry Training Bodies	In relation to the CFA Institute, research will be incorporated into course material/content if the research conducted involves topics included in the Candidate Body of Knowledge (e.g. what a new CFA needs to know). If the topic relates to the Global Body of Knowledge (a broader concept which includes knowledge that an experienced CFA needs to know), it is included in continuing education programs. The **IoB** indicated that the findings of research conducted within the planned GFA ('Global Finance Academy') will not only be fed back into industry but also will inform future programme development, particularly at the 'higher-end'.

(vi) Linking Research to Industry

Finally, consultations highlighted the extent to which **research undertaken by the education providers is being fed back into industry**:

- In general, across the universities and IoTs consulted, there was little evidence of research undertaken by the education providers being fed back to industry;
- A limited number of examples were found in the universities interviewed – research findings were fed back to industry predominantly as a result of joint research programmes/sponsorship of research by industry and industry attendance at 'academic conferences', however it was reported that industry have a "lack of interest" in research activity in Irish universities; and

- Some evidence of linking back research to industry was found in one of the industry training bodies, via industry membership of programme advisory boards, etc (refer to Table 4.24 for further detail).

Table 4.24 Research activity by the Irish financial services education and training providers – linking research to industry

Skills/research provider	Linking research to industry
Universities	In general, there was little evidence of research conducted within the universities consulted being fed back into industry. Of those universities that indicated that they fed research findings to industry, the two principle methods of doing so were: ■ As an output of joint research programmes and/or where sponsorship has come from industry; and ■ Through 'Academic Conferences' – some universities however, reported a "lack of interest" from industry in attending such events. UCC however hope to share their research with industry more formally going forward, through the establishment of an 'industry board' for the proposed Centre for Financial Mathematics (virtual centre jointly developed with DCU). This board will be used as a forum for discussion and sharing of research ideas/topics. Furthermore, UCC expect that PhD students (through the 'Centre for Financial Mathematics') will join industry on an internship and integrate/share their research and/or industry may undertake research at the Centre for a period of one/two years.
Institutes of Technology	It was found that research is not linked back to industry in Waterford IT at present, however they would like to develop greater links with industry going forward.
Industry Training Bodies	The CFA Institute did not report that research conducted is fed directly back into industry. However, as research ideas are primarily generated by practising members advisory boards who comprise industry professionals, research results can be fed back to industry via their involvement with the CFA. The IoB stated that it was important for their expected research to be fed back to industry. Although they are not currently involved in research activities the IoB envisage that their role within the planned GFA will be a bridge between academia and industry. "ensuring research is brought-out of academia and is of direct use to the financial services industry in Ireland".

4.4 Industry Linkages/Collaboration

Finally, to identify the **linkages Irish financial services education has established with industry**, the Irish education and training providers were asked for their experience of/views on the following aspects: industry design of course content; industry delivery of course content; internships/work placements; joint research programme with industry; funding from industry; and other evidence of industry participation. Details of each are provided in the following sections.

(i) Design of Course Content

Firstly, consultations with Irish education providers highlighted the level of industry input into the **design of financial services programmes** within the Irish education providers interviewed. As a result, the following trends were identified (refer to Table 4.25 for further detail):

- Industry involvement in the design of course content is primarily informal in nature – input is primarily in the form of informal discussions and meetings between university/IoT staff and industry representatives, however the frequency/level of interaction varies across individual staff members;
- Contacts are developed through linkages with industry via joint research activity, student work placements, alumni, personal contacts, etc, which is typically driven by the universities approaching industry;
- Some evidence of formal processes to include industry in the design of course content was noted (through participation on course boards, industry advisory boards, etc), however this was limited to a small number of the universities and IoTs interviewed;
- It appears from consultations with IoTs that many of their financial services courses are tailored towards the skills requirements of their local financial services industry; and
- There was strong evidence across the industry bodies interviewed of industry representatives formally designing course material, in particular through writing class material/textbooks.

Table 4.25 Industry linkages for Irish financial services education and training providers – design of course content

Skills research provider	Design of course content
Universities	Industry involvement in the design of financial services related course content is typically informal in nature. This is usually conducted via informal discussions and meetings between university staff and industry representatives, however the frequency/level of interaction varies across individual staff members. It was the view of one university that: "industry collaboration in relation to course design needs to be structured in order to facilitate the exchange of ideas – very hard to get industry signed up to this". Contacts are developed through linkages with industry via joint research activity, student work placements, university alumni, personal contacts, etc, which is typically driven by the universities approaching industry. There is also some evidence, albeit to a lesser degree, of industry approaching universities to inform/influence course content. For example, UCD increased the student internship for the 'MSc Quantitative Finance' from three months to one year based on feedback from Pioneer. In UCC, during the design of the 'BSc Financial Mathematics and Actuarial Science', the Institute of Actuaries asked UCC to meet with industry to discuss potential course content (the Institute is responsible for awarding exemptions to Actuarial exams). Some evidence of formal processes to include industry in the design of course content was noted, however this was limited to a small number of the universities interviewed. For example, (as described in Section 2, Table 4.15) in the Business Information Systems Department in UCC, an 'Advisory Business Board' was established to advise the Department on industry developments and future course content. Furthermore, coinciding with the development of the 'Centre for Financial Mathematics' in UCC, is the establishment of an 'industry board'. Although the primary focus of the board is sharing of research issues/ideas, it is expected that industry views will indirectly feed into course content and design.
Institutes of Technology	Similar to the universities, it was reported that industry involvement in the design of course content in the IoTs is primarily informal in nature. For example, through feedback on quality of work placement students and graduates and discussions and meetings with industry to discuss industry requirements and trends/developments. Some evidences of formal processes to include industry in the design of course content was found. In Waterford IT for example, an industry advisory board or the 'Advisory Forum for Management Education' advises the Business School on industry developments and future course content. In addition, when introducing a new course module a 'Peer Review Panel', which includes members of industry, reviews module content. In relation to the level of industry involvement, IoTs reported significant collaboration with industry. For example, Sligo IT noted that industry was heavily involved in the design of their financial services course content stating that "local industry is very willing to get involved". They also believe that it was to industries benefit to be involved as "they see what is being produced and this helps develop good relationships". It appears from consultations with IoTs that many of their financial services courses are driven by the skills requirements of the local industry. For example, the finance courses in Waterford IT are geared towards the skills needs of the funds administration industry in the South East, including companies such as State Street, PFPC and BYSIS. It was commented that "on occasion we have made a lot of changes in our courses for the funds industry". Furthermore, the H. Dip in Financial Services Technologies in Letterkenny IT was developed specifically in response to a demand by Primerica and Northbrook Technologies for students with skills in mainframe programming.

Skills research provider	Design of course content
Industry Training Bodies	There was strong evidence across the industry training bodies interviewed of industry representatives formally designing course content, in particular through writing class material/textbooks. For example in the III, course material/textbooks are sent to each member of the industry advisory panel dedicated to updating an individual modules – comments/changes/extra materials are suggested by the industry representative and incorporated into course material by the textbook writers. Furthermore in the CFA Institute, practising investment professionals are engaged to write curriculum material (e.g. specific book chapters), which is provided to the CFA candidates to prepare for the CFA examinations. In addition, the IoB offers provide a Certificate in Applied Financial Services to Citigroup. This Certificate is open to Citigroup employees in Ireland and is accredited under the European Transfer System (ECTS). The benefits to Citigroup are it: ■ Is a tailored programme; ■ Results in a formal qualification; ■ Brings participating employees to a common level of education training; ■ Provides upgrading of existing staff; and ■ Assists with staff retention and motivation levels.

(ii) Delivery of Course Content

In relation to industry's involvement in the **delivery of financial services course content** the key findings are summarised below, with further detail available in Table 4.26.

- Industry involvement in the delivery of course content is primarily through the use of guest lecturers/ speakers in the universities/IoTs interviewed.
- Although they are considered a benefit to some courses/modules, the involvement of guest lecturers is typically not a formal course requirement. Instead, guest lecturers are typically brought in on an ad hoc basis and are very often personal contacts of individual lecturers.
- Some evidence was found however, of industry representatives delivering entire modules – however, this was limited to one of the IoTs interviewed.
- By contrast, two of the industry training bodies regularly use industry representatives to deliver entire modules, with industry delivering all modules for one of the bodies interviewed.

Table 4.26 Industry linkages for Irish financial services education and training providers – delivery of course content

Skills/esearch provider	Delivery of course content
Universities	The principle method of industry delivery of course content is through the use of guest lecturers/ speakers. Although they are considered a beneficial addition to some courses/modules, the involvement of guest lecturers is typically not a formal requirement of a course/university. Instead, guest lecturers are typically brought in on an ad hoc basis and are very often personal contacts of individual lecturers. For example, UCD makes reference to individuals from leading financial services institutions who occasionally deliver seminars and talks as part of their financial services courses. DCU also has a number of 'adjunct' lecturers from industry, who have specialisms in the areas of: hedge funds; portfolio analysis; financial markets; financial products; and regulation. In UL, industry representatives cover either an industry topic or presentation – this is predominantly at a postgraduate level rather than undergraduate. In UCC, an 'Actuarial Teaching Team' was established for the BSc Financial Mathematics and Actuarial Science degree, which comprises three people from industry (qualified actuaries) who regularly deliver guest lectures. NUI Galway commented that guest lecturers are used occasionally; however they have plans to introduce a more structured input from industry lecturers in their new MEconSc International Finance. All universities reviewed were of the view that industry involvement in the delivery of courses was beneficial in providing students with practical insights into relevant industries/sectors. However, many universities cited time constraints as a factor limiting the development in this area.
Institutes of Technology	As per the universities, the principle method of industry delivery of course content is through the use of guest lecturers/speakers. For example, in Letterkenny IT, guest lecturers from Primerica and Northbrook are regularly used as guest lecturers on the H. Dip. Financial Services Technologies. In Waterford IT, in addition to using guest lecturers regularly throughout the year, PFPC also deliver some modules on their financial services course – modules are related to fund administration and fund agency.
Industry Training Bodies	The use of industry representatives varies across the industry training bodies interviewed, however they are used more frequently than in the universities and IoTs interviewed. For example, all modules in the III are delivered by industry practitioners, which are delivered during the evening and at weekends. The IoB draw their lecturers from both academia and industry. The do not offer full-time lecture posts which allows them to select the best from both areas with the most appropriate knowledge to deliver a programme/module(s). In the CFA Institute however, the course program itself is self study, so lectures are not delivered by the Institute.

(iii) Internships/Work Placements

The following points provide a summary of the key findings in relation to the use of **work placements/ internships** amongst the Irish education providers interviewed (refer to Table 4.27 for a detailed review and examples):

- A small number of financial services related courses have work placements/internships across the universities and IoTs interviewed. Specifically, of the 176 courses delivered by the universities and IoTs, 27 (15 percent) include a work placement option (21 by universities and six by IoTs);
- The vast majority of work placements (22 out of 27 courses) are offered at undergraduate level; and
- Work placements are typically offered across business and finance courses, rather than mathematics or statistics programmes;

- Students in the universities appear to work with financial services companies based in Dublin or in other cities including Galway, Cork and Limerick. A smaller number of work placements are completed abroad in the US or UK. In the IoTs however, students are more likely to complete internships with local companies in the surrounding area, rather than in Dublin; and
- Although work placements were noted by the education providers as being important, time and level of industry interest/participation were cited as key barriers to the introduction of internships.

Table 4.27 Industry linkages for Irish financial services education and training providers – internships

Skills/research provider	Internships/work placements
Universities	Across the universities interviewed, 21 (or 16 percent) of the 132 financial services related courses (including both existing and new courses expected in 2007/2008 or 2008/2009) formally offer students a work placement/internship programme (optional or compulsory). The vast majority of work placements are offered at undergraduate level (18 of 21 courses), with only three postgraduate courses offering a work placement programme. Placements are typically offered across the business and finance courses, rather than mathematics or statistics courses. Students primarily work with companies in Dublin, however placements are also completed in Galway, Limerick and Cork and other regional towns. For example, in UL, students in the undergraduate Bachelor of Business Studies course complete work placements with a range of financial services companies in Ireland, including JP Morgan; AIB Capital Markets; Bank of Ireland; Intel Finance Department, etc. Many of the work placements are completed in Dublin. However, some placements are undertaken with leading financial services companies abroad, particularly in the US. For example, as part of the BSc Business Information Systems course in UCC, students are required to complete a six month work placement. The vast majority of students work in the US in the leading financial services companies (82 students from this course in East Coast America in 2007), including Federal Reserve Bank, Sunlife, State Street, RBS, Chevy Chase Bank, etc. Students are also placed in Ireland in companies such as Accenture, Deloitte and AIB. Internships/work placements with industry are considered to be both beneficial for the student and for industry. In addition to providing a student with insight and practical experience of the industry, it provides industry with "cheap resources" and can be "an excellent source of future employees". UCC for example, reported that almost 100 percent of Business Information Students are offered jobs by their industry placement employers. There were however a number of issues/constraints noted by the Universities in relation to internships/work placements. They include: ■ Lack of interest from industry in providing placements to students; ■ The time factor in organising work placements in that it is very time-consuming; and ■ The difficulty in finding quality work placements in their immediate region for universities located outside of Dublin. As an alternative to work placements, UL are in the process of constructing a 'trading floor' facility in their Kemmy Business School, to be delivered in conjunction with two of their Masters programmes (Financial Services and Computational Finance) due for completion in early 2008. This will allow for simulated training and teach students how to trade while in an academic setting. For example, of the 10 subjects delivered in the Masters in Computational Finance, eight of these are delivered in the trading room, in a 'learning-by-doing' fashion.

Skills/research provider	Internships/work placements
Institutes of Technology	Across the IoTs interviewed, 6 (or 14 percent) of the 44 financial services related courses (including both existing and new courses expected in 2007/2008 or 2008/2009) include work placements as part of their financial services related courses. Four of these are offered at undergraduate level, with the remaining two available at postgraduate level. Students typically work all over Ireland, however it appears that students in the IoTs are more likely to complete internships with local companies in the surrounding area, rather than in Dublin. For example, in Letterkenny IT, students on the H. Dip in Financial Services Technologies complete a four week work-placement in Primerica or North Brook Technologies based near the college. The majority of students (12 out of 15 in 2007) are offered positions as a result. In Waterford IT, students complete a six month work placement with a financial services company as part of the BA Financial Services and the Bachelor in Business Studies (Economics and Finance and/or Accounting Streams). The vast majority of students work for companies in the South East, namely PFPC, BYSIS, State Street and Citigroup, however, students also complete placements in Dublin. Students taking the Accounting stream in BBS, work with the 'Big 4' or some smaller accountancy firms. However again these are predominantly with companies in the local area. Students, who take the Financial Services stream in BBS in Sligo IT, undertake a five month work placement with companies such as Bank of Ireland and Morgan Stanley amongst others.
Industry Training Bodies	None of the industry training bodies interviewed include work placements as part of their programmes.

(iv) Joint Research Programmes

The bullet points below provide a summary of the key points identified from the consultations with Irish financial services education providers in relation to **joint research programmes** between industry and education (refer to Table 4.28 for further detail):

- There was limited evidence of joint research activity between industry and the universities/IoTs; and
- The universities attributed this low level of joint research activity to a number of factors including: differing time-scales between industry and academia; industry conducting in-house research; and ownership issues. It was also considered that the availability of research funding from industry is limited.

Table 4.28 Industry linkages for Irish financial services education and training providers – joint research

Skills/research provider	Joint research programmes/research linkages
Universities	Based on the university interviews, there were limited examples of joint research activity with industry. For example, UCD conducts a number of joint research programmes with industry through both the 'Centre for Financial Markets' and their 'National Computing Research and Application Group'. In addition, UL is partnering with Intuition, a provider of financial services training software, in the development of a trading simulation software library, which will be used across the financial services industry. The university will have an extensive licence for use of the software afterwards. Some universities commented that the low level of joint industry research programmes within their institutions was due to factors including: ■ Academic research requires time, whereas industry generally requires research to be conducted at a quicker pace; ■ Many financial services institutions are conducting their own in-house research and "have the time, money and personnel to do so"; and ■ Industry very often want to own the rights to research (Non-Disclosure Agreements), particularly product-development research. This conflicts with the academic priority of increasing their university credibility by publishing research findings.
Institutes of Technology	Based on consultations with IoTs, there appears to be no joint research programmes between academia (IoTs) and industry. Waterford IT, however, report they receive a small amount of funding from industry, and in the future would like to develop their relations with industry further: "…believe industry is interested in research, but we need to make that leap like we did in the sciences" As the financial services related courses in Sligo IT have recently been introduced, they have not yet engaged in undertaking research activities. However, as these courses mature, they hope to establish research capacity in this area. Similarly in Letterkenny IT, they hope to "venture into financial services research in the future".
Industry Training Bodies	There was no evidence of joint research programmes found in the industry training bodies interviewed. It was indicated by IoB however, that this be a major focus of the planned GFA and Doctoral programmes.

(v) Funding from Industry

Consultations with Irish universities/IoTs/industry bodies indicated the **level and nature of funding received from industry** by the education providers.

- Overall, it was reported that little/no funding was provided by industry for financial services related research activities – it was perceived by the universities that industry has "little interest in doing so".
- Where funding is received, this can take the form of 'monetary' support for research or through the provision of researchers.
- Outside of research, in some cases, industry were involved in providing student sponsorships (refer to Table 4.29 for further detail).

Table 4.29 Industry linkages for Irish financial services education and training providers – funding from industry

Skills/research provider	Funding from industry
Universities	Overall, it is the view of those interviewed that little/no funding was provided by industry for financial services related research activities and there would appear to be little interest from industry in doing so as reflected in the comments below: "Collaboration with industry on research does not happen, and although there is some interest from industry on their research, no funding is offered or provided by industry for further research". "No money is being made available to allow individuals to conduct research, which would put them at the top of their field, however there is no premium or incentive from industry to move this forward". Where funding is received, this can take the form of 'monetary' support, whereby a small number of universities reported limited levels of research funding from the financial services industry. For example, the Business Information Systems Department in UCC received research funding from a wide range of financial services institutions including the Federal Reserve Bank, Barclays, Bank of Ireland and State Street. There was also some evidence of the provision of student sponsorship: For example, UCD cited NTMA, Goodbody Stockbrokers and Bank of Ireland amongst their sources of student sponsorship. Finally, some universities reported that industry may also provide universities with researchers: UCD commented that AXA and VHI provided researchers in addition to monetary support for research. Each of the universities consulted were hopeful of increased levels of funding from industry in the future. For example, UL is building up their research capacity to facilitate increased levels of research, and as a result, are looking for further industry support for research initiatives. Whereas other universities indicated that development of this area was constrained by lack of available funding.
Institutes of Technology	There were no reports from the IoTs consulted of any funding being made available from industry.
Industry Training Bodies	The CFA Institute noted that some contributions were made from industry for research. Going forward, the IoB envisage that future joint/industry drive research initiatives will be funded in part by industry. Furthermore, the courses delivered by the industry training bodies interviewed are primarily funded by member subscriptions (from industry professionals) and/or payment for courses by those already working in industry.

(vi) Other Industry Linkages/Collaboration

Consultations with the Irish financial services education providers identified a number of **further linkages** with industry, including:

- industry sponsorship of speakers at conferences;
- agreements with industry to use their university/college facilities (e.g. classrooms, technical equipment, etc);
- joint promotion of specific financial services courses; and
- funding from the financial services sector for facilities.

Table 4.30 Industry linkages for Irish financial services education and training providers – other linkages/collaboration

Skills/research provider	Other industry linkages/collaboration
Universities	Other forms of industry linkages cited include: ■ Trinity College reported industry sponsorship of speakers at conferences, e.g. INFINITI; ■ In UL, post completion of their trading room, they have an agreement with Intuition that it can be used as a base for providing Executive Education to Intuition's client base in the US (four, three-day sessions annually); ■ Pioneer is involved in the promotion of UCD's MBS Quantitative Finance, e.g. joint Pioneer/ UCD advertisement in the national media; and ■ UCD has received funding from the financial services sector for facilities.
Institutes of Technology	There were no additional industry linkages identified, further to those listed above.
Industry Training Bodies	No additional industry linkages were identified in the industry training bodies interviewed.

4.5 Summary

- The **provision of Irish financial services education and training** is quite diverse in the Irish universities/IoTs interviewed, ranging from "broad" business studies, accounting, economics and mathematics/statistics courses to "dedicated" courses for the financial services industry, such as those covering finance, actuarial science, insurance, banking and corporate finance. The number of courses however, dedicated to specific sectors (e.g. insurance, banking and capital markets and/or investment management) is relatively low (less than 5 percent). It is important to note that many of the "dedicated" finance courses offer modules which provide students with the skills to work across almost all finance sectors at some level. Conversely, the courses delivered by the industry bodies have a high sector focus, concentrated on one or more sectors.
- There is greater flexibility for Irish universities/IoTs to **update course content/course modules** rather than introduce a new course, which is typically a complex and lengthy process taking up to three years. Industry bodies appear to have a less onerous process around new course development and minor changes to course content can be made as required without formal approval.

- The universities and IoTs use a number of processes to **review course content** including: periodic university-wide reviews; formal/informal annual reviews; and ongoing reviews conducted informally throughout the year. Review mechanisms used by the industry bodies are primarily centred around reviewing course content annually in conjunction with industry.

- **Mechanisms to ensure courses remain up-to-date with industry developments** in the universities/ IoTs include processes such as: ongoing fostering of informal industry linkages through work placements, individual personal networks, university alumni and industry conferences; course boards to review and input into the design of course content typically comprising industry experts; and face-to-face meetings with industry. While industry input is recognised as being vital to ensuring graduates are equipped with the latest industry requirements and that courses are kept up-to-date with the latest trends and developments, universities/IoTs cited the challenges and difficulties associated with ensuring industry engages effectively in this activity. Conversely, the industry training bodies appear to interact with industry on a more formal basis more regularly than the Universities and IoTs, through, for example industry surveys and dedicated meetings with industry to discuss course content.

- There was limited evidence of **inter-institutional collaboration** in the universities and IoTs on the design and delivery of course content. Industry training bodies on the other hand report significant levels of collaboration with other representative bodies and academia in the development of their programmes.

- Although each of the universities interviewed are active in **financial services research**, only one IoT and one industry body were active in this area. The key drivers of research activity in the universities/ IoTs were individual lecturer research interests and industry trends and developments. Specific research areas were found to vary across the research active institutions. However, a number of broad research themes emerged, covering risk management asset management and corporate finance. The majority of the universities have developed dedicated finance research centres, with inter-institutional collaboration evident in some of the centres. Various funding sources for research initiatives were cited including: the Irish Government/State Bodies; the university itself; and to a much lesser extent industry. Typically, research findings are fed back to students via course content and class discussions, although this is more likely to happen at postgraduate level due to the often complex nature of the research. Again however, the universities/IoTs interviewed cited the challenges and difficulties associated with encouraging industry to take an interest in research undertaken in the universities/IoT and/or participate in these research activities.

- **Industry linkages** in the Irish universities/IoTs interviewed consist of: industry input into course design and delivery; joint research programmes; internships/work placements; provision of funding; and other linkages such as sponsorship of speakers at conferences and joint advertisement of courses. Industry input into the design and delivery of course content is largely informal, secured through industry contacts and guest lecturers. Some universities/IoTs formally include industry on course review boards and/or have established industry advisory boards, however this is limited to a small number of the education providers interviewed. In contrast, there was strong evidence of industry-designed course content in the industry training bodies interviewed, predominantly through writing class material/ textbooks. A small number of financial services courses (16 percent) in the universities/IoTs offer a work placement option and are predominantly completed in the surrounding area or in Dublin. Evidence of joint research activity with industry was limited as was funding of research by industry. Again however, the universities/IoTs interviewed cited the challenges and difficulties associated with encouraging industry to participate in these activities.

Chapter 5: Comparison of Irish and International Financial Services Skills and Research Providers

5.0 Introduction

This section of the report provides an overview of a number of leading international academic institutions in relation to their provision of education and research in the area of financial services. The results from the national and international consultations are then compared and contrasted in Section 5.6

Five education providers were consulted with as part of this phase of the study, as listed in table 5.1 below.

Table 5.1 Overview of leading international financial services education and research providers consulted

College	Profile
New York University ("Stern")	■ Founded in 1831, it is the largest private university in the United States. ■ Located in five major centres in Manhattan and operates branch campus and research programs in other parts of the United States and abroad, in addition to study abroad programs in more than 25 countries. ■ 14 schools, colleges, and divisions – Leonard N. Stern School of Business delivers finance related programmes. ■ Stern has more than 200 full-time faculty members – was recently (2007) rated 47th in relation to the 'Best National Doctoral Universities' and 18th for 'Best Undergraduate Business Programmes'.
University of Pennsylvania ("Wharton")	■ Founded in 1740, it is America's first university and is the fourth-oldest institution of higher education in the United States. ■ About 4,500 professors serve nearly 10,000 full-time undergraduate and 10,000 graduate and professional students. ■ Four undergraduate schools and 12 graduate and professional schools, one of which is the Wharton School, offering finance related programmes. ■ Wharton has over 300 professors and is the world's most published and cited business school faculty. ■ Ranked the best business school in the world by Financial Times every year except for 2005, when it tied with Harvard.
London Business School ("LBS")	■ London Business School has 92 faculty members and over 1,400 degree students. ■ The School's full-time and Executive MBA programmes are counted among the world's best according to the Financial Times and Business Week business education surveys. ■ The School has also twice been awarded the highest research rating of five star (5*) by the Higher Education Funding Council for England (HEFCE).

College	Profile
City University London ("Cass")	■ Over 40 Professors involved in the areas of finance and management, in addition to 100 active research members. Research in Cass received a 5* RAE rating in 2001. ■ Cass undergraduate programmes are ranked 1st in London and 3rd in the UK for business by the Guardian University Guide 2008. ■ Largest provider in Europe of Specialist Masters courses geared towards the global financial services industry (over 20, 18 of which are specifically related to financial services).
University of Reading, London ("ICMA Centre")	■ Established in 1892, with three campuses in Reading. ■ Established in 1991 as a result of collaboration between the university and the International Capital Markets Association. Finance courses are delivered through the ICMA centre in the Business School. ■ The centre has two dealing rooms using similar software to those found in leading investment banks – extension completed in 2008 to include an additional 50 seat dealing room.

Source: PwC derived.

Each of the organisations consulted with, as listed above, are involved in the provision of financial services courses. The nature and extent of their provision at both undergraduate and postgraduate levels, are described in the following table, Table 5.2

Table 5.2 Summary of financial services courses and research in the international institutes interviewed

College	Number of financial services courses 06/07	Undergrad or postgrad	Faculty	Title of financial services related courses*
New York University*	6	2UG 4 PG	Finance Department, Stern Business School	■ BSc Finance ■ MBS Finance ■ PhD Finance
			Accounting, Taxation and Law Department, Stern Business School	■ BSc Accounting, Taxation and Law ■ MBS Accounting, Taxation and Law ■ PhD Accounting, Taxation and Law
University of Pennsylvania*	12	4 UG 8 PG	Finance Department, Wharton	■ BSc Finance ■ MBA Finance ■ PhD Finance
			Insurance and Risk Management Department, Wharton	■ BSc Insurance and Risk Management ■ MBA Insurance and Risk Management ■ PhD Insurance and Risk Management
			Accounting Department, Wharton	■ BSc Accounting ■ MBA Accounting ■ PhD Accounting
			Statistics Department, Wharton	■ BSc Statistics ■ MBA Statistics ■ PhD Statistics

College	Number of Financial Services courses 06/07	Undergrad or postgrad	Faculty	Title of financial services related courses*
London Business School	4	4 PG	Business School	■ MSC in Finance** ■ MBA Business ■ PhD Accounting ■ PhD Finance ■ (EMBA Global)*** ■ (Dubai – London EMBA)***
City University London	18	5 UG 13 PG	Faculty of Finance, Cass Business School	■ BSc Banking and International Finance ■ BSc Investment and Financial Risk Management ■ BSc Real Estate Finance and Investment ■ MSc in Banking and International Finance ■ MSc in International Accounting and Finance ■ MSc in Investment Management ■ MSc in Finance ■ MSc in Real Estate Investment ■ MSc in Finance, Risk and Investment ■ MSc in Quantitative Finance ■ MSc in Financial Mathematics ■ MSc in Mathematical Trading and Finance ■ Graduate Diploma in Anti Money Laundering
			Faculty of Actuarial Science and Insurance, Cass Business School	■ BSc in Actuarial Science ■ BSc Risk Analysis and Insurance ■ Diploma/MSc in Actuarial Management ■ Diploma/MSc in Actuarial Science ■ MSc in Insurance and Risk Management
University of Reading	7	1 UG 6 PG	ICMA Centre (in the Business School)	■ BSc Finance and Investment Banking ■ MSc International Securities, Investment and Banking ■ MSc Investment Management ■ MSc Financial Risk Management ■ MSc Capital Markets, Regulation and Compliance ■ MSc Finance and Real Estate ■ PhD Programme

** Note: courses offered in finance related areas are specialisms of an overall Business Qualification.*

***The MSc in Finance is a recognised CFA programme partner.*

**** These courses have been left out of the course count as they are not offered in the local jurisdiction.*

Source: PwC derived.

In order to review the provision of financial services education by these leading international institutions the same analysis framework developed to profile the Irish education and training provision has been used. The information gathered during this programme of consultations is presented under the headings of:

5.1 Course provision;

5.2 Course development and update;

5.3 Research activity; and

5.4 Industry linkages/collaboration.

Each of these four framework areas comprise several sub-criteria under which the information gathered is presented.

5.1 Course Provision

The **course provision** section includes details of: the number of courses provided; the extent to which these courses are accredited or certified; the level of financial services sectoral focus contained within the course content; the nature of the core focus of the courses; and the level of national and international recognition attained by the courses. Details of each of the above are presented in aggregate for the international academic institutions consulted.

(i) Number of Financial Services Related Courses

The following points summarise the key findings from the consultations with the international academic institutions, relating to the number of **financial services related courses**. (Refer to Table 5.3 for further detail).

- A total of 47 courses, either specific to, or relevant for, financial services, are delivered by the leading international academic institutions consulted. Each university/college typically provides anything between one and five undergraduate programmes and three and 13 postgraduate courses that are dedicated or related to financial services. The majority of the courses are geared towards postgraduate education, with only 12 of the 47 courses aimed at the undergraduate level.
- The vast majority of courses (36 programmes) are dedicated financial services programmes, covering areas such as finance, insurance, risk management, banking, quantitative finance, capital markets, actuary and investment management.
- The remaining 11 courses, although not direct finance courses, provide skills which are central to working in the financial services industry and cover areas such as accounting, taxation, law, economics and statistics.
- In the universities/colleges consulted, financial services related courses are typically delivered by the Business Faculty/School. Although within the individual schools, one to four Departments are responsible for providing finance related courses.

Table 5.3 Course provision by international financial services education providers – financial services courses

Skills/ research provider	Number of financial services related courses
International Education Providers	Across the international universities/colleges consulted there was a total of 47 financial services related courses delivered. Each university/college typically provides anything between one and five undergraduate programmes and three and 13 postgraduate courses that are dedicated, or related, to financial services. The majority of these courses (36 programmes) are dedicated financial services programmes, covering areas such as finance, insurance, risk management, banking, quantitative finance, capital markets, actuary and investment management. Examples include: ■ BSc Finance (NYU/Penn State); BSc Insurance and Risk Management (Penn); ■ BSc Banking and International Finance (Cass); BSc Investment and Financial Risk Management (Cass); ■ BSc Real Estate Finance and Investment (Cass); MSc Quantitative Finance (Cass); ■ MSc Actuarial Science (Cass); BSc Finance and Investment Banking (Reading); ■ MSc Financial Risk Management (Reading); MSc International Securities, Investment and Banking (Reading); and ■ MSc Finance (LBS); and PHD Finance (LBS). The remaining 11 courses, although not direct finance courses, provide skills which are central to working in the financial services sector. Such courses cover areas including accounting, taxation, law economics and statistics. These courses are as follows: ■ BSc Accounting, Taxation and Law (NYU); MBS Accounting, Taxation and Law (NYU); ■ PhD Accounting, Taxation and Law (NYU); BSc Accounting (Penn State); ■ BSc Statistics (Penn State); MBA Accounting (Penn State); ■ PhD Accounting (Penn State); MBA Statistics (Penn State); ■ PhD Statistics (Penn State); MBA Business (LBS); and ■ PHD Accounting (LBS). At present, none of the international institutions consulted are planning to introduce any additional financial services related courses in the near future. In the universities/colleges consulted, financial services related courses are typically delivered by the Business Faculty/School. Although within the individual schools, one to four Departments are responsible for providing finance related courses. For example, in Penn State, the Finance Department, Insurance and Risk Management Department, Accounting Department and the Statistics Department within the Wharton School of Business, are all responsible for delivering financial services related courses. In Cass Business School, two Faculties are responsible for delivering finance related courses, namely the Faculty of Finance and the Faculty of Actuarial Science and Insurance. In NYU Stern, the Finance Department and the Accounting, Taxation and Law Department deliver financial services related courses within the Stern Business School. While in Reading, one Centre within the Business School, the International Capital Markets Association, is responsible for the delivery of finance courses. In LBS finance related courses/modules are drawn from the School's Finance, Accounting and Economics faculty together with a small number of staff from other departments around the school.

(ii) Accreditation/Certification

The key findings in relation to the level to which financial services related education and training is **certified** in the international universities/colleges consulted are summarised in the points below (Refer to Table 5.4 for further detail):

- Of the financial services related courses reviewed the majority (35 of 47 courses) are accredited as postgraduate programmes, with the remaining 12 courses being undergraduate programmes; and
- Of the 36 dedicated financial services courses delivered by the universities in 2006/2007 (as described in the previous section (Section (i), number of financial services related courses)), the vast majority (25 courses) are undergraduate, with the remaining 11 courses accredited to postgraduate level.

Table 5.4 Course provision by international financial services education providers – accreditation/certification

Skills/research provider	Accreditation/certification
International Education Providers	Across the international universities/colleges interviewed, the financial services related courses consist of undergraduate honours bachelor degree courses and postgraduate programmes including a small number of PhD programmes. Specifically: ■ 35 of the 47 financial services related programmes are postgraduate and PhD programmes; and ■ The remaining 12 courses are accredited as undergraduate bachelor degrees. Undergraduate programmes are typically three to four years in length, with postgraduate programmes ranging from one to two years and PhDs from three to five years. Of the 36 dedicated financial services courses delivered by the universities in 2006/2007 (as described in the previous section [Section (i), number of financial services related courses]), the vast majority (25 courses) are undergraduate, with the remaining 11 courses accredited to postgraduate level.

(iii) Sector Focused Courses

The following bullet points highlight the key findings in relation to the **sector focus** (i.e. investment management, banking and capital markets and/or insurance) of the dedicated financial services courses reviewed in section (i). Further analysis is provided in table 5.5 below.

- Of the 47 courses delivered by the international universities/colleges, 36 of these are dedicated financial services courses (as discussed in Section (i). Over half of these courses (19 out of 36) are dedicated to one or more specific financial services sectors.
- Two programmes cover the investment management sector, three cover all three sectors (e.g. risk management courses), six are solely focused on the banking and capital markets sector; and eight are dedicated to the insurance sector.
- The remaining 17 broad finance courses (covering areas such as finance, quantitative finance, etc) provide students with the skills to work across almost all financial services courses at some level.
- Importantly, there is substantial potential for sector specialisation within many of these broader finance courses. For example, the BSc Finance in NYU Stern offer inter-related modules and projects that enable students to specialise in two to three core finance areas including banking, corporate finance and quantitative finance.

Table 5.5 Course provision by international financial services education providers – sector focused courses

Skills/research provider	Sector focused courses
International Education Providers	Of the 47 courses delivered by the international universities/colleges, 36 of these are dedicated financial services courses (as discussed in Section (i). The following table highlights the sector focus of each of these courses (i.e. focus on investment management, banking and capital markets and/or insurance) The majority of courses (17 out of 36) are broad finance courses (covering areas such as finance, quantitative finance, etc) and provide students with the skills to work across almost all financial services sectors at some level. Importantly, there is substantial potential for sector specialisation within many of these broader finance courses. For example, in NYU Stern, students undertaking the BSC Finance and MBA Finance typically choose to specialise in two/three of the following areas: ■ Banking; ■ Corporate Finance; ■ Finance; ■ Financial Instruments and Markets; ■ International Finance; and ■ Quantitative Finance. Both Wharton and NYU Stern considered that through their combination of compulsory and elective modules students can tailor their qualification in line with sector specific requirements. London Business School's (LBS) Masters in Finance provides students with a foundation in the principles and practices of finance as well as providing them with the analytical tools to assist with financial decision-making. The remaining 19 courses are dedicated to one or more specific financial services sector (i.e. banking and capital markets, investment management and/or insurance). For example: ■ Banking and Capital Markets – MSc International Securities, Investment and Banking [Reading], BSc Finance and Investment Banking [Reading], BSc Banking and International Finance [Cass]; ■ Investment Management – MSc Investment Management [Reading], MSc in Investment Management [Cass]; and ■ Insurance – MBA Insurance and Risk Management [Penn], BSc in Actuarial Science [Cass], MSc in Insurance and Risk Management [Cass]. Across all of the sector focused courses, the following was observed: ■ Two programmes cover the investment management sector; ■ Three cover all three sectors (e.g. risk management courses); ■ Six are solely focused on the banking and capital markets sector; and ■ Eight are dedicated to the insurance sector.

Skills/research provider	Sector focused courses

International Education Providers cont../

Dedicated Financial Services Courses	IM	BCM	INS
Finance Courses:			
1. BSc Finance (Penn)			
2. BSc Finance (NYU)			
3. BSc Real Estate Finance and Investment (Cass)			
4. MBA Finance (Penn)			
5. PhD Finance (Penn)			
6. MSc in International Accounting and Finance (Cass)			
7. MSc in Finance (Cass)			
8. MSc in Real Estate Investment (Cass)			
9. MSc in Quantitative Finance (Cass)			
10. MSc in Financial Mathematics (Cass)			
11. Graduate Diploma in Anti Money Laundering (Cass)			
12. Masters in Finance (LBS)			
13. PhD in Finance (LBS)			
14. MBS Finance (NYU)			
15. PhD Finance (NYU)			
16. MSc Finance and Real Estate (Reading)			
17. PhD Finance Programme (Reading)			
Sector Focused Courses:			
1. BSc in Actuarial Science (Cass)			
2. BSc Risk Analysis and Insurance (Cass)			
3. BSc Finance and Investment Banking (Reading)			
4. BSc Insurance and Risk Management (Penn)			
5. BSc Banking and International Finance (Cass)			
6. BSc Investment and Financial Risk Management (Cass)			
7. MSc in Finance, Risk and Investment (Cass)			
8. MSc Financial Risk Management (Reading)			
9. Diploma/MSc in Actuarial Management (Cass)			
10. Diploma/MSc in Actuarial Science (Cass)			
11. MSc in Insurance and Risk Management (Cass)			
12. MSc International Securities, Investment and Banking (Reading)			
13. MSc Investment Management (Reading)			
14. MSc Capital Markets, Regulation and Compliance (Reading)			
15. MBA Insurance and Risk Management (Penn)			
16. PhD Insurance and Risk Management (Penn)			
17. MSc in Banking and International Finance (Cass)			
18. MSc in Mathematical Trading and Finance (Cass)			
19. MSc in Investment Management (Cass)			

(iv) Core Course Focus

Feedback was also gathered from the leading international academic institutions on the **focus of their financial services related courses**. This was assessed against the skills areas of: general management; business; back-office/administration; customer facing/operations; product development; and financial processes. A summary of the key findings are provided below, with detailed findings presented in Table 5.6.

- The leading international academic institutions consulted were of the opinion that their core course provision offered a generic grounding across each of the 'core focus' areas. Their provision of a number of elective modules then allows students to specialise in their 'core area' of choice.
- For example, Cass Business School reported that they listen to feedback from their students in relation to the introduction of new specialist elective modules – hence allowing students more flexibility to tailor their course to their particular area(s) of interest.

Table 5.6 Course provision by international financial services education providers – core course focus

Skills/research provider	Core course focus*
International Education Providers	Each of the international universities/colleges consulted considered their core course provision to offer a generic grounding across each of the 'core focus'* areas. Typically, students have the option to select from a number of elective modules, which the universities consider provide the students with the required skills in one or more of the 'core areas' listed. For example, in Cass Business School students can choose from a number of electives in addition to conducting a number of core course modules. There is a high level of flexibility in terms of the introduction of specialist elective modules. If students feel an area is of particular importance and needs to be covered it can be added to the course with relatively little effort. Cass also allows students to take additional elective modules in lieu of preparing a dissertation project hence allowing them to tailor the courses to their specific areas of interest. In both Wharton and Stern, in the broad finance undergraduate and postgraduate courses, students can choose from a range of elective modules, which can provide them with the skills in one or more of the 'core areas'. `For example, in the undergraduate finance programme in Stern students can choose the modules 'Money, Banking, and Financial Markets' and 'Real Estate Capital Markets', both banking and capital markets related modules. In LBS, the Masters in Finance has a core course programme covering the areas of: financial accounting and analysis; corporate finance and valuation; capital markets financing; and foundations in finance. In addition to this core course provision students choose an additional five to seven electives from a list of 25 financial services related electives. These electives cover a wide variety of finance areas with the most popular areas of specialism chosen by students typically including: corporate finance; financial engineering/capital markets; asset management; private equity/venture capital; and financial and strategic analysis.

** 'Core course focus' is a focus on one or more of the following areas: General Management/Business; Product Development; Financial Processes; Back-office/Administration; and Customer Facing Role/Operations.*

(v) National and International Recognition

In terms of the **national and international recognition** of financial services courses provided by the leading international academic institutions consulted the following key trends were highlighted (refer to Table 5.7 for detailed review):

- The leading international academic institutions consulted are revered as leading academic institutions in relation to their course provision and level of research activity. For example the NYU Stern Doctoral programme is rated first in the US and Cass Business School's undergraduate programmes are ranked 1st in London and 3rd in the UK for business by the Guardian University Guide 2008;
- LBS has twice been awarded the highest research rating of 5* by HEFCE and their MBA programmes are rated amongst the world's best;
- From a non-academic perspective, LBS are also considered to be key providers of talent to the financial services sector of graduates and postgraduates; and
- In addition to the above trends, it was noted, by a number of the universities, that academic rankings are very often based on the number of MBA/management related courses and research activity and not on the level/standard of financial services course provision. However, one participant indicated that they believed a financial services academic ranking was being developed.

Table 5.7 Course provision by international financial services education providers – national/ international recognition

Skills/research provider	National and international recognition
International Education Providers	The international institutions consulted were selected on the basis of being renowned providers of financial services education, training and research. For example, data compiled by 'Academic Analytics LLC' rate the Doctoral Program in Finance at NYU Stern as the number 1 programme in the US. The rankings are based on the number of book and journal articles published by each program's faculty, as well as journal citations, awards, honours, and grants received. LBS's full-time and Executive MBA programmes are counted among the world's best according to the Financial Times and Business Week business education surveys. Furthermore the School has twice been awarded the highest research rating of five star (5*) by the HEFCE. Cass Business School has also been voted 1st in London and 3rd in the UK for its undergraduate course provision (Guardian University Guide 2008). Furthermore, Wharton is ranked the best business school in the world by Financial Times in every year in which the magazine has ranked business schools, except for 2005, when it tied with Harvard. However, it was noted that rankings are very often compiled based on the number of MBA/ Management courses and the amount of research conducted within an institution and not specifically relating to the area of finance. Cass Business School noted that current rankings and league tables are calculated by provision of MBA programmes, management related courses and research activity, and not on level/ standard of financial services course provision. However they believed a ranking/league table was being developed related to financial services education provision.

5.2 International Course Development and Update

The second aspect of the international education provider profile relates to the **development and update of courses** and incorporates details of: the mechanisms used to update course materials; the level of industry involvement in determining course content; the extent of collaboration both within and across institutions; and the ability of the courses to reflect content changes on a timely basis.

Each of these elements is reviewed in the following section.

(i) Flexibility of Course/Modules

The consultations presented a number of key trends in relation to the international education provider's **flexibility to change courses and/or modules**, or introduce new courses. A summary of these key findings are presented in the bullet points below (refer to Table 5.8 for further detail and examples):

- The institutions indicated that the development and introduction of a new course typically takes 12 months. Whereas, the introduction of a new 'core module' could be introduced within four to six months with 'elective modules' generally requiring even less time;
- The US universities consulted with, cited offering a combination of compulsory/elective core modules providing students with a generic grounding in financial services. In addition, a number of specialist modules are offered allowing students to specialise in a particular area or sector;
- US universities reported keeping their courses relevant/up-to-date with the introduction of additional modules on an annual basis; and
- In terms of modifying existing courses/modules it was cited that minor and/or major changes to course content did not require formal approval from the university/Department.

Table 5.8 Course update by international financial services education providers – flexibility of course/modules

Skills/research provider	Flexibility of course/modules
International Education Providers	**Introduction of a New Course/Module** The international institutions consulted indicated that the introduction of a new course typically takes 12 months to develop and introduce. For example, Cass Business School commented that the introduction of a new course can take up to 12 months and requires the undertaking of a formal process, involving consideration of: i. The requirement for/interest in the course; ii. The aims and objectives of the course; iii. Availability of an appropriate lecturer; and iv. Identification of target students. LBS also referred to new course/module introduction involving a formal process. However, the introduction of an individual module to an existing course was reported as only requiring four to six months to develop and introduce. Furthermore, the introduction of an elective module is reportedly easier to introduce than core modules. The US universities consulted with, commented that they offer a number of generic finance undergraduate, MBA and PhD courses. This allows students to gain a generic grounding in the area of financial services through a combination of compulsory and/or elective modules. In addition, students can specialise in a particular area/sector by selecting specialist modules. The finance course is kept relevant/up-to-date through the development and introduction of additional modules on an annual basis. For example, the Finance Department in NYU Stern introduces two to three new modules annually. A number of modules in the MBA and Undergraduate Finance courses in Stern have generic titles, e.g. 'Topics in Corporate Finance', 'Topics in Investments' and 'Topics in International Finance'. This allows the 'topic' to be changed from year-to-year depending on emerging issues/ developments in financial services and new ideas for courses generated as a result. For example, under 'Topics in Investments' in the MBA Finance, seven different modules are offered, each covering a different area in Investments, including: ■ Advanced Fixed Income Analytics for Practitioners; ■ Policy Choices for Financing Retirement; ■ Derivatives Markets: Analyses and Applications; and ■ Investing in Distressed Securities. These 'Topics' are predominantly delivered by Adjunct Professors, comprising part-time lecturers who work full-time in industry. Whereas a new topic can typically take six to nine months to develop and introduce (obviously depending on the timing of the academic year), a new topic can be introduced within a matter of days, as it doesn't require formal approval from the department/university. However if a new module is introduced (e.g. course which requires a new name and a new course code), the course has to go through an administrative approval process which takes approximately one/two months. Most recently, NYU Stern introduced two hedge fund modules (quantitative methods of operating hedge funds and hedge fund management) and going forward, the Finance Department foresees a strong demand for modules in Credit Derivatives and Project Finance. **Modification of Existing Courses/Modules** It was noted by the international institutions, that minor and/or major changes to course content can be made without seeking formal approval from the university/department. For example, Cass Business School reported that modules can be 'tweaked' as necessary without formal committee approval. As explained above, NYU Stern can modify their 'Topics' modules annually to introduce an additional two to three new topics. This in a relatively quick process, with no formal approval required from the department.

(ii) Frequency of Course/Module Update

Key findings in terms of the **frequency of course and/or module update**, as cited by the leading international academic institutions consulted with, are summarised in the points below. Detailed findings can be viewed in Table 5.9.

- The leading international academic institutions consulted referred to a number of mechanisms that are adopted to ensure courses are relevant and up-to-date, namely: periodic university/department review; formal annual review; informal annual review; and continuous/on-going feedback on course content.
- Periodic university/department reviews were cited as being conducted anywhere between every four and ten years and comprise a full review of all courses and modules offered by the institution. This process provides the opportunity to appraise course content and make modifications as required. Cass Business School for example stated conducting a periodic review typically every four years which included a review of course content and performance, industry and student feedback, assessment of quality of the graduates and fulfilment of course aims and objectives.
- Formal reviews of course content were reported as occurring on an annual basis involving review of course content by a Course Board or Course Coordinator. Whereas the occurrence of informal annual reviews were found to be wholly dependent on the individual lecturer and may not be conducted on all course modules.
- Further to the structured processes referred to above, continuous feedback from students and industry on course content is also used to review modules.
- Feedback from industry and students, market trends and market developments were cited as being the key drivers of module/course change.

Table 5.9 Course update by international financial services education providers – frequency of course/module update

Skills/research provider	Frequency of course/module update
International Education Providers	**Review Processes** Across the international institutions consulted, a number of mechanisms are adopted to ensure course materials remain relevant and up-to-date. These mechanisms include: ■ periodic university/department review; ■ formal annual review; ■ informal annual review; and/or ■ continuous/on-going feedback on course content. The periodic university/department review can be conducted anywhere between every four and ten years and consists of a review of all courses/modules offered by a university. This review presents an opportunity to overhaul/re-appraise programme content and make major modifications as necessary. For example, Cass reported that they undertake a periodic programme review typically every four years. This review involves input from both academics and practitioners and includes a review of the following areas: ■ Course content; ■ Course performance; ■ Industry/student feedback; ■ Quality of graduates; and ■ Fulfilment of course aims and objectives.

Skills/research provider	Frequency of course/module update
International Education Providers cont../	In NYU Stern, a formal curriculum review of the Business School is undertaken approximately every eight to ten years. The aims of this review are to check for overlap/duplication between modules and to ensure relevance of course content. Another process referred to was the review of course content formally (typically on an annual basis), which can include a review of course content by a board or a course-coordinator. For example, in NYU Stern a course co-ordinator oversees and reviews the finance modules with multiple sections (e.g. one module with 12 classes or more). Such modules are checked for duplication in content against other finance modules. Typically, changes in course content do not happen regularly as the modules with multiple sections are 'core' finance modules, providing students with the general/basic finance skills. Furthermore, in the ICMA Centre in Reading Business School, course material is reviewed annually through a course board. Some of the international institutions consulted with also stated they also reviewed course content informally. For example, Cass undertakes an informal annual review of course content. This involves providing substantial summaries of programmes informed by consultations/meetings with staff, students and alumni. All feedback received is reviewed and used to further develop the course. However, it was commented upon that very often the occurrence of an informal annual review was dependent upon the individual lecturers and may not be conducted across all modules in a particular course. In NYU Stern and Wharton, course content may be reviewed annually by the lecturer and changes made if necessary. This however, is largely dependent on the individual lecturer and may not happen across all modules. The universities do not tend to oversee the review of individual modules too closely and trust the lecturers will deliver a course that's of a high standard. Wharton noted that they rely on the individual lecturer to ensure courses are kept relevant and up-to-date: "If you hire the right people they will amend course content when appropriate". Continuous feedback on course content was reported as also being used as a form of reviewing modules: For example, in Cass, ongoing feedback is received from students throughout the academic year. If both students and lecturers agree that an additional topic should be covered in the course, this can be incorporated without committee approval. **Drivers of Module/Course Change** All the international institutions consulted with were in agreement that the key drivers of module/course change are: ■ Feedback from industry; ■ Feedback from students; and ■ Market trends and developments. For example, Cass is introducing a module in Islamic banking which is considered to be a growing area and a module which the 'City' is "very excited about". Cass also states that it is very Important to listen to industry and react by providing the required education, training and research to meet their specific needs.

(iii) Mechanisms in Place to Ensure Industry Relevance

During consultations with the leading international academic institutions a number of key processes used for **updating courses in line with industry trends and development** were identified. A summary of these are provided in the points below with further detail presented in Table 5.10.

- The level of contact with industry in order to inform course content was found to vary across the international institutions consulted. Some of the universities interviewed were found to have significant levels of structured industry input into course design, whereas other institutions reported much lower levels.
- Contact is typically categorised as informal, through discussions and meetings with industry, and formal contact via industry involvement in the design of course content.
- One education provider indicated that keeping up with the latest trends was less important than providing students with the basic skills required to work in the industry.

Table 5.10 Course update by international financial services education providers – mechanisms for industry relevance

Skills/research provider	Mechanisms in place to ensure industry relevance
International Education Providers	International universities/colleges reported varying degrees of contact with industry in relation to informing finance course content. This contact can be categorised into: ■ Informal contact through discussions and meetings with industry; and ■ Formal contact through industry involvement in the design of course content. For example, Cass indicated that they have some informal industry involvement in the programme review process. This is typically in the form of face-to-face meetings to discuss course content and the quality of graduates produced. In addition, they reported other informal linkages with industry, for example personal contacts with industry and contacts established via consultancy work. Both of these forums help keep the Business School well informed on any market developments and emerging skills requirements. In NYU Stern, industry is formally involved in the design of course content. A number of diverse modules are delivered by the Finance Department on specialist finance topics, of which two to three are changed annually to reflect industry trends/developments. These modules are designed and delivered by Adjunct Professors (who work full-time/part-time in industry). This process is viewed as "a great way of getting industry ideas into the classroom" and provides students with "up-to-date ideas and insights into the financial services industry". In Reading University, the ICMA Centre sends course material to the ICMA Board annually (comprising industry representatives from the International Capital Markets Association) requesting their feedback on the relevance of course material/content. Wharton however, noted that they are not overly concerned with ensuring that course content reflects the latest industry trends/issues. Rather, they aim to teach students the basic skills required to work in financial services. They stated that the course curriculum had not "significantly changed over the past 20 years" with little change to the tools used and skills taught over this period.

(iv) Cross Faculty Coordination

In general, little evidence of cross faculty coordination was reported in course design and delivery during the consultations with the international education providers interviewed. Further detail and examples are provided in Table 5.111.

Table 5.11 Course update by international financial services education providers – cross faculty coordination

Skills/research provider	Cross faculty coordination
International Education Providers	In general, little evidence of cross faculty coordination was reported in course design and delivery. However some cross-faculty coordination was found to take place in Cass and LBS: Cass Business School comprises faculty members from the areas of Finance, Actuarial Science and Insurance and Management. The Finance Faculty reports higher levels of collaboration with the Actuarial staff than Management. However, they did report that lecturers are selected based on their appropriateness to deliver a module rather than the School or Faculty they belong to. LBS's faculty delivering their Masters in Finance, are drawn from the School's Finance, Accounting and Economics groups with a small number of Faculty from other departments around the school. Furthermore, finance faculty are also involved in the delivery of financial services related modules on the MBA programme. There was little evidence of cross-faculty collaboration found in the other international institutions interviewed. This is predominantly due to the fact that the business/finance departments had key responsibility for delivering finance related courses.

(v) Inter-institutional Collaboration

The key findings in terms of the level of **inter-institutional collaboration** in the design and delivery of courses are summarised in the points below (refer to Table 5.12 for a detailed analysis).

- Significant levels of global inter-institutional collaboration were reported across the leading international academic institutions consulted.
- Inter-institutional collaboration was reported as taking the form of student exchange programmes and provision of modules.
- A number of courses were reported as being jointly delivered by universities/colleges.

Table 5.12 Course update by international financial services education providers – inter-institutional collaboration

Skills/research provider	Inter-institutional collaboration
International Education Providers	Of the universities/colleges interviewed, a number of courses are jointly delivered with other international universities, a selection of which include: ■ Collaboration between Cass Business School and Olin Business School; ■ MSc in Global Finance jointly delivered between HKUST Business School in Hong Kong and Stern Business School; ■ TRIUM MBA Degree jointly delivered between London School of Economics, Stern Business School and HEC School of Management, Paris; and ■ Joint EMBA Global programme between LBS and Columbia Business School. Further detail on these courses are as follows: Cass Business School has an inter-institutional relationship with Olin Business School, St. Louis. This collaboration involves undergraduate students from Olin completing an internship with a London based financial services company. During this time they also complete a number of academic modules which are delivered by Cass. Although not happening at present, the opportunity exists for students in Cass to do the same in St. Louis. The MSC in Global Finance is a joint alliance between the Hong Kong University of Science and Technology's Business School (HKUST) and NYU Stern. During this 1 year, part-time program, classes are primarily held in Hong Kong with a two-week intensive learning module in New York. The TRIUM MBA Degree is an alliance of three universities – NYU Stern, London School of Economics and Political Science, and HEC School of Management, Paris. Six intensive educational modules are delivered in five international locations which require 10 weeks of out-of-office time over a 16-month period. Two modules each are held in NYU, LSE and HEC Paris, as well as two other international locations which are chosen annually for their relevance to current global business issues. LBS has developed strong partnerships with Columbia Business School (joint MBA programme), the Indian School of Business Hyderabad and the China Europe International Business School (CEIBS). They also have over 30 top business schools in their international exchange programme. LBS also have a sister research centre based in Singapore Management University which is aligned to the BNP Paribas Hedge Fund Centre in the UK. The ICMA Centre in the University of Reading does not deliver any courses jointly with another universities at present.

5.3 Research Activity

Table 5.13 provides an overview of: the number of faculty members involved in finance research; the number of financial services research centres; and the nature/focus of the research undertaken in each of the leading international academic institutions consulted with.

Following on from Table 5.13, a detailed description of the financial services **research activity** is presented under the following six headings:

(i) Drivers of research activity;

(ii) R&D funding;

(iii) Level and nature of research activity;

(iv) Financial services research centres;

(v) Linking research to course content; and

(vi) Linking research to industry.

Table 5.13 Summary of research activity in the international institutions interviewed

College	Number of full-time academics involved in finance research	Research centres	
		Centre	Research focus/Research themes
New York University [Stern]	45	Salomon Centre	The Centre is involved in seven research initiatives, each directed by a Stern School of Business professor: ■ Asset Management; ■ Corporate Governance; ■ Credit and Debt Markets; ■ NASDAQ DRP; ■ Financial Econometrics; ■ Financial Institutions; and ■ Macro Finance.
University of Pennsylvania* [Wharton]	40	Financial Institutions Centre	Focus on technology, regulatory changes and globalisation.
		Weiss Centre for International Financial Services Research	World's first research centre devoted exclusively to an understanding of international finance. It sponsors research on markets, financial instruments and global economies.
		Rodney L. White Centre for Financial Research	The White Centre has established itself as a source of information on the financial community.
London Business School	23	Private Equity Institute	The Institute's research activity focuses on the areas of economic history, econometrics, accounting, finance, evolutionary economics, organisational behaviour, sociology and psychology.
		BNP Paribas Hedge Fund Centre	Quantitative modelling of Hedge Fund Strategies.
		Centre for Corporate Governance	Focuses on the emerging issues surrounding the rise of alternative investors in the fields of Private Equity and Hedge Funds and their value creation strategies.

City University London [Cass]	53	Alternative Investments Research Centre (AIRC)	AIRC aims to generate practical answers to practical questions concerning alternative investments and their role in investment portfolios. It acts as a clearing house for data and research ideas between academia and industry. The AIRC builds and maintains databases for the various types of alternative investments and allows its associate researchers to access this data for qualifying research projects.
		Centre of Econometric Analysis	The centre promotes and supports research activities in the field of: ■ Econometrics (methodological and applied, macro and micro); ■ Financial econometrics and other quantitative methods used in finance; and ■ Theoretical and empirical research in financial markets and corporate finance.
		Centre for Research on European Financial Markets and Institutions	The objectives of the centre are to: ■ Analyse the efficiency, safety and global competitiveness of Europe's financial services industry and the sustainability of the UK's leading position in many aspects of financial services; and ■ Provide a platform for discussion for the strategic and public policy issues affecting the European financial sector. Research conducted is organised under the three themes of: ■ Technology, innovation and competition; ■ Law and regulation; and ■ European and global financial integration.
		Emerging Markets Group	The objectives of this group are to: ■ Establish a forum for academic research on foreign exchange and financial markets with particular reference to emerging economies; ■ Serve as a centre for exchanging information; ■ Provide a home for research students interested in international capital markets; and ■ Organise and contribute to seminars, conferences and symposia nationally and internationally.
		Pensions Institute	Research is undertaken in the fields of: ■ Pension micro-economics; ■ Pension fund management and performance; ■ Pension funding and valuation; ■ Pension law and regulation; ■ Pension accounting, taxation and administration; ■ Marketing of private sector pension schemes; ■ Macro-economics or pensions; and ■ Public policy.

		Private Equity and Venture Capital Research Centre	The centre conducts research to investigate the structure, functioning and performance of private equity firms and their investee companies, especially (but not exclusively) within the European community. All aspects of private equity investment are studied from business angles and seed capital to buyouts and restructuring investments.
		Research Centre for Real Estate Finance	Recent research of the centre has examined issues ranging across: ■ Housing economics and policy; ■ Real estate investment and portfolio management; and ■ Real estate securities and econometric modelling and forecasting.
		Actuarial Research Centre	Research areas of the centre include: ■ Health and care; ■ Life insurance; ■ Mortality; ■ Non-life insurance; and ■ Pensions.
		Centre for Financial Regulation and Crime (CFRC)	The CFRC aims to develop and deliver a gold standard for teaching and research in all aspects of the fight against financial crime, including prevention, detection, investigation and management. The centre will covers the following areas: ■ A forum where law enforcers, regulators and city professionals can come together to combine their shared expertise; ■ Executive MBA or Diploma in financial regulation and crime; and ■ Independent research. ■ It also offers a Diploma in anti-money laundering and MSc in Financial Crime and Compliance to professionals within financial services.
		Risk Institute	The centres main areas of expertise are: ■ Operational and system risk; ■ Risks faced by financial institutions e.g. market exposure, corporate restructuring, investment portfolio management, capital/bond and currency markets; and ■ Risks faced by populations and individuals e.g. fluctuating financial markets, pensions, life insurance and related financial and insurance products.
University of Reading [ICMA Centre]	12-15	International Capital Markets Association	Research at the ICMA Centre focuses on: ■ Quantitative finance; ■ Market microstructure; ■ Fund management; ■ Risk management; and ■ Regulation.

** Research Centres in Wharton are predominantly responsible for organising and hosting conferences rather than undertaking and organising research activity.*

(i) Drivers of Research Activity

Feedback from the consultations identified a number of **key drivers of research activity**. A summary of these drivers is presented in the bullet points below. Further detail can be found in Table 5.14.

- There was a consensus amongst the international academic institutions consulted in relation to the key drivers of research activity, namely: personal faculty interests; industry interests and response to industry developments/issues.
- However, the overarching driver of research activity was considered to be the relevance of the research undertaken to the financial services industry.

Table 5.14 Research activity by the international financial services education providers – drivers of research activity

Skills/research provider	Drivers of research activity
International Education Providers	The universities/colleges consulted with were in agreement in relation to what they considered to be the key drivers of research activity. The areas stated were: ■ Personal interests; ■ Industry interests; and ■ Industry developments/issues. The universities/colleges commented that research topics can be determined by individual faculty members personal interests. For example in Wharton, research is predominantly driven by individual faculty members. Finance related research in NYU Stern can also be driven by individual faculty member's interests, although not to the same extent as Wharton. Finance research can also be driven by industry research interests. For example, NYU Stern noted that industry approach the Finance Department approximately three times a year to undertake specific research projects. Finally, important industry trends/issues were considered to drive finance research activity across the universities/colleges consulted with as part of this study For example, in NYU Stern and Wharton, this is facilitated by frequent discussions with industry via research seminars. Conferences and workshops were also found to highlight areas of interest to industry – this can in turn influence the type/area of research undertaken by Faculty. However, regardless of what drives financial services research activity, all universities/colleges consulted, were of the opinion that the main importance of research is its high level of industry relevance.

(ii) R&D Funding

Based on the output of the consultations with the leading academic institutions, **funding for financial services research and development** is provided from a range of sources including:

- The university itself;
- Industry;
- Government/state bodies (e.g. National Science Foundation);
- Not-for-profit organisations (e.g. Ford and Rockefeller Foundations);
- Student fees from the delivery of executive and postgraduate courses; and
- Subscription fees to financial services databases.

Further detail and examples are provided in Table 5.15.

Table 5.15 Research activity by the international financial services education providers – R&D funding

Skills/research provider	R&D funding
International Education Providers	Sources of funding varied across the international universities/colleges reviewed, and typically includes funding from: ■ University; ■ Industry; ■ Government/State Body; and ■ Not-for-profit organisations. For example, the primary source of R&D funding in Wharton was cited as internal university funding, which is covered by student tuition fees and executive education courses. It was reported that they don't receive any funding from industry for research. In the Finance Department in NYU Stern however, sources of R&D funding include a mixture of university, government grants (National Science Foundation), funding allocations from Not-for-Profit organisations (Ford Foundation and Rockefeller Foundation) and industry funding. The industry funding is predominantly obtained through their primary research Centre, the 'Salomon Centre'. However, in addition, the department receives funding from the university as well as the other sources of external funding. The ICMA Centre in Reading University is funded through a mixture of self-financing (through the delivery of executive education and postgraduate courses), sponsorship from industry and various grants. Subscriptions to financial services databases are purchased annually by the university, some of which is sponsored by industry. The BNP Paribas Hedge Fund Centre in LBS is funded by BNP Paribas (a large six digit sum over a 3 year term). The contract does not determine the research undertaken but allows the Centre total academic independence. In addition, BNP Paribas is a source of non-financial support and advice to the Centre. LBS also reported individual sponsorship of students from other sources including government/ not-for-profit organisation grants and industry funding for specific research projects.

(iii) Level and Nature of Research Activity

A summary of the **level and nature of research** undertaken by the leading international academic institutions consulted is presented in the bullet points below. Further detail and specific examples can be found in Table 5.16 and 5.17.

- The international institutions consulted have between 12 and 53 faculty members who are involved in undertaking financial services research.
- Specific research areas were found to vary across the universities interviewed. However, a number of broad research themes emerged, including: financial markets; private equity research; econometric and quantitative techniques/financial modelling; public policy; and globalisation.
- Thereafter, the universities interviewed conducted research on a range of specific finance areas including: pensions/life insurance; real estates; fund management, in particular alternative and hedge fund markets; risk and compliance; and technology.

Table 5.16 Research activity by the international financial services education providers – level/nature of research activity

Skills/research provider	Level and nature of research activity
International Education Providers	Table 4.42 (summary of research activity in the international institutions interviewed) provides an overview of the level and nature of financial services research activity in each of the international universities interviewed. The international institutions consulted have between 12 and 53 faculty members who are involved in undertaking financial services research. Cass has the largest number of academic staff with 53 full-time faculty members, significantly more than that of Reading with 12-15 finance faculty involved in research. All remaining universities have between 23 and 45 faculty members involved in finance research. Specific research areas were found to vary across the universities interviewed. However, based on a review of the financial services research activities of the universities interviewed, a number of broad research themes emerged, including: i. Financial markets (e.g. credit and debt markets, NASDAQ [NYU]; financial markets, fluctuating financial markets [Cass]); ii. Private equity research (e.g. Cass); iii. Econometric and quantitative techniques/financial modelling (e.g. econometric modelling and forecasting [Cass]; quantitative modelling of hedge fund strategies [LBS]; financial econometrics [NYU]); iv. Public policy (e.g. health and care, public policy, public policy issues affecting Europe [Cass]); and v. Globalisation (e.g. globalisation, global economics [Wharton]). Thereafter, the universities interviewed conducted research on a range of specific finance areas including: i. Pensions/life insurance (e.g. pension micro-economics, pension fund-management; pension funding and valuation, life insurance; mortality [Cass]); ii. Real estates (e.g. real estate investment and portfolio management, real estate securities [Cass]); iii. Fund management, in particular alternative and hedge fund markets (e.g. quantitative modelling of hedge fund strategies [LBS]; alternative investments [Cass]); iv. Risk and compliance (e.g. law and regulation [Cass]; regulatory changes [Wharton]); and v. Technology (e.g. Wharton; Cass).

(iv) Financial Services Research Centres

The prevalence of **dedicated research centres** within the leading international academic institutions consulted is summarised below (please refer to Table 5.17 for additional detail and examples).

- All of the international universities/colleges consulted with reported a minimum of one dedicated financial services research centre focusing on a particular area within financial services e.g. Salomon centre in NYU Stern and Wharton (i.e. Financial Institutions Centre, the Weiss Centre and Rodney White centres), and LBS BNP Paribas Hedge Fund Centre.
- It was found that the nature and level of research conducted within the individual research centres varied across the institutions.
- Within Stern however the main purpose of the Salomon research centre was reported as being the organisation of conferences and dissemination of research findings rather that conducting the actual research.

Table 5.17 Research activity by the international financial services education providers – research centres

Skills/research provider	Financial services research centres
International Education Providers	Each of the international Universities/Colleges interviewed has one or more dedicated financial services research centre, however the level of research driven and conducted through these centres varies. For example, the 'Salomon Centre' in NYU Stern is the principal driver of financial services related research. It consists of seven research areas/themes and is the means through which finance seminars and periodic conferences are organised. In addition the ICMA Centre is the main driver of finance research in the University of Reading. Wharton has three dedicated finance centres, namely: ■ Financial Institutions Centre; ■ Weiss Centre for International Financial Services Research; and ■ Rodney L. White Centre for Financial Research. In contrast to NYU Stern, Wharton's centres do not play a central role in finance research activity in the University; rather their role is limited to organising conferences and the dissemination of research. Research is not initiated or driven by these Centres, instead research is driven by in the individual faculty members personal research interests. Research in Cass Business School is predominantly driven through their 10 research centres, clustered under the main areas of Finance, Management, Actuarial Science and Insurance. Research is conducted in several areas including: Hedge Funds; Econometrics; Emerging Markets; and Mathematical Finance. LBS has a number of research institutes and research centres. Those specifically related to financial services include: ■ The Centre for Corporate Governance; ■ Private Equity Institute; and ■ The BNP Paribas Hedge Fund Centre. The research initiatives undertaken in these Centres/Institutes are very much driven by the individual faculty members.

(v) Linking Research to Course Content

In terms of **linking research back into course content** the following points were highlighted.

- It would appear that research findings are fed back into course content within the international institutions consulted.
- The extent and timeliness of research findings being fed back into course content was found to be dependent on individual lecturers.
- LBS's Private Equity Institute feedback their research findings to their students via regular conferences, seminars and workshops.
- It is more likely that research findings will feed back at postgraduate levels rather than undergraduate level due to the very often-complex nature of the research.

Table 5.18 Research activity by the international financial services education providers – linking research to courses

Skills/research provider	Linking research to course content
International Education Providers	Each of the international universities/colleges interviewed reported that research is eventually fed back to students, however this is more frequent at a postgraduate level, and depends on the individual lecturer. For example, NYU Stern reported that research findings filter their way back to the classroom eventually, however, the frequency and speed of sharing research depends on the individual lecturer. In addition, this happens more frequently at PhD level, rather than MBS and undergraduate, as those students form part of the human capital that undertake the research initially (e.g. through a role as a research assistant, analysing data, etc). LBS reported that findings from research initiatives of the various Centres/Institutes are fed back into course content. In particular the Private Equity Institute ensures transfer of the knowledge back to students via regular conferences, seminars and workshops. In addition, Wharton noted that research can be incorporated into course content, however this depends on the individual lecturer and it is difficult to generalise for the whole University.

(vi) Linking Research to Industry

Summary findings of the consultations with the leading international academic institutions in relation to the extent to which **research findings are linked back into industry** are presented in the bullet points below. A detailed review of findings and specific examples can be found in Table 5.19.

- Each of the international academic institutions consulted with reported some level of linking research findings back to industry.
- The manner in which research findings are linked back can be categorised as formal and informal via a number of different methods including conferences, industry workshops/seminars and research centres.
- The frequency of research being fed back to industry was found to range from weekly research seminars to annual conferences.
- Furthermore, research was cited as feeding back to industry via industry sponsorship of research and research centres.
- The consultees indicated that research findings were fed back to industry on a more formal basis, in some instances, particularly when the research Centre was sponsored by industry.

Table 5.19 Research activity by the international financial services education providers – linking research to industry

Skills/research provider	Linking research to industry
International Education Providers	Based on the international institutions interviewed, financial services related research is fed back to industry both formally and informally, via a number of methods, including: ■ Conferences; ■ Research seminars; ■ Industry workshops/seminars; ■ Industry sponsorship of research/research centres; and ■ Other informal linkages with industry. Both Wharton and NYU Stern cited conferences as an effective way to share and discuss research with industry. For example, through the 'Salomon Research Centre' in the Finance Department in NYU Stern, six or seven conferences are organised annually, each addressing a particular finance area/issue. In May 2007, the conference addressed 'Derivatives 2007: New Ideas, New Instruments, New Markets' and was sponsored by International Securities Exchange and The NASDAQ Stock Market. Approximately 300 people, both academic and industry, attend the conferences. These conferences typically comprise a series of lectures given by representatives from industry, regulatory bodies and academia. Similar to how research findings are fed back to students LBS's research Centres/Institutes report involving industry practitioners by inviting them to their various conferences, seminars and workshops where research findings are presented and discussed. In addition, the three finance Research Centres in Wharton (further detail on research centres in part (iv) of this section) are responsible for organising several conferences annually. Recent conferences were centred around the following topics: ■ Model Governance and Model Validation; ■ Corporate Finance of Financial Intermediaries; ■ Innovation and Risk Management in Real Estate Markets; and ■ Financial Risk Management in Practice: The Known, the Unknown and the Unknowable.

Skills/research provider	Linking research to industry
International Education Providers cont../	In addition, at Wharton, NYU Stern and Reading up to four Research Seminars are held weekly, to which industry are invited. In the finance department in Wharton, four research seminars are conducted per week, of which two are industry-academic focused seminars. During the industry seminars, one to two academics (from Wharton and from another University, e.g. NYU, MIT, Harvard, Rochester, University of Chicago, etc) deliver presentations on a specific research topic, which is followed by a discussion between industry and academia. Such seminars are considered to be the "centre of research activity" and a "great way to learn what industry is interested in and what they are doing". Similarly, the finance department in NYU Stern hold three research seminars per week, 28 weeks a year, which can be attended by industry representatives. Recent seminar topics include: ■ Inflation and the Price of Real Assets; ■ Financially Constrained Arbitrage and Cross-Market Contagion; ■ The Economics of Private Equity Funds; ■ Environmental Risk Insurance under Dynamic Moral Hazard; and ■ Phase-Locking and Switching Volatility in Hedge Funds. In the ICMA Centre in Reading, one research seminar is held weekly, comprising approximately 30 people, of which a third consist of industry representatives. Lectures are delivered by both Reading researchers and researchers from other universities. Topics vary from week to week – recent topics included: ■ Does valuation method choice affect target price accuracy; ■ Mutual fund performance: skill or luck; and ■ Searching for a metric. In terms of Industry Workshops/Seminars, industry hold workshops for academia from time-to-time: For example, in 2007 Lehmann Brothers in the US established a programme for academic staff in US Universities. This programme consists of a series of lectures delivered by researchers/experts in Lehmann Brothers which address a range of issues/research developments – academic staff can pick and choose to attend the lectures which are most relevant to them. Wharton described this programme to be: ■ An effective means of sharing and discussing research with industry; ■ A way of informing faculty members of the skills required of their students once they enter the workforce; and ■ A means of giving faculty members ideas of potential research topics, which are relevant to industry. Through industry sponsorship of research/research centres, research findings can be fed back to industry. For example, in the Salomon Centre in NYU Stern, a number of leading financial services companies donate $10,000-$15,000 annually for research, which in turn provides them with advanced access to research findings and free copies of all publications and working papers from the centre. Cass also report holding seminars/workshops which industry attend to 'consume' the findings of research projects.

5.4 International Industry Linkages/Collaboration

To identify the linkages the leading international academic institutions have established with industry feedback was gathered in the areas of: industry design of course content; industry delivery of course content; internships/work placements; joint research programmes with industry; funding from industry; and other evidence of industry participation. Feedback gathered under each of these headings is presented in the following sections.

(i) Design of Course Content

Consultation with the leading international academic institutions highlighted the following points in relation to **industry's involvement in the design of course content** (please refer to Table 5.20 for detailed findings and examples):

- Industry involvement in the design of course content can be categorised as being formal or informal in nature;
- Contacts developed with industry through research, work placements, alumni, personal industry contacts, can informally feed into the design of course content in the international education providers interviewed; and
- Some evidence of the formal design of course content by industry was also found in the international education providers interviewed. For example, Adjunct Professors in NYU Stern design and deliver several modules annually.

Table 5.20 Industry linkages for international financial services education providers – design of course content

Skills/research provider	Design of course content
International Education Providers	There was some evidence of industry involvement in the design of finance course content found in the international universities/colleges interviewed. Contacts developed with industry through research, work placements, alumni, personal industry contacts, can informally feed into the design of course content in the international education providers interviewed. This is typically driven by the individual lecturer however. There was some evidence found of the formal design of course content by industry. For example, in the Finance Department in NYU Stern, Adjunct Professors (from industry) who formally deliver some of the modules/programmes also design the content of that module. This is usually in conjunction with another full-time academic staff to ensure no duplication of other modules and an appropriate level of academic reference is included in the module. In the ICMA Centre in Reading, a representative board from the International Capital Markets Association reviews course content annually, offering feedback and suggestions on future course material. There were no reported instances of industry being involved in the design of course/module material within LBS. However, as their staff includes ex-practitioners from industry this helps ensure the relevance of course/module content.

(ii) Delivery of Course Content

In relation to industry's involvement in the **delivery of course content** the key findings are summarised in the bullet points below. Further detail and specific examples from the leading international academic institutions consulted is presented in Table 5.21.

- The use of industry representatives to deliver course content was found to be commonplace across all international academic institutions consulted with. Wharton referred to their Finance Department inviting guest lecturers from industry to speak and NYU Stern reported having 45 Adjunct Professors, the majority of which are from industry (i.e. MD within Citigroup Global Finance Strategy Group and MD within UBS Global Media Equity Research Team), who assist in the delivery of course content. In some cases Adjunct Professors can be responsible for the delivery of full modules;
- It was reported that very often it is industry who contact the academic institutions to suggest the introduction and delivery of a new course or module;
- It was also reported that on occasion industry approach academia with suggestions for a new module/course, offering their services to assist with the delivery of the module/course; and
- Cass Business School cited the benefits of using guest lecturers/adjunct lectures as providing a market angle and complimenting the academic delivered content.

Table 5.21 Industry linkages for international financial services education providers – delivery of course content

Skills/research provider	Delivery of course content
International Education Providers	Each of the international institutions interviewed use industry to deliver course content – this can range from the use of occasional guest lecturers, to formally using Adjunct Professors from industry to deliver entire modules/programmes. For example, in Wharton Business School, the Finance Department invites industry representatives as guest lecturers to speak regularly throughout the year. They note this is an excellent way for students to "see theory put into practice". The Finance Department in NYU Stern has 45 Adjunct Professors, of which the majority are from industry, who deliver modules/programmes in Finance. These modules are typically one of the 'generic' courses, including Topics in Corporate Finance, Investments and/or International Finance. Many of the Adjunct Professors hold Senior Positions within their respective companies, for example: ■ Eric Lindenburg (Managing Director, Global Financial Strategy Group, Investment Banking Division at Citigroup Global Markets) delivers a module under 'Topics in Corporate Finance' called Energy Markets and Instruments; and ■ Christopher Dixon (Managing Director of the Global Media Equity Research team at UBS) teaches Financial Analysis in Media and Entertainment. Rather than the university approaching industry for Adjunct Professors to deliver a new module, an existing Adjunct professor or someone from industry may approach the finance school with suggestions for a new module/course. Cass also report than industry representatives are selected to conduct certain aspects of the elective modules offered on their MSc programmes. "They provide the market angle/practice side which nicely compliments the academic delivered content." Guest lecturers are also incorporated into class delivery in the ICMA Centre in Reading. Guest lecturers can deliver a short series of lectures on specialised topics, provide one-off lectures or teach on their executive courses. Furthermore, the Finance Faculty within LBS comprises ex-practitioners from industry. This allows taught material to be related to the practical experiences of these faculty members.

(iii) Internships/Work Placements

The following bullet points provide a summary of the key findings in relation to the use of **work placements/internships** amongst the leading international academic institutions consulted (refer to Table 5.22 for a detailed review and examples).

- The use of work placements/internships was found to vary across the international institutions consulted. For example Stern does not include internships in their undergraduate and PhD programmes whereas both Wharton and Cass offer internships with finance companies, investment banks and fund management companies.
- The use of work placements/internships is typically more prevalent in undergraduate courses however there was some evidence of linked research projects with industry at MSc level.
- Cass and Wharton also stated that work placements/internships typically result in the offer of permanent employment upon graduation.
- There are also examples of some of the institutions consulted with e.g. ICMA Centre and LBS providing trading room/hedge fund simulators as part of their course offering to students. This facility is also offered for industry training.

Table 5.22 Industry linkages for international financial services education providers – internships/ work placements

Skills/research provider	Internship/Work placements
International Education Providers	The use of work placements is mixed across the universities interviewed. For example, NYU Stern does not include internships in the undergraduate, MBA or PhD Finance programme. However as part of the Finance MBA and undergraduate in Wharton, students complete summer internships, the majority of which are with finance companies in New York. Frequently, internships lead to offers of regular positions. In Cass Business School, 3rd year students of their undergraduate courses complete an internship. Typically this is conducted with an investment bank or fund management company. Students in the past have also completed internships with American Express. It is estimated that 70 percent of students who conduct an internship will be offered employment on graduating. Cass MSc students, as part of their course, conduct a project with industry on a topic chosen by the individual company. However, the length on the MSc courses (one year) does not allow for the inclusion of a work placement or internship. Although some of the international institutes don't include work placements, simulated training can be included to provide students with 'on the job' training. For example, the ICMA Centre opened a 20 terminal dealing room in 1994. In 1998, a further two dealing rooms opened with 30 Reuters equipped workstations and 30 workstations with software similar to that found in investment banks. In 2007, the terminals in each room have been upgraded with Reuters' latest products – one with Reuters 3000Xtra, the other with the new Reuters Trader product, (a web-based product students will be able to access from any workstation in the Centre). The ICMA Centre will soon be the largest, non-investment bank, Reuters populated facility in the world when a further 50 workstation flagship dealing room. It will be equipped with a combination of 3000 Xtra, Reuters Trader and Reuters Wealth Manager. Due to be completed in October 2008, the facility will have a total of 112 workstations, which is comparable to a medium sized investment bank's dealing floor. LBS's BNP Paribas Hedge Fund Centre has a 'Simulator for Hedge Fund Business'. This allows teams (both students and industry) to manage Hedge Funds as a business i.e. decide where to invest and how the money is spent.

(iv) Joint Research Programmes

The bullet points below provide a summary of the key points highlighted from the international institution consultations in relation to **joint research programmes** between industry and academia. A detailed review and specific examples supporting these points can be found in Table 5.23.

- There is some evidence of joint research programmes. For example, Stern stated that they are frequently approached by industry requesting them to undertake specific pieces of research, whereas, the ICMA Centre conducted research for following a successful outcome to a competitive tendering process.
- Research programmes are regularly funded by industry, seeking research on specific topics. This can take the form of either direct contact from industry or response to a competitive tendering process.
- More frequently than not, industry will fund research projects as opposed to have any direct involvement in the research itself.

Table 5.23 Industry linkages for international financial services education providers – joint research programmes

Skills/research provider	Joint research programmes
International Education Providers	There was some evidence of joint research programmes across the universities/colleges consulted with. This typically takes the form of funding from industry for specific research initiatives. For example, the Finance Department in NYU Stern, reported that industry approach them two to three times a year requesting them to undertake a specific piece of research – funding is provided by industry to undertake such research. The ICMA Centre in Reading commented that specific pieces of research are often undertaken on behalf of industry. These projects are typically obtained through competitive tendering for the research, with industry funding the entire project. The Centre regularly have to turn down research from industry due to a lack of capacity. LBS reported joint research initiatives with industry an example of which is the BNP Paribas Hedge Fund Centre's collaboration with JP Morgan. In addition to this they also cited that individual students very often receive sponsorship from industry to undertake specific research projects. In addition, studies which require interviews with industry executives (e.g. survey of Financial Services CEOs) are often conducted in conjunction with, or have support from, an organisation. This gives the study an added credibility when approaching industry to arrange interviews. There was some evidence of joint research initiatives being conducted between Cass and industry in particular in the area of 'Alternative Investments'. However it was stated that in the majority of instances research is academically focused and industry's role is as a 'consumer 'rather than having direct involvement in conducting/Initiating the research.

(v) Funding from Industry

The key findings in relation to the extent to which the leading international institutions consulted receive **funding from industry** is reported in the points below (refer to Table 5.24 for further detail and specific examples).

- The level of industry funding was found to vary across the international institutions consulted.
- Types of funding were reported as including: individual project funding; and funding for facilities and infrastructure e.g. the International Capital Markets Association provided the University of Reading with funding for the development of the ICMA Centre.
- In addition to these funding sources, NYU Stern also commented that the Institutional Brokers Estimates System in the US provides many universities with their data for free.
- Furthermore industry was reported as providing funding for projects and conferences undertaken by individual research centres. For example NYU Stern's Salomon Centre is funded in part by corporate associates which includes Morgan Stanley, PricewaterhouseCoopers, the New York Stock Exchange, Reuters, Deutsche Bank and State Street.

Table 5.24 Industry linkages for international financial services education providers – funding from industry

Skills/research provider	Funding from industry
International Education Providers	The level of funding received from industry varies across the international institutes interviewed. It typically consists of: ■ Industry funding for individual research projects; ■ Provision/access to data for research; ■ Industry funding for research centres; and ■ Funding for facilities/infrastructure. Across the institutions interviewed, some level of funding is received from industry for individual research projects. For example, Stern receives requests from industry to conduct research on a particular topic/area approximately three/four times a year. LBS reported a specific research projected undertaken on behalf of, and funded by, JP Morgan in the area of 'Investible Indexes'. In addition, industry can provide universities/colleges with access to data if they research the company or an area the company is interested in. For example, the Finance Department in NYU Stern noted that the 'Institutional Brokers Estimates System' in the USA has provided many Universities with their data for free, as the company itself benefits from the research undertaken on their data – to date some 10,000 papers are available which refer to the source data from this system. There is also evidence of industry providing universities/colleges with funding for dedicated finance research centres. For example, in NYU Stern, the research centre in the Finance Department, the 'Salomon Centre', has created a structure of Corporate Associates through which a number of U.S. and international financial institutions, institutional investors, securities exchanges, and corporations support its activities.

Skills/research provider	Funding from industry
International Education Providers cont../	Each Associate commits a limited amount of funds over a renewable five-year period (typically $10,000-$15,000 per annum), which underwrites faculty research and conferences conducted by the Centre. The spending of such funding is unrestricted and can been spent on research as the Centre sees appropriate. In return, industry receives: ■ Advance access to research findings; ■ Invitation and attendance without charge to all Centre conferences and workshops; ■ Reduced cost attendance of executive programs in the Frontiers in Finance Series; and ■ Copies of all Centre publications and working papers. There are approximately 30 Corporate Associates at present, including: Morgan Stanley; HSBC, PricewaterhouseCoopers, New York Stock Exchange; Reuters; Deutsche Bank; and State Street. LBS's BNP Paribas Hedge Fund Centre is funded solely by BNP Paribas. The level of funding provided is €1 million over a three year period. In addition to the financial funding they also receive business group level support from the company. This funding covers the academic programme and visiting researcher programmes undertaken within the Centre. There were also reports of industry funding for college facilities/infrastructure. For example, the 'International Capital Markets Association' gave the University of Reading 3m to construct and establish the ICMA Centre in 1995. The Centre was sponsored a further $5m from the ICMA in 2006 for an extension to the existing Centre, which is currently under construction and due for completion in October 2008. The new facilities will include a 50 seat flag dealing room; 150-seat lecture theatre; and a PhD study area.

(vi) Other Industry Linkages/Collaboration

Consultations with the international financial services education providers identified a number of **further linkages** with industry, with supporting details and specific examples presented in Table 5.25, including:

- Sponsorship of competitions;
- Consulting work; and
- An ex-practitioner faculty.

Table 5.25 Industry linkages for international financial services education providers – other linkages/collaboration

Skills/research provider	Other industry linkages/collaboration
International Education Providers	Other forms of industry linkages cited include: i. Sponsorship of competitions: Lehmann Brothers sponsor a competition for the best PhD thesis in the USA. A selection of students with the best theses are invited to New York to present to an industry panel. This also benefits Lehmann Brothers who are presented with some of the latest finance related research being undertaken. ii. Consulting Work: In Wharton and NYU Stern, staff members are often used as external consultants to the finance industry, e.g. hired to work on a specific issue, analyse data, etc. iii. Faculty members may also have come from industry. For example, the new Dean of Cass is an ex-practitioner. In addition, the head of the ICMA Centre in Reading and the Academic in charge of the dealing room both worked as traders previously.

5.5 Summary of International Financial Services Skills and Research Providers

- The **provision of financial services education and training** offered by the international institutions interviewed is quite diverse, ranging from "broad" to "dedicated" courses. The vast majority however, are "dedicated" finance courses covering areas such as finance, insurance, risk management, banking, quantitative finance and actuary. The number of courses dedicated to specific financial services sectors (e.g. insurance, banking and capital markets and/or investment management) is relatively high (circa 44 percent). Importantly, the remaining "dedicated" finance courses also provide substantial potential for sector specialisation through a combination of modules/electives. It should be recognised that this is partly due to a function of scale, as the US and UK have a larger and more diverse economy, a larger population and a leading finance sectors that can support a more varied/in-depth course provision, than perhaps Ireland could.

- **Introduction of new course** typically takes between 12 and 18 months, requiring a formal approval process (internal and/or external), whereas the introduction of an individual module is substantially quicker requiring a two to nine month time period. Minor changes to modules can happen on an ongoing basis without formal approval.

- Several processes are used by the international institutions to **review course content** including: periodic university/department reviews; formal annual reviews; informal annual reviews (largely dependent on individual lecturer); and continuous/on-going feedback (including feedback from students and industry).

- **Mechanisms to ensure courses remain up-to-date** with industry developments include: structured industry involvement in course review, design and delivery through industry panels and the design and delivery of finance modules by adjunct professors and ongoing fostering of informal industry linkages through personal contacts and meetings with industry. Industry input from leading financial services companies was typically recognised as being vital to ensuring graduates enter the workforce with the latest industry requirements.

- There is a strong emphasis on **financial services research** across the international academic institutions interviewed. The key drivers of research activity included personal interests of the academics; industry interests (e.g. industry approaching academia to undertake specific research projects); and industry developments and issues (e.g. specific finance research Centres and research seminars/conferences). Research activity was found to be funded by a combination of sources including: the university themselves; industry; government; and not-for-profit organisations (e.g. Ford Foundation in US, Welcome Trust in UK).

- Each of the international institutions host at least one research centre; however functions of these centres vary. The principle role of these centres is undertaking research activity, although some focus on organising conferences and seminars around thought leadership and research findings. International academic institutions indicated that research findings are regularly fed back to students, however, this occurs more frequently at postgraduate level and depends on the individual lecturer. Research findings are fed back to industry via a number of methods including: academic/industry conferences; academic research seminars which are attended by industry; industry workshops/seminars; and industry sponsorship of research/research centres.

- **Industry linkages** in the international institutes, both in terms of design, delivery and course development or update, are well-developed, with evidence of structured industry input through mechanisms such as those described above, in addition to the regular use of guest lecturers. The prevalence of work-placements/internships with industry was found to vary across the international institutions, ranging from none at all to limited to undergraduate/MBA courses only. There is significant evidence that the international academic institutions consulted with received funding/support from industry for research initiatives, taking the form of: funding for research centres; joint-research programmes; student sponsorship; and the provision of/access to data.

5.6 Irish and International Skills and Research Providers – Gap Analysis

Table 5.26 summarises the key findings of Part A and B by presenting the relative "gap" between the education, training and research offered by the Irish education and training providers interviewed and the offerings of a small number of leading international education and training providers. Following the framework used to review financial services education, training and research, the table is presented under the headings of:

i. Course provision;

ii. Course development and update;

iii. Research activity; and

iv. Industry linkages/collaboration

In summary, the comparison of Irish and international providers highlights a number of areas in which Ireland could develop its approach to financial services education and training provision.

1. The provision of financial services education and training is quite diverse in both the Irish and international institutions interviewed, ranging from "broad" to "dedicated" financial services courses, however a greater proportion of courses are "broad" in nature in Ireland. Furthermore, course provision in the US and UK appears to have a higher level of sector specialisation (through specialised courses and/or choosing modules in a specific area) than their Irish counterparts. This can partly be recognised as a function of scale, as the US and UK, with a larger population and leading finance industries, can support a more varied and in-depth course scope. Despite this, there are some lessons to learn from the international institutions on the nature of their financial services education and training provision.

2. The ability of Irish third-level institutions to introduce new courses appears to be more limited than the international universities with international institutions reporting significantly shorter timescales. To meet industry requirements however, some of the international universities develop several new modules annually, rather than introducing a new course. This enables them to keep courses up-to-date with the latest financial services market trends and developments.

3. There is little evidence of inter-institutional collaboration in the design and delivery of courses in the Irish universities/IoTs interviewed, although industry bodies reported collaboration with academia in relation to course development. Conversely, inter-institutional collaboration, both nationally and internationally, is commonplace in the international universities interviewed (e.g. joint delivery of MBA programmes, etc).

4. Both Irish and international universities interviewed were found to be active in financial services research, with almost all universities interviewed having established one or more dedicated finance research centres. It appears however, that the international universities interviewed place a stronger emphasis on producing research that is industry relevant than their Irish counterparts. This can largely be attributed to scale (i.e. the international universities interviewed have a much larger research capacity than Irish universities – e.g. There are a total of 53 financial services researchers across all of universities interviewed in Ireland, however there is on average, 35 researchers in each international institutions consulted) and the fact that, unlike Ireland, industry have shown a strong interest in financial services research undertaken in the international universities interviewed. Internationally, industry regularly discuss research findings with the research centres and provide financial support to research centres/projects (e.g. through regular industry attendance at research seminars, conferences and through sponsorship to establish research centres/specific research projects, etc). In the IMCA

Centre in Reading University, Wharton and NYU, these research seminars are typically held two/three times per week and consist of one to two academics delivering presentations on a specific research topic to a group of 30/40 representatives from industry and academia.

5. Industry linkages in Ireland between industry and the Irish education providers, in terms of course design/delivery, course development and update, funding and joint research programmes, are not as well-developed as those in the international universities interviewed. There was strong evidence in the international institutions of structured industry input (e.g. design and delivery of course content by industry professionals, research and facilities funding by industry, and joint research programmes between industry and academia).

Table 5.26 Comparison of education and research delivered by Irish and leading international academic institutions

<table>
<tr><th>Criteria</th><th>Description</th></tr>
<tr><td>Course Provision</td><td>
The majority of Irish financial services courses tend to be “broad” in their covering business studies, accounting, economics and mathematics/statistics. To a lesser extent, Irish institutions deliver “dedicated” financial services courses such as those covering finance, actuarial science, insurance, banking and corporate finance. A limited number of sector specific/niche courses are offered, the majority of which are tailored towards the banking and capital markets and insurance sectors.
<table>
<tr><th>Course Category</th><th>No. Courses</th><th>Irish Courses</th></tr>
<tr><td>Broad</td><td>112</td><td>Bachelor of Business and Legal Studies (UCD), BSc Statistics (NUIM, UCD), BA Accounting (WIT).</td></tr>
<tr><td>Dedicated</td><td>105</td><td>BA Accounting and Finance (DCU), Bachelor of Commerce (banking and finance/insurance specialism) (UCD), BSc Finance (UCC).</td></tr>
<tr><td>Sector</td><td>16</td><td>MSc Finance and Capital Markets (DCU), BA Actuarial and Financial Studies (UCD); Specialist Diploma in Corporate Banking (IoB).</td></tr>
</table>
Internationally, institutions also deliver a number of “broad” finance courses. However, the vast majority are “dedicated” finance courses covering finance, insurance, risk management, banking, quantitative finance and actuary amongst others. The number of courses dedicated to specific sectors (e.g., banking and capital markets, investment management and/or insurance) is relatively high. Importantly, the remaining “dedicated” finance courses also provide substantial potential for sector specialisation through a combination of modules/electives.
<table>
<tr><th>Course Category</th><th>No. Courses</th><th>International Courses</th></tr>
<tr><td>Broad</td><td>11</td><td>MBS Accounting, Taxation and Law (NYU), BSc Statistics (Penn State), PHD Accounting (LBS).</td></tr>
<tr><td>Dedicated</td><td>36</td><td>BSc Finance (NYU/Penn State), MSc Financial Risk Management (Reading), MSc Finance (LBS).</td></tr>
<tr><td>Sector</td><td>19</td><td>BSc Banking and International Finance (Cass), BSc Insurance and Risk Management (Penn), MSc in Investment Management (Cass).</td></tr>
<tr><td>Niche modules</td><td>-</td><td>Fixed Income Strategies, Risk Management in Financial Institutions, Equity Capital Markets, Hedge Funds – Investment and Management (all MBA modules in SYU Stern).</td></tr>
</table>
International institutions have proportionately more sector focused/dedicated financial services courses/modules than Irish institutions.
</td></tr>
</table>

Criteria	Description
Course Development and Update	■ International institutions report shorter timescales for introducing new courses than Irish institutions. They are also more inclined to keep courses relevant/up-to-date by introducing new individual modules rather than full courses/programmes, which are more time consuming to introduce due to the course/programme approval process. For example, a number of modules in Stern have generic titles (e.g. 'Topics in Corporate Finance'. 'Topics in Investments' and 'Topics in International Finance'). This allows the 'topic' to be changed from year-to-year depending on emerging issues/developments in financial services and new ideas for modules generated as a result. Changing a topic doesn't require formal approval from the university and can be introduced within a matter of days if required. ■ Internationally, academics proactively solicit views on their curriculum from industry players and in many cases have mechanisms in place that formalise this arrangement. This input is sought both for 'complete courses' and also for modules within courses. Due to the flexibility of modules, they are updated regularly to reflect industry trends and drivers and to ensure industry relevance of the materials covered. For example, in NYU Stern adjunct professors from industry design and deliver a number of modules annually, and module topics are changed each year to reflect current market trends/developments. In Reading University course content is reviewed annually by the International Capital Markets Association (ICMA), who originally provided funding for the development of the ICMA Centre. ■ Currently, Ireland lacks a conduit to support or drive this level of interaction between industry and academia and consequently such an initiative may need an 'owner' or 'driver' in the future if it is to become a useful input to development and delivery. So, while Ireland is not as advanced as the international education providers with regard to industry interaction, there is evidence of programmes that have been developed with industry input and/or consultation. For example, in the Business Information Systems Department in UCC, an 'Advisory Business Board' was established to advise the Department on industry developments and future course content. In addition, the IoB has jointly developed courses with UCD, to be delivered through the upcoming 'Global Finance Academy' in UCD. Irish institutions have longer processes for introducing new courses and have no inter-institutional collaboration in the development of these. International institutions tend to have formal mechanisms for interacting with industry to obtain and input and feedback on course development. Similar initiatives are emerging in Ireland.
Research Activity	■ There is a strong emphasis on research within the international institutions. Although drivers of research activity are similar in the Irish and international institutions, there is a greater focus on industry relevance of the research undertaken in the international institutions than the Irish institutions. ■ Irish institutions indicated that they receive limited funding from industry for research whereas international institutions receive significant levels of financial support. ■ Research centres were found to be common-place in both Irish and international universities. However the involvement of industry within these is limited to non-existent in Ireland. If research is to become more industry relevant, then industry need to engage with the research centres, both in terms of the identification of thematic research areas and also in terms of providing funding and support in return for outputs and findings from the research. For example, Wharton conducts two research seminars per week, which are attended by industry. These consist of one to two academics delivering presentations on a specific research topic, which is followed by a discussion between industry and academia. In addition, NYU Stern organise several conferences annually, each addressing a particular finance area/issue. Approximately 300 representatives from industry and academia typically attend these sessions. The Salomon Centre in Stern has also created a structure of corporate associates, whereby circa 30 financial services related companies provide $10,000-$15,000 per annum to support research activities. ■ Industry have shown a strong interest in research undertaken in the international universities, and regularly discuss research findings/provide financial support to research centres/projects Limited evidence of joint research activity between Irish institutions and industry, nor linking research findings back to industry.

Criteria	Description
Industry Linkages/ Collaboration	■ International institutions have extensive contact with industry to ensure industry relevance of courses/modules. ■ Adjunct lectures are used more frequently within international institutions and often deliver full modules. As noted above, there are 45 adjunct professors still working in industry in Stern delivering a range of modules on recent industry developments. The use of industry representatives to deliver modules is also commonplace in Cass and the ICMA Centre. ■ Industry funding of/support for research is more evident in international institutions – lack of interest from industry reported by Irish institutions. For example, students in Stern receive data for free from some financial services companies, which can be very expensive for universities to purchase. In LBS, their BNP Paribas Hedge Fund Centre is funded by BNP Paribas, with significant funding provided over a three year period. Significantly lower levels of collaboration between Irish universities and industry than international institutions. Funding by Irish financial services companies for research activity is also limited.

Chapter 6: Research, Development and Innovation

6.0 Introduction

The purpose of this chapter is to examine the extent to which international financial services firms engage in research and development (R&D) activities and to assess whether there is potential to leverage R&D as an area of competitive advantage for Ireland. Specifically, the questions to be addressed include:

- Do international financial services companies engage in R&D activities?
- What are the barriers to R&D investment?
- What support structures could be developed to support R&D activities?

6.1 Background to R&D in Financial Services

As the importance of the services sector in the global economy has grown, so too has study into the role and importance of research and development in the services sector, as traditional principles of R&D do not appear to fit as easily in an environment where there is no physical product to patent. As understanding of services marketing has developed so has recognition that research and development does take place but that this is quite different from the traditional laboratory-based research associated with manufacturing.

A 2005 study undertaken by the National Science Foundation (NSF) in the US into R&D in the services sector used the financial services sector as a case study. The NSF defined R&D activities as:

- The planned, systematic pursuit of new knowledge or understanding toward general applications (basic research);
- The acquisition of knowledge or understanding to meet a specific, recognised need (applied research); and
- The application of knowledge or understanding toward the production or improvement of a product, service, process, or method (development).

Based on the interviews undertaken to support the NSF study, it was found that these concepts of R&D did not resonate well within the financial services industry with none of the firms interviewed indicating that they engaged in either basic or applied research[58]. Where examples of R&D were identified the level tended to vary depending on the type and size of the firm. Investment services firms were the main organisations relying particularly heavily on technology to ensure that they could supply accurate and complete information to investors to help differentiate their company from the competition[59].

58 NSF/NIST Measuring Service Sector Research and Development (2005).

59 Scottish Science Advisory Committee - Working Papers Series No. 6.

However, this study also identified a number of themes which suggested that "innovation" plays an important role in supporting the development of the sector, such as[60]:

- Increased competition and consolidation are forcing financial services companies to innovate to maintain profitability;
- Dis-intermediation is forcing financial services companies to lower costs by using more efficient technologies and to move into new product and service areas; and
- Across all areas of the industry there was evidence of a constant effort to innovate service offerings but this typically took a different form from the traditional "laboratory based" R&D undertaken in the manufacturing sector.

Industry consultations (both national and international) undertaken as part of this study supports the findings of the NSF research, as the majority of industry respondents consulted cited that they did not have a dedicated R&D function or budget. The instances where dedicated R&D facilities existed, these were typically in the larger-scale organisations which offered a diversified range of products and services and were generally engaged in end-user information and service delivery e.g. Citigroup, Merrill Lynch and Fidelity Technology Group. For these organisations technological capabilities are seen as being critical to enabling the development of new products, processes and services. As a result, the associated R&D initiatives tend to have a strong technology and process automation focus e.g. straight through processing.

Innovation

When questioned during industry consultations on the lack of R&D activity, recurring themes from interviewees were that:

> "change in the industry was evolutionary rather than revolutionary and therefore it was a case of innovative tweaks rather than full-scale R&D that was required"

> "product innovation was part of daily operations for certain areas in investment management but the timelines did not allow for lengthy R&D cycles"

Interviewees found it much easier to articulate innovation activities that their organisations were engaged in and were able to further categorise these by type of innovation:

- Product innovation;
- Technology innovation;
- Process innovation; and
- Team/Culture innovation.

Furthermore, most organisations' efforts appeared to be focused on product and process innovations.

A recent study by McKinsey's found that a majority of executives (54 percent) believed that innovation was more challenging for financial services firms than for other companies due to the focus on short-term financial returns. Despite this fact, 57 percent considered innovation to be extremely or very important to the ability of their company to meet revenue targets over the past three years[61].

Interestingly, this study investigated the reasons for innovation being particularly challenging for financial services. The main reasons identified were:

- Short-term financial success is expected in everything we do and innovation initiatives often result in short term losses;
- The resources needed to pursue innovation initiatives aren't allocated because these resources are critical to short term execution;
- Organisational mechanisms that would encourage the generation of new ideas and their execution don't exist in the industry;
- The industry is mature and as a result opportunities to innovate are limited; and
- The industry lacks insight into consumer needs and behaviour.

It is worth noting that the McKinsey survey found that 40 percent of respondents stated that "their company lacks organisational mechanisms to facilitate innovation" with only 26 percent stating that "funds were dedicated to support innovation activities". This suggests that the required support structures within financial services are relatively immature.

Despite the low priority given to R&D activities among many of the organisations interviewed, a number of examples were identified which placed significant emphasis on this activity, and viewed it as being crucial to their organisations future success. Importantly, it was suggested that investment in technology based RD&I could provide a "high value" area of focus for Ireland, which if successfully supported, could result in further expansion and leverage of the high-end IT skills base which has already been established.

These R&D initiatives would likely focus on using IT to automate existing manual processes and interventions (particularly in back-office functions), and to automate risk reporting and compliance monitoring activities. Positioning Ireland as a solutions centre for the development of enabling technologies for the sector could provide a sustainable knowledge based platform for further growth while enhancing the strategic role of operations located in Ireland. It should be noted that some industry representatives commented that this was the strategy that India was seeking to pursue in an effort to expand its global presence in the sector.

However, in order to facilitate further investment in RD&I activities it was suggested that a number of barriers to investment should be eliminated, these are outlined overleaf.

61 Innovation in Financial Services – A McKinsey Global Survey 2007.

6.2 Barriers to RD&I

In summary, a number of barriers to RD&I were identified during the interview programme:

- A lack of collaboration between industry and educational institutions to support industry relevant advanced research;
- A lack of understanding of best practice processes for innovation in the services sector;
- The financial risks associated with large-scale investments in establishing RD&I facilities with no guaranteed returns; and
- The lack of government incentives/support for technology companies to support development of leading-edge software solutions for the sector.

Measures which assisted in reducing these barriers could result in a step-change in the level of RD&I activities being based in Ireland and the development of a distinctive competency as a "solutions centre" for financial services advancement.

6.3 Support Structures

The Centre for Financial Services Skills (the Centre), which is described in the next chapter, could form a central support for the industry in terms of advancing the research agenda. In particular, operations at the Centre could assist in eliminating some of the main barriers to RD&I by:

- Providing a mechanism to build closer linkages between industry and educational providers by exchanging information on their respective needs;
- Providing self-study educational resources (without charge) to improve understanding across a wider cross-section of the population/industry; and
- Co-ordinating the call for tenders and award of funding to support the provision of strategically important skills development and research initiatives.

In addition, by providing a mechanism to foster closer linkages between industry and academia the existing "high-value" and scarce resources of the academic world could be leveraged to address industry challenges. The financial theory which underpins the operation of the international financial services sector e.g. option pricing models, are typically advanced through mainstream "academic" research. Whilst pricing of individual products involves elements which are proprietary to each company, it was suggested that research into industry relevant themes could be accelerated through improved linkages with academia. By harnessing existing academic resources through coordinated initiatives to focus on selected research topics, it was suggested that the sector in Ireland could achieve a competitive advantage by successfully positioning itself at the leading edge of some of the more complex niche elements of the sector.

This should increase the quality of innovation initiatives and support the positioning of Ireland as a solutions centre for international financial services.

Finally, having a structure which facilitates discrete research initiatives could assist in addressing some of the scale issues, by providing access to top-level research and technology resources to smaller and medium sized organisations, who otherwise might not have the demand or resources to support their own dedicated RD&I function.

6.4 Summary

Research suggests that the international financial services sector does not engage in significant amounts of "traditional" research and development activity. Where R&D investments are undertaken, it is typically by the larger scale organisations which offer diversified products and services and where they are typically engaged in end-user delivery. Technology plays a critical role in enabling the delivery and processing of financial services products, and where companies are making significant investments in RD&I, these typically have a technology focus.

It was suggested that the potential exists to position Ireland as a "solutions centre" for the development of enabling technologies for the international financial services sector, as this could provide a sustainable knowledge-based platform which builds upon our existing ICT presence. This would provide a driver for achieving operational efficiencies, which would support continued growth and enhancement of the strategic role of operations located in Ireland.

The term "innovation" has a greater resonance with the majority of financial services organisations, and in many cases innovation is viewed as being an integral part of maintaining competitiveness. Several of the companies interviewed were actively pursuing opportunities to improve their products and processes through innovation initiatives.

A number of barriers to RD&I were identified, which included:

- A lack of collaboration between industry and educational institutions;
- A lack of understanding of best practice processes for innovation;
- The financial risks associated with scale investments in R&D; and
- The lack of government incentives/supports.

Initiatives designed to increase the levels of RD&I activity in Ireland must first seek to overcome these barriers.

Chapter 7: A Centre

7.0 Origin of the Centre

The concept of a Centre for Financial Services Skills, which would form a central support for the industry in the areas of education, training and research, was proposed in the *Building on Success* report published by the Department of the Taoiseach and the Clearing House Group. Some of the key points articulated by *Building on Success* are highlighted below.

- "In order to sustain and grow our attractiveness as a location for international financial services, Ireland needs a Centre for Financial Services Skills.
- "The Centre will ensure a coordinated and cohesive approach to educational provision. Collaboration and competition will be cornerstones of the Centre – within the Centre collaborating institutions will compete with each other to deliver educational programmes and win research contracts."
- "The establishment of the Centre and the appointment of the Director will take place after a competitive process following the submission of proposals from collaborating institutions."

(Building on Success, page 31)

The form that this Centre should take was not explicitly defined in *Building on Success*.

7.1 Expert Group on Future Skills Needs Consultation Process

Subsequent to this, and following on from a specific recommendation in the report, the Expert Group on Future Skills Needs (EGFSN) was asked to undertake a study into the skills and research requirements of the International Financial Services industry. One of the strands of the Terms of Reference of this project requested the EGFSN to "provide policy advice on the role of the Centre for Financial Services Skills". Further, the EGFSN was also asked to provide advice on the form of the proposed Centre.

As an input, opinions were sought from education and training providers and industry on the form the proposed Centre might take. On balance, the consensus from both academia and industry was that a Centre should provide a single point of contact for both industry and academia, while having responsibility for ensuring that the skills and resources required to support the development of the industry are available.

Furthermore, it was suggested that a Centre would have responsibility for the coordination of education, training and research (facilitating discussions with, and ensuring involvement between, both academia and industry) as well as the promotion of the industry, in particular opportunities within it, in order to attract sufficient numbers of new employees from all groups i.e. secondary school students, back-to-work parents, third level graduates, other industry sectors and overseas.

Table 7.1 summarises the feedback received.

Table 7.1 Feedback from consultations on the key principles for the proposed Centre

	Industry	Academia
Role and remit	A mechanism that provides a single point of contact for industry to ensure that the required resources and skills are available to support the development of the sector. This could be achieved by: ■ Promoting the sector's requirements in schools and colleges; ■ Co-ordinating skills development at a range of levels; ■ Facilitating feedback to education providers on industry skills needs, and ■ Co-ordinating industry relevant research.	■ Not a provider of education and training but rather a forum for industry and education and training providers to interact on research activity. A forum to facilitate identification of industry skills requirements. ■ Courses should be developed in response to 'requests for proposal' from a Centre.
Structure	Hub and spoke model with relationship managers.	Virtual Centre – no physical location, or else very small presence. Board comprising industry and academia.
Scale	Small – avoid duplication of resources and existing infrastructure.	Small entity, which is not duplicating any existing education providers' resources.
Funding	Must be government sponsored to begin with – possibly some co-funding/ sponsorship at a later stage from industry.	Government sponsorship to establish Centre. Centre to obtain industry funding for research.
Skills delivery	Should not be another skills delivery agency although could provide some introductory materials to help smaller firms.	Not a provider of education and training. Use existing education infrastructure to deliver new courses if necessary.
Research	Coordination of research into industry selected themes.	Coordination of research – Centre should help identify relevant areas of research. Consortiums of universities/colleges should tender for specific research projects and funding via the Centre (which are supported by/relevant to industry).

Role and Remit

There was general consensus from both academia and industry in respect of the role of a Centre. In order to best serve the sector and all its stakeholders, a Centre should provide a single point of contact for both industry and academia, while having responsibility for ensuring that the required resources and skills are available to support the development of the sector.

Within this overall role, it was suggested that a Centre have the following congruent responsibilities:

- **Coordination role – education and training**: A Centre should be the conduit for coordinating the demands of industry with the supply of skills from training and education providers. In this regard, a Centre will need to ensure appropriate communications channels are established with both constituents, with a view to providing a mechanism/forum through which industry's views can be articulated and through which skills providers can clearly define and test the syllabus, with a view to developing new courses or modifying existing courses to make them more industry-relevant. The consultation forum will also provide a mechanism through which education and training providers can engage with industry to solicit their views on, and input to, course review and delivery. It also provides the opportunity for both parties to agree a framework for incorporating placements and internships into some of the longer-term courses;

This coordination role is relevant across all training and education providers, from post-leaving certificate level to postgraduate level. In terms of training and education providers it would include: the third level institutions; the industry trainers/professional bodies; private skills providers; and government training agencies such as FÁS, etc;

- **Coordination role – research:** Similar to the education and training coordination role described above, a Centre should also be the conduit through which the industry and academics discuss and identify research themes; share research approaches; provide input to the research process; share industry data, where applicable; and present and discuss research findings. This joint approach to research occurs internationally, however, there is little evidence of this collaboration nationally. In the absence of this occurring organically, a Centre would have a role to drive the development of the research agenda by encouraging collaboration on research projects both industry-academic and inter-institutional that provide practical and implementable solutions from an industry perspective; and
- **Promotion role:** The development of the international financial services sector requires the attraction of significant numbers of new employees to the sector to address both current skills and capacity gaps and to deliver on the growth plans for the sector. Against this background, it is important that all potential sources of employees are aware of the opportunities in the sector. This will start with knowledge of the sector and an awareness of the opportunities within it. The promotion should be aimed at all potential employee groups from secondary school students to back-to-work parents to third level graduates, amongst others.

Structure and Scale

One of the key requirements of a Centre is that it avoids duplicating existing resources and facilities, but rather leverages current investment in educational, training and research infrastructure. On that basis a Centre would operate at a policy and strategic level as opposed to providing education and training materials and facilities.

A board or advisory group would be required to steer the work of a Centre. Such a group would need to be representative of industry players; educational providers; and other interested stakeholders, as appropriate.

Funding

In order to be effective a Centre will require funding to support its initiatives and activities. During consultations it was suggested that initial funding be provided by government in order to mobilise the Centre and its stakeholders, establish a presence and develop a track record in the delivery of programmes and initiatives that are beneficial to its stakeholders.

Once mobilised, funding should be sought from industry in return for relevant outputs, whether they be research programmes or skills development initiatives. There are many examples of industry funding for international training and research activities such as, the BNP Paribas sponsorship of the Hedge Fund Research Centre based in London Business School, where research is undertaken into quantitative modelling of hedge fund strategies.

Education, Training and Research Delivery Mechanisms

As mentioned earlier, it is not envisaged that additional delivery mechanisms be established, but rather that existing infrastructures be leveraged.

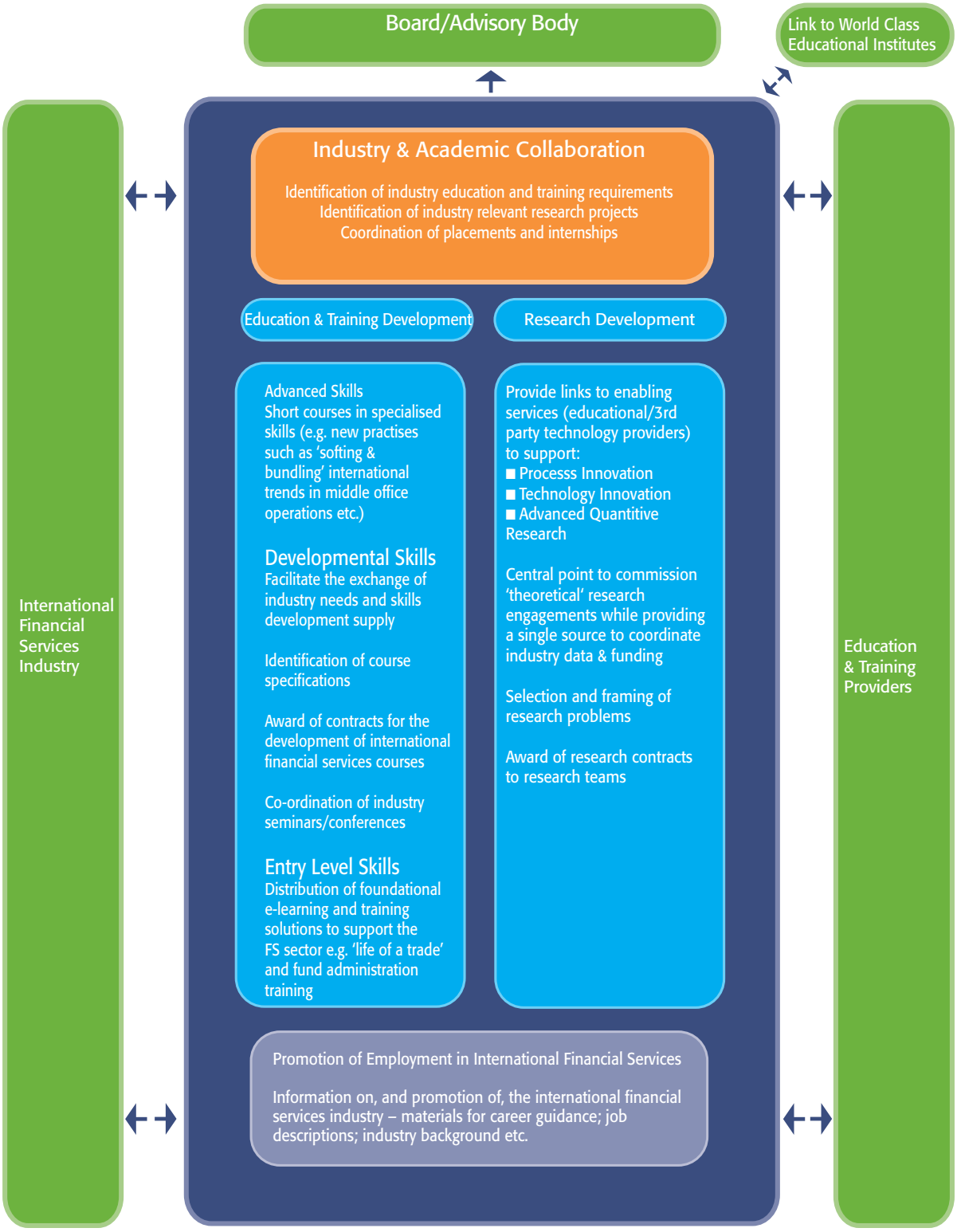
Therefore it is envisaged that once the need for an educational or training course/module is identified that a Centre could potentially draft the course specification, which would then be circulated to potential bidders by way of a request to bid for the course provision. A Centre would assess the bids and identify the preferred supplier, against pre-determined criteria, and award the contract for the course development and delivery to the preferred bidder. Thereafter a Centre would have a role in monitoring the delivery of the course. The course would be reviewed regularly, with a view to updating or terminating the course, based on participant and industry feedback.

The research delivery mechanism would be similar, with research teams preparing proposals in response to research requests. The timeframe for, and use of outputs from, the research would need to be agreed amongst the parties involved.

7.2 Potential Models for the Centre

Figure 7.1 provides a graphical illustration of the possible elements of a Centre.

Figure 7.1 Elements of a centre



The model outlined above is designed to reflect the balance of opinion expressed during the consultation process. However, the EGFSN ask that the following considerations be taken into account if a Centre is to be developed.

- Consideration should be given to how a Centre will interact with the current enterprise development apparatus of the State. Any mechanism should be complementary to existing mechanisms and leverage the expertise of existing State agencies.
- While recognising the need for a relatively light structure, if developed, a Centre would need to have a clearly articulated mandate and power to influence in a meaningful way the skills and research agendas outlined in this report. Clear guidelines should be developed describing how the proposed structure and activities of a Centre will derive its authority to influence and execute the functions and the agendas that it may be assigned.
- As well as establishing the mandate of a Centre, it will be crucial that it be provided with adequate resources, budgets and reporting lines to fulfil any mandate it may be given.
- The Governance of any new entity needs to complement existing mechanisms for public/private collaboration. Existing entities' roles e.g. the *Clearing House Group* need to be clearly defined vis-à-vis any proposed Centre.

7.3 Next Steps

The development of a Centre should not been seen as an end in itself and should not slow progress on addressing the skills and research gaps outlined in this report. In finalising its recommendations, the Expert Group has identified the next steps which current stakeholders should take in order to progress the significant skills agenda which exist for the International Financial Services Sector. The development of an alternative mechanism such as a Centre may over time provide a forum to continually address these issues, but its absence in the short term should not deflect attention from the core issues at hand.

It is not possible at this point to identify the level of funding required. Funding, however, needs to be considered in the context of the National Development Plan. There is an immediate job of work to be undertaken in identifying what education and training provision and research can be undertaken within current resources and what additional funding is required and available to address the remaining gaps recognising that both the State and industry have a role to play.

Chapter 8: Recommendations

8.0 Introduction

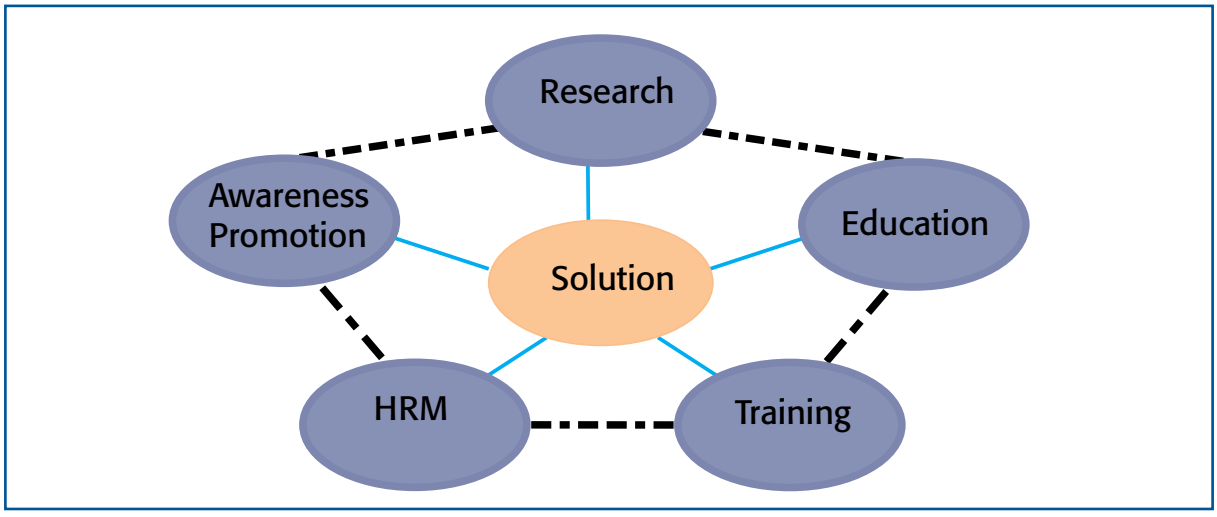
This section outlines a number of recommendations based on the preceding research and consultations. Due to the diverse nature of the international financial services industry, it is clear that no single solution will meet all of the challenges facing the sector from a skills perspective. It is also clear, however, that there is a sense of urgency, amongst both policymakers and amongst the industry itself, to take immediate action to rectify some of the more pressing issues. This will help to protect the existing industry in Ireland, which in turn can act as the foundation for its future development and expansion.

The preceding chapters have outlined a range of challenges facing the industry. Essentially, the challenges can be grouped under four broad headings:

- To urgently tackle current skills needs;
- To address staff retention issues;
- To put in place a skills pipeline that a) meets the likely future needs of the sector, and b) delivers a supply of high skilled workers that can help to build the knowledge economy and shape the type of industry that develops in Ireland; and
- To put in place the infrastructure (from a skills perspective) that will allow a financial services research agenda to develop in Ireland.

With this in mind, the EGFSN has identified recommendations requiring immediate specific action, and others which will need to be implemented over a longer time frame. The recommendations proposed address a range of issues and are illustrated in Figure 8.1.

Figure 8.1 Range of actions required



In addition to the five areas outlined above, there is a need for enhanced communications between all stakeholders and a number of recommendations are proposed to achieve this.

Each recommendation has a set of associated 'next steps' that must be taken to ensure that the international financial services industry in Ireland has a sustainable future, and indeed can continue to develop and undertake higher-value functions in the future. These recommendations are summarised briefly below, and are looked at in more detail in subsequent sections.

8.1 Summary of Recommendations

This report contains 6 key recommendations, incorporating 18 different elements:

1. **Education:** Increase the **supply of graduates** emerging from formal education with appropriate skill sets to meet the needs of the industry. This will require the introduction of new education and training modules and courses at graduate, postgraduate and professional level;
2. **Training:** Introduce improved training mechanisms to upskill new entrants into the industry. In particular, the requirement to expand the pool of labour available to IFS firms will require an expansion of the supply of **foundation level skills**;
3. **Human Resource Management:** In order to expand the supply of labour available to international financial services firms, innovative approaches to **Human Resource Management** are required;
4. **Awareness/Promotion:** More effective **career advice and promotion** is required in order to highlight the attractiveness of career opportunities on offer in the industry;
5. **Research:** Establish a financial services **research capability** in collaboration with industry tasked with developing leading edge thinking and solutions that are shared through structured industry fora; and
6. **Communications and Collaboration:** Establish a forum to **facilitate inter-institutional academic** collaboration with industry to support course development and delivery.

8.2 Detailed Recommendations

Table 8.1 contains a summary description of the recommendations with further details on each recommendation provided on the following pages.

Table 8.1 Recommendations proposed by EGFSN

1 **Education**: Increase the **supply of graduates** emerging from formal education with appropriate skill sets to meet the needs of the international financial services industry. This will require the introduction of new education and training modules and/or courses at graduate, postgraduate and professional level.	■ Increase the numbers of graduates and postgraduates undertaking courses and modules appropriate to the needs of the international financial services industry. Specifically, this requires the development of new modules and, where appropriate, new courses designed specifically to meet the needs identified in this report. Mathematical and technological skills sets are fundamental to the sector. ■ Provide opportunities to specialise in specific areas of international financial services through elective modules e.g. derivatives structuring, risk management, financial modelling etc.
Next Steps (i) The financial services industry, through the offices of Financial Services Ireland (FSI) should collectively agree on short-term priorities in relation to their skills needs as set out in this report in early 2008. (ii) Higher Education Institutes (HEIs) should be provided with an opportunity to respond to the contents of this report. The Higher Education Authority (HEA) should facilitate this consultation in early 2008. HEIs responses should identify opportunities to address the recommendations within current funding; identify opportunities to introduce modules onto existing programmes; and outline planned provision. (iii) The HEA and FSI should work together through the Clearing House Group to agree an action plan to deliver the prioritised skills sets. The Clearing House Group has established a subgroup to facilitate this process. (iv) Having completed steps (i)-(iii) and identified the remaining gaps that cannot be met through existing provision and funding, the HEA should, subject to funding, issue a call for proposals.	
2 **Training**: Introduce improved training mechanisms to upskill new entrants into the industry. In particular, the requirement to expand the pool of labour available to IFS firms will require an expansion of the supply of **foundation level skills**.	■ Develop mechanisms to support rapid skills development to ensure that resources can develop the requisite understanding of the sector and proficiency in core areas e.g. 8-week intensive course incorporating simulated environments.
Next Steps (i) FÁS currently offers a number of courses relevant to the international financial services sector such as its hedge fund administration course and is seeking to expand its offerings in the financial services sphere in 2008. The development of these programmes should be prioritised in consultation with industry. (ii) The Clearing House Group subgroup supported by the Development Agencies should seek proposals from other education and training providers such as the Vocational Education Colleges (VECs) and professional institutes to deliver these skills.	

3 **Human Resource Management**: In order to expand the supply of labour available to international financial services firms, innovative approaches to **Human Resource Management** are required.	■ Evaluate the core skills and competencies required to operate at foundation level and develop competency profiles for standard roles e.g. client servicing, funds administration. ■ Identify alternative labour pools e.g. school leavers, parents returning to the workplace, well educated migrant workers currently employed in other sectors, who are capable of performing foundation level roles and of meeting probable skills needs. ■ In order to boost the stock of human capital, both firms and education providers should recruit world-class talent, regardless of where that talent is to be found. This requires a flexible and attractive immigration system that minimises the burden on both individuals and their employers.

Next Steps

(i) A forum is required to bring together the HR managers from IFS companies to develop responses and share best HR practices. This could be addressed by the Shared Services Forum.[62]

(ii) The EGFSN should continue to monitor the skills requirements of the international financial services industry and communicate these needs to the Employment Permits section of the Department of Enterprise, Trade and Employment.

4 **Awareness/Promotion:** More effective **career advice and promotion** is required to highlight the career opportunities on offer in the international financial services industry.	■ Promotion of financial services career paths to second level students, with a particular focus on high-level mathematics students. ■ Promotion of career opportunities to third-level students, focusing on students in business/finance, mathematics/statistics, engineering and technology courses. ■ Identification and targeting of promotional activities towards specific population groups e.g. parents returning to the labour market, those changing careers, migrants working in other sectors.

Next Steps

(i) The industry, coordinated by Financial Services Ireland, and supported by IDA Ireland and FÁS, should develop a strategy for careers information. These bodies should ensure that all those involved with the provision of career guidance and information are fully aware of the positive career opportunities within the industry.

5 **Research**: Establish an international financial services **research capability** in collaboration with industry tasked with developing leading edge thinking and solutions which are shared through structured industry fora.	■ Identification of key thematic areas of research by academia, that are relevant to industry requirements/interests. ■ Sharing of research undertaken by academia with industry via 'research seminars' and 'conferences'. ■ Research themes should also be expanded to include new subjects in the humanities and emerging disciplines such as behavioural economics ■ Interaction between academia and leading international researchers and education and training providers to identify innovative areas of research. ■ Additional research funding to academia from industry e.g. sponsorship of research projects, research centres and provision of data.

Next Steps

(i) IDA Ireland, Enterprise Ireland, HEA and SFI on an on-going basis will facilitate a forum for industry and academia to jointly agree a research agenda that will be mutually beneficial. The first forum should be held in early 2008.

(ii) Existing funding sources SFI, the Irish Research Council for Science, Engineering and Technology (IRCSET) and the Irish Research Council for the Humanities and Social Sciences (IRCHSS)) should be leveraged in order to progress the international financial services research agenda.

(iii) SFI plans to increase its funding of research in the area of financial mathematics over the coming years. Any funding should be cognisant of the findings of this report.

(iv) Similarly, the Development Agencies currently operate a number of schemes to support their companies in undertaking R&D activities research funding in the area of IFS. In particular, IDA Ireland is developing concepts and specifically targeting R&D from financial services companies.

62 *The Shared Services Forum was established in 1998 as a joint initiative between the IDA and Whirlpool. Its objectives are to (i) share knowledge and experiences of member organisations; (ii) maximize synergies generated from the combined interests of the group and the organisations they represent; (iii) discuss and debate issues that affect competitiveness; (iv) provide updates on developments within industry; and networking.*

6 **Communications and Collaboration:** Encourage **academic collaboration with industry** to support course development and delivery at graduate and postgraduate level.	■ Improve linkages between academia and industry to ensure the relevance of course curricula and research topics. ■ Increase the frequency of course reviews and reduce the time taken to revise course contents. ■ Examine mechanisms that provide for greater flexibility in introducing topical, practical and industry relevant modules and courses. ■ Encourage the use of industry placements and internships as part of course delivery.

Next Steps

(i) An on going mechanism is required to facilitate academic – industry collaboration. In the short term, the HEA and FSI should facilitate a forum between industry and academia to discuss the skills needs outlined in this report. This forum should take place on foot of the consultations undertaken in relation to recommendation 1, which deals with the supply of graduates. Such a forum should take place in early 2008.

Recommendation 1	**Education:** Increase the **supply of graduates** emerging from formal education with appropriate skill sets to meet the needs of the international financial services industry. This will require the introduction of new education and training modules and/or courses, at graduate, postgraduate and professional level.
Key Actions	■ Increase the numbers of graduates and postgraduates undertaking courses and modules appropriate to the needs of the IFS industry. Specifically, this requires the development of new modules and, where appropriate, new courses designed specifically to meet the needs identified in this report. Mathematical and technological skills sets are fundamental to the sector. ■ Provide opportunities to specialise in specific areas of international financial services through elective modules e.g. derivatives structuring, risk management, financial modelling etc.

Education and training provision at all levels has serviced the IFS industry well to date. It is now a matter of continuous improvement and maintaining relevance. During the industry consultation programme, senior international financial services industry leaders indicated a lack of availability of certain suitably skilled resources to meet their current requirements for certain roles which are shown in the table below. This mirrors closely the findings from the FÁS/SLMRU research that highlighted a number of key skills needs in the sector.

In addition, and based on expected opportunities for the industry to grow and develop over the medium term, a number of future skills areas have been identified which should provide a focus for supply-side initiatives targeted at addressing these anticipated industry needs. The skills needs of the industry will evolve continuously and this will need to be reflected in future revisions to course curricula.

Table 8.2 Summary of current and future skills needs

Current and future	Future
1. Maths/Economics/Quantitative Modelling 2. Accountancy (with funds experience) 3. Risk Management 4. Compliance 5. Middle-management with financial services experience 6. Project and change management 7. Funds servicing and banking back-office 8. Actuary	1. Derivatives structuring 2. Quantitative analysis 3. Credit analysis 4. Hybrid technologists – business analysis with IT/systems skills 5. Business development with detailed product knowledge/industry qualifications 6. Pan-European tax/legal specialists 7. Behavioural economists 8. Funds servicing – client relationship management for complex products 9. Fluency in European languages 10. International compliance

This study has highlighted the dynamic nature of the international financial services sector, and the importance of the availability of suitably skilled resources in ensuring the stability of highly mobile investment. In addition, industry representatives have forecast areas of likely growth and the resulting skills development challenges over the medium term. This information provides direction for educational course developers which will assist them in designing future course curricula to ensure these are relevant in meeting the industry's projected skills needs. Based on the estimated current and future demand for skills and the skills areas outlined above, it is recommended that a programme of various courses and modules be developed in response.

The matrix in Table 8.3 sets out a framework for this course development, based on current and expected future industry needs. This list is intended to be indicative of the types of courses and modules required. It is likely that some of the courses (particularly at postgraduate level) could be bundled together and delivered jointly.

During the course of consultations, it was also suggested that the depth of content/knowledge needed to be reviewed, as it was suggested that the Irish system was structured to produce "skilled generalists" rather than "specialists". Course curricula in the US facilitate a higher degree of specialisation by allowing students to choose elective modules, thereby achieving higher levels of proficiency in their chosen area. This is attractive from an industry perspective as it generally reduces the learning curve and time taken to achieve proficiency for new recruits upon entering the workforce. If higher levels of specialisation are combined with "hands-on" experience or simulated environments then the ability of graduates to quickly integrate and add value to an organisation would be greatly increased.

On the other hand, there is a need to provide a broad education at undergraduate level to allow students to develop and avail of future opportunities. There is a need to strike a balance in this regard. Introducing up-to-date, industry-relevant modules on an on going basis is a mechanism to do this.

Table 8.3 Summary of the nature and content of new courseware

Skill demand	Course topics/contents	Course features (delivery, scale, etc)
	Graduate level	
Maths/Economics/ Quantitative Modelling	■ General Mathematics and Economics degree programmes with a focus on higher-level quantitative skills. Modules might include: ■ Econometrics; ■ Quantitative modelling in C++; ■ Product development; ■ Product modelling; ■ Asset pricing; and ■ Stochastic modelling.	■ Degree programme. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx 20 per annum).
Accountancy with funds experience	Accounting courses with a focus on fund accounting (modular format).	■ Degree programme with professional exams. ■ Incorporating applied/case study elements from funds servicing environments. ■ Work experience. ■ Medium volume (300+ per annum).
Risk Management	General Risk Management courses with modules covering: ■ Risk management in financial institutions; ■ International risk management; ■ Risk modelling; ■ Regulation; and ■ Compliance. Reference course – BSc in Insurance and Risk Management offered by Penn State and BSc in Investment and Financial Risk Management offered by Cass.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services ■ Work experience. ■ Low volume (<50 per annum).

Quantitative financial analysis	Quantitative finance/Mathematics courses with modules in the following areas: ■ Technical skills in quantitative financial analysis; ■ Quant asset management; ■ Financial engineering; ■ Quantitative strategic analysis; and ■ Quantitative strategy implementation.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx 20 per annum).
Credit analysis	General Financial services degree programmes with modules in: ■ Financial analysis technology; ■ Scenario modelling; ■ Credit analysis and rating interpretation; ■ Company research; and ■ Asset quality/Forensic.	■ Degree programme. ■ Specialised modules incorporated into existing degree programmes. ■ Incorporating applied/case study elements from financial services. ■ Work experience. ■ Low volume (approx 20 per annum).
Hybrid technologists – business analysis with IT/systems skills	IT Courses with a specific focus on financial services, including: ■ Applying IT to financial services; ■ Financial products; ■ Financial modelling; ■ Product development; and ■ Business systems analysis.	■ Degree programme or 6 month/1 year graduate diploma programme/ conversion course to provide graduates from IT courses with basic financial services skills. ■ Classroom based. ■ Medium volume (approx 100 per annum).
Business development with detailed product knowledge/industry qualifications	Incorporation of financial services aspect into general Business/Marketing courses: Topics might include: ■ Introduction/background to international financial services; ■ Products, services and markets; and ■ Financial products and markets.	■ Certificate course/module providing business and marketing graduates with an understanding of financial products and instruments. ■ Medium volume (approx 80 per annum).
Middle-management with financial services experience	Incorporation of following skills into financial services related courses: ■ General business skills; ■ Marketing skills; ■ Business development skills; and ■ Effective communication skills.	■ Certificate course/conversion course providing a basic understanding of financial products and instruments, the IFS sector and general management training. ■ Medium volume (approx 80 per annum).
	Postgraduate level	
Compliance/ International compliance	Provision of specialist programmes/research into the area of international regulation and compliance. Including modules in: ■ Audit principles; and ■ System controls. Reference course – MSc in Capital Markets, Regulation and Compliance.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx. 30 per annum).
Risk Management	Provision of specialist programme/research in relation to: ■ Risk management in financial institutions; ■ Risk modelling; and ■ Added quantitative techniques. Reference course - MSc in Financial Risk Management as offered by Reading University.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx 20 per annum).

Derivatives structuring	Specialist Derivative programme including modules in: ■ Financial engineering; ■ Dynamic asset pricing theory; ■ Portfolio risk analysis; ■ Credit risk and Derivative products; and ■ Stochastic modelling.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx 20 per annum).
Behavioural economics	Economic specialist programme with a focus on: ■ Economic theory; ■ Behavioural science; ■ Rational theory; ■ Momentum investing; and ■ Arbitrage.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx 20 per annum).
Project and change management	Certificate in Project Management incorporating modules such as: ■ Project management procedures and techniques; ■ Project planning and control; ■ Quality management; and ■ Earned value analysis.	■ Certificate course in project management best practices incorporating financial services case studies. ■ Medium volume (approx 80 per annum).
Pan-European tax/ legal specialists	Specialist programme for tax and legal graduates to provide an international perspective.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx 20 per annum).
Actuary	Specialist Actuarial programme with particular reference to the international financial service sector. For example – MSc in Actuarial Science and MSc in Actuarial Management as offered by Cass university.	■ Specialist programme. ■ Incorporating applied/case study elements from financial services. ■ Low volume (approx 20 per annum).

In essence at **foundation level** the requirement is for short courses with flexible delivery mechanisms, aimed at bringing alternative populations of personnel (back) into the workforce in high numbers.

At **undergraduate – graduate level** the emphasis is on both:

- Developing specialised modules that can be updated regularly to reflect industry trends and incorporated into existing degrees programmes; and
- Developing new or updating existing degree programmes to tailor their contents to improve their focus on particular skills demands e.g. tailored towards hybrid technologists or credit analysts. Where appropriate, applied or case study elements and work experience should be incorporated into these programmes. Some of these courses/modules may be best delivered by the professional bodies.

The **postgraduate** proposition is for specialist programmes of varying length focused on particular specialist skills e.g. international compliance, behavioural economics, etc. Again these courses should incorporate applied or case study elements. The focus at this level is primarily on new courses, which are dynamic in nature, reflecting latest industry trends.

Alongside the traditional business and finance courses, increasing product and pricing complexity and focus on process efficiency have placed a greater demand on advanced mathematical and computing/IT skills as "core" financial skills for the sector. Therefore, action is required to create greater linkages between the courses that produce advanced mathematical and technology skills to ensure that these incorporate modules that facilitate these graduate being deployed in a financial services environment. Specifically, these measures should:

- Target secondary school students with a view to increasing the numbers taking maths and science-based courses at higher levels by highlighting the employment opportunities for people with these skills in key roles in the financial services sector e.g. trading, risk management and portfolio management. There are, however, a wide range of issues in this regard which are outside the scope of this report; and
- Technology based courses need to evolve from a focus on pure software development towards a greater emphasis on problem solving and innovation. With increased outsourcing of development activities to other territories, technology functions in international financial services in Ireland are increasingly focusing on higher value problem solving roles which require business process and systems analysis skills. These technology skills will be critical to positioning Ireland as a centre for developing financial services solutions.

Next Steps

(i) The international financial services industry, through the offices of Financial Services Ireland (FSI) should collectively agree on short-term priorities in relation to their skills needs as set out in this report in early 2008.

(ii) Higher Education Institutes should be provided with an opportunity to respond to the contents of this report. The Higher Education Authority (HEA) should facilitate this consultation in early 2008. HEIs responses should identify opportunities to address the recommendations within current funding; identify opportunities to introduce modules into existing programmes; and outline planned provision.

(iii) The HEA and FSI should work together through the Clearing House Group to agree an action plan to deliver the prioritised skills sets. The Clearing House Group has established a subgroup to facilitate this process.

(iv) Having completed steps (i)-(iii) and identified the remaining gaps that cannot be met through existing provision and funding, the HEA should, subject to funding, issue a call for proposals.

Recommendation 2	**Training**: Introduce improved training mechanisms to upskill new entrants into the industry. In particular, the requirement to expand the pool of labour available to international financial services firms will require an expansion of the supply of **foundation level skills**.
Key Actions	■ Develop mechanisms to support rapid skills development to ensure that resources can develop the requisite understanding of the sector and proficiency in core areas e.g. 8-week intensive course incorporating simulated environments.

This recommendation is linked with Recommendation 3 which addresses the need to expand the pool of labour available to IFS companies. There is a need to ensure that both existing and potential employees in the IFS sector are equipped with the appropriate skills sets to meet the needs of the industry.

It has been suggested by the industry representatives that mechanisms should be examined to facilitate up-skilling of these alternative populations in Ireland in relevant areas, which could be achieved through a range of FÁS, post-leaving certificate, VEC or industry-led, accredited short courses and training programmes. Thus, a two pronged approach is required, one aspect focused on new entrants at foundation level and the other focused on the appropriate deployment of graduates. This could provide a significant boost to the total labour supply and provide a more stable foundation upon which to expand the overall sector.

Table 8.4 provides guidance on indicative course features designed to address the requirements for foundation level skills.

Table 8.4 Summary of the nature and content of new courseware

Skill demand	Course topics/contents	Course features (delivery, scale, etc)
	Foundation level	
Funds servicing and banking back-office	Introductory Funds Industry course with modules including: ■ Basic accounting; and ■ Principles of fund administration (Valuation, Settlements, Custody and Corporate Actions).	■ Short duration 8-12 weeks. ■ Flexible delivery mechanisms to include distance learning/web. ■ Simulated environments/ work experience. ■ Scaleable model to facilitate high volume and regional delivery up to 1,500/annum.
Funds servicing – client relationship management for complex products	Introductory Funds Industry course with modules including: ■ Basic accounting; ■ Principles of fund administration; ■ Effective communications; and ■ Client Relationship Management.	■ Short duration 8-12 weeks. ■ Flexible delivery mechanisms to include distance learning/web. ■ Simulated environments/ work experience. ■ Scaleable model to facilitate medium to high volume up to 200/annum.
Fluency in European languages	Inclusion of modules in general financial services courses, including: ■ Business and legal language training; and ■ International business finance.	■ Modular training incorporating. ■ Aural training. ■ Low volume (<50 per annum).

Next Steps

(i) FÁS currently offers a number of courses relevant to the international financial services sector such as its *hedge fund administration* course and is seeking to expand its offerings in the financial services sphere in 2008. The development of these programmes should be prioritised in consultation with industry.

(ii) The *Clearing House Group* subgroup supported by the Development Agencies should seek proposals from other education and training providers such as the VECs and professional institutes to deliver these skills.

Recommendation 3	**Human Resource Management:** In order to expand the supply of labour available to international financial services firms, innovative approaches to **Human Resource Management** are required.
Key Actions	■ Evaluate the core skills and competencies required to operate at foundation level and develop competency profiles for standard roles e.g. client servicing, funds administration. ■ Identify alternative labour pools e.g. school leavers, parents returning to the workplace, well educated migrant workers currently employed in other sectors, who are capable of performing foundation level roles and of meeting probable skills needs. ■ In order to boost the stock of human capital, both firms and education providers should recruit world-class talent, regardless of where that talent is to be found. This requires a flexible and attractive immigration system which minimises the burden on both individuals and their employers.

Significant attention has been accorded to the problems associated with high-skills needs in IFS. While undoubtedly the supply of high skilled graduates and experience specialists is fundamental to the development of the industry, a large supply of skills at other points along the skills spectrum is important.

In order to provide a foundation for the development of higher value activities in IFS in the future, we must protect current investments and ensure that the existing cadre of IFS firms can continue to operate successfully in Ireland. Essentially, the availability of a supply of suitably skilled labour at competitive rates is a critical prerequisite to further growth.

Industry consultations showed that many firms are currently experiencing difficulties in hiring and retaining resources for certain foundation level (operational and administrative) roles, which do not require advanced/specialist education.

The current industry practice of targeting degree level graduates to fill the majority of foundation level roles appears to be a contributory factor to attrition levels, as highly mobile graduates are more likely to have attained educational competencies, which they perceive as excessive for some of the more administrative entry-level roles. A similar experience in the US led several firms to focus on "alternative populations" to fulfil many of these roles e.g. school leavers, parents returning to the labour force, ex-military etc. It may also be possible to attract well-educated migrant workers from other sectors to this sector, where their qualifications may be more appropriately applied.

In addition, developing a stable core of resources for less specialised tasks increases the potential to free-up graduates to focus on the more complex areas, which should be more aligned with their education and competencies. Increasing product complexity has resulted in a greater need for analytical and problem solving capabilities in some of the more advanced operational functions. Therefore, increasing the overall capacity will facilitate maximising the potential of the labour resources by ensuring that resources are focused on tasks that are appropriately matched to their skills and competencies.

Next Steps

(i) A forum is required to bring together the HR managers from IFS companies to develop responses and share best HR practices. This could be addressed by the Shared Services Forum[63].

(ii) The EGFSN should continue to monitor the skills requirements of the international financial services industry and communicate these needs to the Employment Permits section of the Department of Enterprise, Trade and Employment.

63 *The Shared Services Forum" was established in 1998 as a joint initiative between the IDA and Whirlpool. Its objectives are to (i) share knowledge and experiences of member organisations; (ii) maximize synergies generated from the combined interests of the group and the organisations they represent; (iii) discuss and debate issues that affect competitiveness; (iv) provide updates on developments within industry; and networking.*

Recommendation 4	**Awareness/Promotion**: More effective **career advice and promotion** is required to highlight the career opportunities on offer in the international financial services industry.
Key Actions	■ Promotion of financial services career paths to second level students, with a particular focus on high-level mathematics students. ■ Promotion of career opportunities to third-level students, focusing on students in business/finance, mathematics/statistics, engineering and technology courses. ■ Identification and targeting of promotional activities towards specific population groups, e.g. parents returning to the labour force, those changing careers, migrant populations, etc.

The shortfall of employees in the international financial services industry in Ireland can be partially attributed to a lack of awareness/knowledge of potential career opportunities within the international financial services industry. This is particularly relevant in an economy with a tight labour market. Further, given the nature of skills being sought (i.e. competency in mathematics etc.), IFS firms are in competition with other high-tech sectors such as ICT and engineering for the same finite pool of potential employees.

One way to impact positively on the shortage of employees is to effectively promote the choice of careers in financial services to secondary school and third level students. Potential entrants into employment in IFS must be made aware of the benefits of choosing such a career – the selling points should encompass all elements of a career in the industry, from the relatively high salaries on offer, to the potential for career progression, to the international nature of the industry.

More specifically, at second level, career advisors play a pivotal role in the promotion of careers in the international financial services industry. Several activities at school level should be considered to improve the image/knowledge of the industry, including:

- Improved exposure to the industry through presentations by industry to local secondary schools;
- Increasing collaboration between school career advisors and industry professionals[64]; and
- Efforts by secondary schools to identify and to foster interested students prior to sixth year.

A particular focus should be placed on educating/identifying students that study high-level mathematics.

Initiatives to promote the awareness/image of the international financial services industry at third level include:

- Regular presentations delivered to university/college students by industry professionals[65]; and
- Annual financial services career fairs[66].

Students enrolled in business and finance courses, as well as finance-related courses with a high quantitative focus, such as maths, statistics and engineering should be targeted in particular.

64 *Such interaction could include the provision of information on the international financial services industry to career advisors and structured meetings between industry professionals and secondary schools/career advisors.*

65 *Presentations should be made by industry professional from across the international financial services industry outlining potential career opportunities within specific sectors.*

66 *Career Fairs should comprise representatives from the international financial services industry, private financial services organisations and government agencies.*

In addition to these more captive target groups, there is a need to promote the career opportunities for alternative groups (e.g. parents returning to the labour force, those changing careers, migrants working in other sectors, etc). Appropriate communications channels and materials to heighten awareness among these populations should be developed.

Next Steps

(i) The industry, coordinated by Financial Services Ireland, and supported by IDA Ireland and FÁS, should develop a strategy for careers information. These bodies should ensure that all those involved with the provision of career guidance and information are fully aware of the positive career opportunities within the industry.

Recommendation 5	**Research:** Establish a financial services **research capability** in collaboration with industry tasked with developing leading edge thinking and solutions that are shared through structured industry fora.
Key Actions	■ Identification of key thematic areas of research by academia, that are relevant to industry requirements/interests. ■ Sharing of research undertaken by academia with industry via 'research seminars' and 'conferences'. ■ Research themes should also be expanded to include new subjects in the humanities and emerging disciplines such as behavioural economics. ■ Interaction between academia and leading international researchers and education and training providers to identify innovative areas of research. ■ Additional research funding to academia from industry, e.g. sponsorship of research projects, research centres and provision of data.

In the US in particular, much of the international financial services research is based on topics proposed by industry and is supported by industry. In Ireland, it appears that there is less industry involvement in academic research projects and consequently there is a need to develop initiatives to encourage a collaborative approach to the identification and execution of research projects.

Such initiatives may include:

- The establishment of 'research seminars' that provide an opportunity for academics to present and discuss research results to representatives from both industry and universities/Institutes of Technology/ industry bodies[67];
- The establishment of regular industry-academic conferences addressing relevant industry topics[68]; and
- Industry sponsorship of/involvement in research projects and/or dedicated financial services research centres.

If research is to become more industry relevant, it is imperative for industry to engage with the universities and IoTs and their respective research centres, both in terms of the identification of thematic research areas and also in terms of providing funding and support in return for outputs and findings from the research. Some topical research areas might include:

- Streamlining business processes through technology to automate back-office functions such as trade settlement and reporting;
- Advanced pricing models;
- Regulatory and compliance reporting; and
- Product innovation.

As mentioned previously, the vast majority of financial services research activities will rely on resources with detailed process knowledge gained through practical experience of the business combined with resources with software engineering skills. The more "academic" research elements will require a small number (approximately 10 in the medium term) of highly quantitative specialists who are capable of evolving current industry models through focused research projects.

67 *Research Seminars should be conducted weekly and include representatives from both industry and academia. These should consist of academics (from research institutions in Ireland and potentially internationally) and/or industry representatives delivering presentations on industry relevant research topics, followed by a discussion between industry and academia.*

68 *Conferences could range from one to two days in length and comprise a series of lectures given by representatives from industry and academia on a specific relevant financial service research topic. For example, recent conferences in Wharton Business School were centred around: Model Governance and Model Validation; Corporate Finance of Financial Intermediaries; and Financial Risk Management in Practice: The Known, the Unknown and the Unknowable.*

For "best-in-class" research to be undertaken, in addition to Government funding, there is a need for industry to provide financial support to financial services research initiatives. This can take a number of forms, including:

- Direct sponsorship of research projects;
- Sponsorship of/donations to dedicated financial services research centres; and
- Provision/sponsorship of data for research purposes[69].

The current SFI model for funding research already requires researchers to engage with industry in the manner described in this report. SFI is currently funding research into financial mathematics, for example the Mathematics Consortium for Science and Industry (MACSI) at the University of Limerick is investigating *Pricing models for collateralized debt obligations* in partnership with the Market Risk Division, DEPFA Bank plc, and SFI's Research Frontiers Programme has also funded financial mathematics. Further investments into research in this area are in the pipeline.

To further enhance their research capability and to gain access to and knowledge of leading international research, academic institutions should develop formal partnerships with their leading international counterparts through mechanisms such as:

- Teacher or student exchange; and
- The development of joint research projects.

These relationships will provide a mechanism to gain access to global industry-based research, expertise and innovation.

It is recognised that there are difficulties in working collaboratively when it comes to ownership of intellectual property, and consequently further consideration should be given to this area.

Next Steps

(i) IDA Ireland, Enterprise Ireland, HEA and Science Foundation Ireland (SFI) on an ongoing basis will facilitate a forum for industry and academia to jointly agree a research agenda that will be mutually beneficial. The first forum should be held in early 2008.

(ii) Existing funding sources (such as Science Foundation Ireland (SFI), the Irish Research Council for Science, Engineering and Technology (IRCSET) and the Irish Research Council for the Humanities and Social Sciences[70] (IRCHSS)) should be leveraged in order to progress the financial services research agenda.

(iii) SFI plans to increase its funding of research in the area of financial mathematics over the coming years. Any funding should be cognisant of the findings of this report.

(iv) Similarly, the Development Agencies currently operate a number of schemes to support their companies in undertaking R&D activities research funding in the area of IFS. In particular, IDA Ireland is developing concepts and specifically targeting R&D from financial services companies.

69 *Purchasing data/data licences annually is a huge expense for research institutions.*

70 *IRCSET and IRCHSS do not provide funding according to defined themes. Rather, the focus is on funding innovative, original and exploratory research, aimed at generating new knowledge and energising Ireland's future growth, development and national competitiveness.*

Recommendation 6	**Communications and Collaboration:** Encourage **academic collaboration with industry** to support course development and delivery at graduate and postgraduate level.
Key Actions	■ Improve linkages between academia and industry to ensure the relevance of course curricula and research topics. ■ Increase the frequency of course reviews and reduce the time taken to revise course contents. ■ Examine mechanisms that provide for greater flexibility in introducing topical, practical and industry relevant modules and courses. ■ Encourage the use of industry placements and internships as part of course delivery.

It appears that there is limited interaction between academic stakeholders involved in international financial services education and training, and the industry itself (although there are some examples of good practice in Ireland). Internationally, it has been shown that the development of such relationships brings significant benefits and where this has happened in Ireland to date considerable benefits have accrued to the Irish education and training providers. The interaction occurs at two levels:

- Academia-industry; and
- Inter-institutional/college.

There are a range of initiatives that can support both.

Academic-industry collaboration should occur across a number of different strands. Firstly, to ensure that financial services education and training remain relevant to industry skills requirements, industry should be involved in the identification of the relevance of financial services courses/course material. Keeping courses relevant to industry will require a strong industry input into course review and update. This study suggests the following three actions to support this input:

- At department/faculty level, the development of 'Industry Advisory Boards/Industry Panels' to provide a formal and distinct industry input into programme and syllabus review, design and update[71];
- At course level, the inclusion of industry representatives on Course Review Boards to provide structured industry input into course design and development, review and update[72]; and
- The development of more consistent interaction by the education and training providers with the international financial services industry[73].

Mechanisms need to be put in place which will allow for the introduction of new modules within a short timeframe. A possible strategy is for education and training providers to introduce modules with generic titles (e.g. 'Topics in Corporate Finance', 'Topics in Investment Management') and change module content as required based on industry skills requirements/trends and developments. Content of modules should be changed without requiring formal approval from the university/IoT.

71 *Industry Advisory Boards/Industry Panels should be developed at department/faculty level and should consist of a membership that brings together leading industry professionals, who would meet 2-4 times a year to discuss course-related development requirements.*

72 *Course Review Boards would be independent of the formal accreditation bodies, but operating with the approval of the accreditation bodies. These panels should have the power to significantly modify course content without prior approval and should consist of both leading industry experts and academic experts who would oversee the quality and scope of course material.*

73 *This could include the formal networks of industry linkages at each university or college, the active development and promotion of more joint industry-academic events (e.g. seminars, conferences) and more joint industry-academic research into financial services sector, trends and developments.*

Secondly, industry should be involved in the delivery of financial services education and training on a more frequent basis. This should take the form of:

- A formal guest lecturer programme, e.g. course/module requirements to use a certain number of guest lecturers annually; and
- Use of industry professionals to design and deliver entire modules[74].
- Course curricula should incorporate "applied" elements to improve the "market readiness" of students to take on roles within the sector. A number of methods could be used to achieve this, including:
  - Simulated environments[75];
  - Practical project work; and
  - Co-delivery of classes with industry representatives.
- A mechanism to assist undergraduates to avail of work placement opportunities in international financial services firms should be examined and course developers should seek to increase the number of courses that incorporate placements as a mandatory component. This was identified by industry as a significant gap versus the US and continental European systems. The industry has a key role to play in providing such work placement opportunities.

In addition, students would benefit from broader curricula that incorporate "soft skills" training in key areas such as communications, report writing, customer service and client management.

Flexible delivery mechanisms need to be examined for postgraduate/continuing professional development courses. Several industry respondents cited "outdated" course delivery methods as a key barrier to using the third level educational infrastructure as course durations were viewed as being too long and resulting in too much time away from the job. Options which include a greater emphasis on practical experience and distance learning methods could assist in addressing this gap.

Finally, further inter-institutional collaboration is required both between education and training providers within Ireland, and between Irish and leading international education and training providers. In particular, potential inter-institutional development and running of courses, on a joint basis, should be explored. This will help to leverage synergies in college strengths and potentially avoid duplication of materials/content development and delivery[76].

Next Steps

(i) An ongoing mechanism is required to facilitate academic – industry collaboration. In the short term, the HEA and FSI should facilitate a forum between industry and academia to discuss the skills needs outlined in this report. This forum should take place on foot of the consultations undertaken in relation to Recommendation 1, which deals with the supply of graduates. Such a forum should take place in early 2008.

74 *International Finance'. 'Topics' can be changed from year-to-year depending on emerging issues/developments in financial services and new ideas generated for modules as a result and can be changed within a matter of days if required. They are typically designed and delivered industry professionals.*

75 *Industry professionals should be responsible for/involved in the design of module content, which will act as a means to ensure industry relevance of course material.*

76 *Such simulated environments can include 'trading rooms' which can allow students to work in simulated training environments, and learning how to trade while in an academic environment. Such training was noted as extremely beneficial for students when entering the workforce.*

Appendix A: Glossary of Terms

The table below provides a glossary of technical terms used in this report.

ABS	Asset Backed Securities are a type of bond or note that is based on pools of assets, or collateralized by the cash flows from a specified pool of underlying assets. Assets are pooled to make otherwise minor and uneconomical investments worthwhile, while also reducing risk by diversifying the underlying assets.
Basel II	Basel II is the second of the Basel Accords, which are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. The purpose of Basel II is to create an international standard that banking regulators can use when creating regulations about how much capital banks need to put aside to guard against the types of financial and operational risks banks face.
BIS	The Bank of International Settlements is the central bankers' bank. It aims to foster co-operation between central banks and other agencies to promote monetary and financial stability.
Bonds	A bond is a fixed income debt security, in which the authorized issuer owes the holders a debt and is obliged to repay the principal and interest (the coupon) at a future date
CFA	Chartered Financial Analyst – industry recognised qualification for the investment management sector.
Derivatives	A financial instruments whose value is derived from the value of another underlying security. The most common types of derivatives are futures, forwards, options and swaps.
Hedge Funds	Hedge funds are similar to mutual funds in that they both are pooled investment vehicles which invest on a collective basis. Hedge funds differ significantly from mutual funds, however, in that they are unregistered and subject to lower levels of regulation which allows hedge funds to engage in leverage and other sophisticated investment techniques.
MiFID	The Markets in Financial Instruments Directive – comes into effect on 1 November 2007, when it will replace the existing Investment Services Directive (ISD). Amendments to national legislation and rules to carry out to its provisions must be made by 31 January 2007. MiFID extends the coverage of the current ISD and introduces new and more extensive requirements on financial services firms.
QFA	Qualified Financial Advisor – industry recognised qualification for those working in retail financial advice in Ireland. The qualification is overseen by the QFA Board which is a joint venture between the Institute of Bankers in Ireland, the Insurance Institute, the LIA and the Central Bank.
SPV	Special Purpose Vehicles are body corporates created to fulfil narrow, specific or temporary objectives, primarily to isolate financial risk. These are commonly used in the securitisation of loans (or other receivables) to achieve separation from the originating entity.
Solvency II	Solvency II is an update to the European standard framework for calculating risk and allocating capital for insurance companies.
UCITS	Undertakings for the Collective Investments of Transferable Securities. UCITs are collective funds which can be sold across national borders within the EU in accordance with the UCITS Directive. Under the UCITS III Directive the range of product types in which UCITS funds could invest was expanded.

Appendix B: Steering Group Members

Representative	Organisation
Ms. Aileen O'Donoghue	IBEC, Chairperson
Ms. Jasmina Behan	Skills and Labour Market Research Unit, FÁS
Mr. Joe Breslin	Enterprise Ireland
Dr. Gary Crawley	Science Foundation Ireland
Ms. Bronwyn Gallagher	IDA Ireland
Mr. Conor Hand	Forfás
Mr. Pat Hayden	Department of Enterprise, Trade and Employment
Mr. David Hedigan	Enterprise Ireland
Mr. Pat Howlin	IDA Ireland
Mr. Barry Jennings	Enterprise Ireland
Ms. Deirdre Lyons	IDA Ireland
Mr. Gerry Murray	Department of Education and Science
Ms. Caitriona Ryan	Higher Education Authority
Mr. Martin Shanahan	Forfás and Head of EGFSN Secretariat
Mr. George Shaw	Department of the Taoiseach

Appendix C: EGFSN Members

Representative	Organisation
Ms. Anne Heraty	CEO, CPL Resources PLC, Chairperson
Ms. Ruth Carmody	Assistant Secretary, Department of Education and Science
Mr. Gerry Murray	Principal Officer, Department of Education and Science
Ms. Liz Carroll	Training and Development Manager, ISME
Mr. Enda Connolly	Divisional Manager, IDA Ireland
Mr. Fergal Costello	Head of IoT Designation, Higher Education Authority
Mr. Ned Costello	Chief Executive, Irish Universities Association
Mr. Brendan Ellison	Principal Officer, Department of Finance
Mr. Roger Fox	Director of Planning and Research, FÁS
Mr. David Hedigan	Manager, Sectoral Enterprise Development Policy, Enterprise Ireland
Mr. Gary Keegan	Director, Acumen
Mr. John Martin	Director for Employment, Labour and Social Affairs, OECD
Mr. Dermot Mulligan	Assistant Secretary, Department of Enterprise, Trade and Employment
Mr. Pat Hayden	Principal Officer, Department of Enterprise, Trade and Employment
Mr. Frank Mulvihill	President, Institute of Guidance Counsellors
Mr. Brendan Murphy	Director, Cork Institute of Technology
Mr. Alan Nuzum	CEO, Skillnets
Ms. Aileen O'Donoghue	Director of Financial Services Ireland, IBEC
Ms. Mary O'Leary	School Teacher
Mr. Peter Rigney	Industrial Officer, ICTU
Ms. Jacinta Stewart	Chief Executive, City of Dublin VEC
Mr. Martin Shanahan	Head of Human Capital and Labour Market Policy, Forfás and Head of Secretariat

Appendix D: Research and Secretariat Support

EGFSN Secretariat in Forfás	SLMRU of FÁS
Martin Shanahan	John McGrath
Kay Hallahan	Jasmina Behan
Gerard Walker	Ivica Milicevic
Andrew Colgan	Joan McNaboe
Aisling Penrose	Caroline Shally
	Anne Marie Hogan
	Nora Condon

Appendix E: Publications by the Expert Group on Future Skills Needs

Report	Date published
National Skills Bulletin	Oct-07
Monitoring Ireland's Skills Supply: Trends in Education / Training Outputs 2006	Jun-07
Tomorrow's Skills: Towards a National Skills Strategy	Mar-07
National Skills Bulletin 2006	Dec-06
Future Skills Requirements of the International Digital Media Industry: Implications for Ireland	Jul-06
Careers and Labour Market Information in Ireland	Jul-06
Skills at Regional Level in Ireland	May-06
SME Management Development Report	May-06
Monitoring Ireland's Skills Supply: Trends in Education/Training Outputs	Jan-06
Data Analysis of In-Employment Education Training in Ireland	Dec-05
Skills Needs in the Irish Economy: The Role of Migration	Oct-05
National Skills Bulletin 2005	Oct-05
The Demand and Supply of Foreign Language Skills in the Enterprise Sector	May-05
Skills Requirements of the Digital Content Industry in Ireland Phase I	Feb-05
Innovate Market Sell	Nov-04
The Supply and Demand for Researchers and Research Personnel	Sep-04
Literature Review on Aspects of Training of those at Work in Ireland	Jun-04
Financial Skills Monitoring Report	Nov-03
Responding to Ireland's Growing Skills Needs – The Fourth Report of the Expert Group on Future Skills Needs	Oct-03
The Demand and Supply of Skills in the Biotechnology Sector	Sep-03
Skills Monitoring Report – Construction Industry 2003/10	Jul-03
Benchmarking Education and Training for Economic Development in Ireland	Jul-03
The Demand and Supply of Engineers and Engineering Technicians	Jun-03
The Demand and Supply of Skills in the Food Processing Sector	Apr-03
National Survey of Vacancies in the Private Non-Agricultural Sector 2001/2002	Mar-03
National Survey of Vacancies in the Public Sector 2001/2002	Mar-03
The Irish Labour Market: Prospects for 2002 and Beyond	Jan-02
Labour Participation Rates of the over 55s in Ireland	Dec-01

Report	Date published
The Third Report of the Expert Group on Future Skills Needs – Responding to Ireland's Growing Skills Needs	Aug-01
Benchmarking Mechanisms and Strategies to Attract Researchers to Ireland	Jul-01
Report on E-Business Skills	Aug-00
Report on In-Company Training	Aug-00
The Second Report of the Expert Group on Future Skills Needs – Responding to Ireland's Growing Skills Needs	Mar-00
Business Education and Training Partnership 2nd Forum, Dublin	Mar-00
The First Report of the Expert Group on Future Skills Needs – Responding to Ireland's Growing Skills Needs	Dec-98

Appendix F: List of Submissions Received

Irish Association of Investment Managers

Irish Financial Services Regulatory Authority

Irish Funds Industry Association

Irish Taxation Institute

Letterkenny Institute of Technology

Pioneer Investments

The Society of Actuaries

The Society of Investment Analysts in Ireland

Trinity School of Business

University College Cork

University College Dublin – The Global Finance Academy, Michael Smurfit School of Business

University of Limerick: Kemmy Business School

Appendix G: List of Consultations with Industry

Company	Primary contact	Title	Location
Sun Life	Patrick Bruen	MD Ireland	Ireland
Sun Life	Mary Fay	Head of Annuities Business	US
Sun Life	John Wright	VP US Operations	US
RBS	Rajeev Adrian	Director Leveraged Finance	UK
Barclays	Stephen Gillott (+1)	Learning and Development	UK
HSBC	Rosemary Leahy	Head of Funds	Ireland
State Street	Willie Slattery	Country Manager	Ireland
State Street	Alison Quirke (+1)	Global HR Director	US
State Street	Maribeth Nash	VP HR UK	US
Depfa	Michael Deeny (+4)	MD	Ireland
Depfa	Dr. Donal Gallagher	Director, Market Risk	Ireland
JP Morgan	Carin Bryans	VP Treasury and Securities (Ireland)	Ireland
JP Morgan	Marie Dumas	VP Treasury and Securities (US)	US
Fidelity	Paul Murtagh (+3)	MD	Ireland
Fidelity	David Murphy	VP Software Development	Ireland
Fidelity	Stephen Ashmore	Director Development	Ireland
Fidelity	Cash Mitchell	Learning and Development	Ireland
Fidelity	Jason Hamilton (+2)	VP Technology Training Services	US
Fidelity	Hadley Stern (+2)	Director Fidelity Labs	US
Merrill Lynch	Diane Scheuneman	VP Global Infrastructure Solutions	US
Merrill Lynch	Ann White	Head of GMI Learning and Development	US
Merrill Lynch	Tony O'Halloran (+2)	Chief Technical Officer	Ireland
Citigroup	Aidan Brady	MD	Ireland
Bank of America	Diarmuid Connaughton (+1)	Principal	Ireland
Pioneer	Rob Richardson (+1)	CEO BoA Leasing	Ireland
Pioneer	Kim Hazen (+1)	HR Business Partner	US
Pioneer	Susana Chiros	Employment Manager	US
Unicredito	Stefano Vaiani	MD	Ireland
Bank of Ireland	Liam Butler (+1)	Director	Ireland
Bank of Ireland	Andrew Blair	HR Director	Ireland
BNP Paribas	Tom Woulfe	Group Management	Ireland
IAIM	Frank O'Dwyer		Ireland
DIMA	Sarah Goddard	CEO BoA Leasing	Ireland
Bank of America	David Brown	CEO BoA Leasing	Ireland
Orion Audit Mgt	JB McCarthy		Ireland
Irish Life Investment Managers	Deirdre Rigby	HR Manager	Ireland

Appendix H: List of Consultations with Providers

Institute	Primary contact	Title
School of Business, TCD	Brian M Lucey	INFINITI Group Coordinator
UCD	Prof. Thomas Begley	Dean, College of Business and Law
UCD	Prof. S Dineen	Mathematics
UCD	Dr. Anthony Brabazon	Director, Natural Computing Research and Applications Group
UCD Department of Banking and Finance, Smurfit School	Dr. John Cotter	Director, Centre for Financial Markets
Letterkenny Institute of Technology	John Andy Bonar	Head of Development
UCC	Prof. Ciaran Murphy	Business Information Systems
UCC	Prof. B Hanzon	Mathematics
DCU	Prof. E Buffet	Mathematics
DCU Business School	Prof. Liam Gallagher	Professor of Finance
NUIM	Thomas Flavin	Finance Professor, Economics Department
NUIG	Prof. Seamus Collins	Head of Department of Accountancy and Finance
NUIG	Bredan Kennelly	Economics
NUIG	John Hinde	Mathematics
NUIG	Alan Aherne	Economics
UL Kemmy Business School	Dr. Bernard Murphy	Department of Accounting and Finance
Dept of Accounting and Finance Kemmy Business School	Mr. Fergal O'Brien	Course Director MSc Financial Services
Sligo IT	Pat Scanlon	Head of Department of Business
Sligo IT	Clodagh Caslin	
Waterford IT	Tom O'Toole	Course Director of Business
The Wharton School, University of Pennsylvania	Richard E. Kihlstrom	Chairperson of Finance Department, Wharton School
Stern School of Business, NYU	Richard Levich	Deputy Chair Finance
Fordham Jesuit College of New York	James Lothian	Finance
City University London	Prof. Dirk Nitzsche	Professor of Finance Cass Business School

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