

2015-11-11

Adopting of PAS 1192-2 by Irish AEC companies – A Formula for Winning International Work

Robert Moore

Grangegorman Development Agency, robert.moore@ggda.ie

Alan Hore

Technological University of Dublin, alan.hore@tudublin.ie

Barry McAuley

Technological University of Dublin, barry.mcauley@tudublin.ie

Follow this and additional works at: <https://arrow.tudublin.ie/beschrecon>



Part of the [Construction Engineering and Management Commons](#)

Recommended Citation

Moore, R., McAuley, B. & Hore, A. (2015) Adopting of PAS 1192-2 by Irish AEC companies will better position them to win international work, *Proceedings of the 2nd CITA BIM Gathering*, Dublin, Nov 12 – 13th, PP 148-154 doi:10.21427/x3jt-5184

This Conference Paper is brought to you for free and open access by the School of Surveying and Construction Management at ARROW@TU Dublin. It has been accepted for inclusion in Conference papers by an authorized administrator of ARROW@TU Dublin. For more information, please contact arrow.admin@tudublin.ie, aisling.coyne@tudublin.ie.



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 4.0 License](#)

Adopting of PAS 1192-2 by Irish AEC companies – A Formula for Winning International Work

Robert Moore¹ Barry McAuley² and Alan Hore³

¹*Moore BIM Ltd, Dublin, Ireland.*

^{2&3}*School of Real Estate and Economics, Dublin Institute of Technology, Bolton Street, Dublin 1, Ireland.*

E-mail: ¹rob@moorebim.com, ²barrymcauley@gmail.com and ³alan.hore@dit.ie

Abstract Forfás Ireland policy advisory board for enterprise, trade, science, technology and innovation have recently recommended that the Irish Architecture Engineering Construction (AEC) industry should engage in more international work and in doing so have advised the industry to work within a Building Information Management (BIM) environment, so as to avoid the possibility of a competitive disadvantage in overseas markets. According to Forfás BIM can help develop the appropriate technical skills amongst Irish construction firms so that they can successfully compete in markets where BIM is widely adopted or a requirement. More importantly they have encouraged the industry to strive to achieve and exceed international industry standards. Such a standard is the Public Accessible Standard (PAS) 1192-2, which is now becoming the preferred choice of industry standard regarding BIM collaboration within the United Kingdom (UK). The purpose of this standard is to offer guidelines to the UK in order to ensure they achieve their 2016 mandate.

This standard would seem to be a natural fit for the Irish AEC sector, due to the fact that the Irish Government have previously followed closely behind the UK regarding regulations, as well as been strongly linked through a high number of construction companies exporting their services to the UK. PAS 1192- 2 will potentially become even more relevant in the future as it influences the International Organization for Standardization (ISO) in adopting accredited BIM standards. This may therefore not only limit Irish companies in trading to the important UK market but in also trading the rest of the world if they are not versed with its requirements.

This paper will investigate the potential of adopting PAS 1192-2 within the Irish AEC sector as the preferred industry standard for BIM and how this could help construction companies win international work. The data collation methodology included a number of interviews and an in-depth questionnaire. The interviewees will consist of industry leaders from Ireland, the UK and Australia. This will be complimented by an international questionnaire that was distributed to assess what current standards are been used both within Ireland and abroad. The research findings have indicated that in order to ensure that the Irish AEC sector is ready to compete in overseas markets, that they should adopt PAS 1192-2 in accordance with any future BIM governed projects.

Keywords - Building Information Modelling, BIM Collaboration Standards, PAS 1192-2.

I INTRODUCTION

The Irish AEC/FM industry is beginning to show signs of recovery after one of the most challenging times in its history in which has seen construction output reach alarmingly low levels. As a result of some of the AEC Companies that have survived have become lean, innovative and are capable of expansion.

The Forfas report which details a strategic plan for Ireland moving forward states that the Irish AEC industry should embrace overseas markets in order to maximise their business potential [1].

The UK market is growing, in particular the greater London area, which is good for Irish companies as the Irish/UK market has traditionally had good interconnectivity, with companies competing in both markets. Also Global Construction 2025 details the global construction

market forecast to grow by over 70% by 2025. This international work presents an opportunity for Irish companies moving forward [2].

Therefore Irish construction businesses need to have the right standards in place to make sure that it is able to work effectively at home and be ready to work in international markets, ahead of the competition. The question remains, is PAS 1192-2 the standard that will aid in winning this work.

II LITERATURE REVIEW

The literature review focuses international references detailing how BIM and standards, in particular PAS 1192-2 can play in securing international work.

The construction industry is an important element of Ireland's economy, a competitive and dynamic industry and property market forms a crucial part of the business environment and is a critical competitiveness factor underpinning enterprise investment and growth. The industry needs to build a competitive edge and challenge firms to work with new materials, embrace modern methods of construction, achieve and exceed international industry standards and become more efficient and productive e.g. utilising BIM-based integrated project management. If construction contractors and service providers are unable to work in a BIM environment they are likely to find themselves at a serious competitive disadvantage, particularly in overseas markets [1].

The revolution of BIM across the international construction world continues to grow and must result in Ireland adopting a similar methodology or face being left behind and unable to compete in foreign markets. Ireland needs to follow the examples of other countries experience and learn from their mistakes and successes, while ensuring an adequate support structure is in place to accommodate the change in culture and processes with regard to how we effectively do business [3].

Forfás states that alongside high-level capability, an adherence to standards and a high degree of professionalism across the board within the sector is required to underpin the sector's ability to fulfil its important role in meeting economic and social needs as the economy returns to a growth path [1].

These reports were complimented by a series of industry wide discussion workshops hosted by the Construction IT Alliance (CITA) in 2012. Specifically the workshops aimed to liaise with other international BIM councils and standards bodies and to be responsible for the development of Industry standard BIM execution plans, standards and accreditation [4].

The CITA BIM Workshop 4 focuses on achieving adoption of industry agreed technical

Standards and Protocols for BIM. A speaker at the workshop described a standard as an understanding that involves all parties who wish to see BIM adopted properly and also have a vested interest in seeing it work. This workshop summarised that parties involved in this process must be clearly defined and assigned responsibilities, with the terminology and scope for these standards clearly established, with set time deliverables. It was added that various government bodies need to be heavily involved in the discussion on standards in order to help set out what is to be delivered, how it will be delivered and what to do once it is delivered. The creation of a standardised BIM approach can aid in bidding for work within international arenas and can help in bringing costs down [4].

Developing universal standards is essential for the construction industry. Any ICT standards must ensure collaboration and continuing commitment among the participants. Effective management and administration of the ICT standard roll-out is also necessary for marketing and for spreading information, so that the standards become widely known and accepted in the industry [5].

Forfás warn of low take-up of ICT (Information & Communications Technology) within the sector is an emerging competitive disadvantage in project delivery due to slow adoption of process improvement (e.g. Lean) and productivity enhancing building information modelling (BIM) systems. This is a disadvantage to companies that are seeking to build business overseas and compete in the domestic context where there is increasing likelihood of competition from overseas and a more sophisticated client demanding higher environmental standards, increased efficiency and lower costs [5].

This is echoed by CITA in their 2012 Annual BIM report where they stated that a lack of compatible systems, standards and protocols, and the differing requirements of clients and lead designers, has inhibited widespread adoption of a technology in construction projects [4]. Official endorsement, preferably by ISO, can give wide recognition [6].

The Irish Government has previously followed closely behind the UK system and is also strongly linked to the UK through the vast majority of Irish AEC firms doing business in the UK [3]. In order for the UK to achieve a Level 2 BIM standard, which is a BIM File-Based Collaboration and Library Management, there is little change required to the fundamental building blocks of copyright law, contracts or insurance. This is encouraging from an Irish perspective, as Irish current contracting arrangements are not considerably different to the UK.

PAS 1192-2:2013 is a standards document for collaboration in the design and build phase of a construction project. PAS 1192-2 starts at the need

for the project and goes step by step to the handover. It builds on BS 1192 and references CIC BIM protocol for its application, but it also references other standards for other parts of the asset life cycle outside its scope [7]. It is a comprehensive document that is easy to follow and has been produced with clear diagrams to help with its use. In the summer of 2014 work to adopt PAS 1192-2 as an ISO standard started [8]

Fraser stated that the incorporation of the CIC Protocol (or something similar) in the Irish Public Works Contracts suite will allow the contractual risks to be allocated and managed in a more reasonable manner, which in turn may assist in the recovery of the Irish Construction industry and may give the industry a competitive advantage when competing for international business [9].

Forfás recognised the importance of BIM and overseas work, and identified an action for the organisation to work with industry groups to promote the use of BIM and develop the appropriate technical skills amongst Irish construction firms so that they can successfully compete in markets where BIM is widely adopted or a requirement [1]

In conclusion, PAS 1192-2 is a comprehensive document that covers the requirements of a project and acts as a frame work with reference to other required documents. Forfás stated that the Irish AEC industry is an important industry to Ireland, the industry is been advised to look for work overseas, adopt new BIM processes and adopt industry standards to prepare itself for the challenge of winning this work. These standards will not only aid with winning work they will bring cost down [1].

III METHODOLOGY

The authors' primary data collation methodology involved mixed methods approach of both quantitative and qualitative data collection techniques. The two methods of information gathering were:

1. Informal semi-structured focused interviews: Questions were flexible and open ended, allowing for a more complex response with the goal being to extract their tacit knowledge on this subject. A diverse selection of interviewees where chosen that included representatives from International and domestic based professionals
2. Online questionnaire with convenience sampling: The questions were developed from the literature review and the responses from the semi-structured exploratory interviews. As the research was on international standards it was felt that a large convenience sample of respondents with BIM experience was required. Invites to the questionnaire were

published on construction industry groups with BIM knowledge on the social media site LinkedIn.

The responses were triangulated to facilitate a holistic approach to enable the testing of relationships with data synthesis to produce more insightful secondary common trends.

IV PRIMARY RESEARCH

a) Interviews

Three face-to-face semi-structured exploratory interviews were conducted to acquire a better knowledge of standards, in particular PAS 1192-2. The approach was to ask two broad questions on standards and PAS 1192, with 'What' or 'Why' sub-questions to obtain further detail (Creswell, 1994)[10]. The resulting discussion was distilled into three topics relevant to this paper, which are summarised below.

The interviewees were chosen for their vast experience with BIM, interviewee 1 is a lead project information manager at a large international construction company who worked on projects in both Australia and the UK, and has helped firms implement BIM methodologies.

Interviewee 2 is a managing partner of an Irish architectural BIM design house that provides managed BIM production, support and training services, this practise has been leading the development and adoption of BIM in Ireland since 2009. He is also the chairman of the RIAI practice committee for BIM, and coordinator of the Construction IT Alliance (CITA) BIM Group.

Interviewee 3 is the director of BIM EMEA (Europe, the Middle East and Africa) at a large international construction company and seconded to the Cabinet Office's Efficiency and Reform Group, where he is head of BIM implementation. He is also Chair of the UK BIM Task Group, BIM2050 and various BIM4 steering groups.

i) PAS1192-2 as a standard

Interviewee 1 was asked about PAS 1192-2. He had some knowledge of this standard and defined it as a BIM standard that "formalises and communicates the process of better procurement of facilities, where that would be buildings or infrastructure projects. The mantra of starting with the end in mind is exhibited in that standard." It establishes "the requirements up front, feeding them into the client process at the start and then being able to iteratively check to see either requirements or performance all the way."

Interviewee 2's understanding of PAS 1192-2 is that it is "an information delivery manual" and

“specification for the process for production of building information into using the BIM.” It is also “part of a suite of documents” and “sets out the process of how information flows through the cycles, how it starts from the very beginning at the client information requirements and how that flows into BIM execution planning, and agreeing who is going to do what,” using the “Model Delivery Production Table”, and the process is checked at different stages through data drops. It checks “What has been produced and if the right level of information being produced at each stage as set up by the team”, at the end of the project there is another 1192 standard that picks up where PAS 1192-2 leaves off.

Interviewee 2 outlined how PAS 1192-2 is different to other standards: “Standards can be quite broad in telling you what you have to do but does not say how. Because PAS is starting to suggest how you might do it, having these key elements like EIR or BEP” which give guidance on how information is delivered. He then states that “clients need to realise that they are the very starting point of PAS 1192. The EIR is the key document, if clients don’t ask the right kind of questions at the beginning, they are not going to get the right results.”

Interviewee 3 believes that PAS 1192-2 “should be read in conjunction with its companion documents PAS 1192-3 and BS 1192-4” and states, “it shouldn’t be used in isolation” and it starts “with the end in mind.” He further describes PAS 1192-2 as looking “at the information management during the capital expenditure stages, starting off with PAS 1192-3. PAS 1192-3 starts to define organisation information requirements and asset information requirements, PAS 1192-2 which then starts to implement them through an employer’s information requirement and BIM execution plan. PAS 1192-2 then starts to look at the process and starts to define information requirements in terms of when is it, when is the information required, and in terms of who is responsible for the information. That’s achieved through Task Information Delivery Plans. One of the key things of it is the MIDP (the Master Information Delivery Plan), which sets out the roles and responsibilities but, more importantly, the level of definitions of the model for achievement. It ensures the information can flow right through the whole asset lifecycle but in a common data environment.”

All interviewees agreed that PAS 1192-2 is a comprehensive document and starting “with the end in mind” is the key element, this is achieved with the EIR. The MIDP helps the project teams better manage their tasks by informing them what to expect by who and when. They also agreed that PAS 1192-2 is a process for delivering a building to the client’s needs.

ii) The Irish context and international perspective on standards

Interviewee 2 stated that “lots of our regulations are based on the British standard.” He continues by stating that Ireland “does not have a standard” and does not have “resources to produce our own standards; many companies in Ireland would work both in Northern Ireland and UK, he did not see the point in having different standards.

He elaborated that there has been a “policy decision from the RIAI to promote PAS 1192-2 as a standard across industry” which “has been announced and other institutes have been informed of the RIAI position.” He warns that the “worst thing that could happen is that everybody goes in different directions”, and believes “the more and more people start talking about this standard, adopting it and using it and encouraging others to use it the better.”

Interviewee 3 does “not think there should be two standards” for the UK and Ireland. He does not see “any reason why Ireland should not take PAS 1192-2 and use it, as it can easily be lifted.” He has seen it used in Russia and lots of other countries.

Interviewee 1 speaks about a client that is looking to implement PAS 1192-2 in New Zealand and they have started to investigate its applicability to Australia, stating that he and colleagues approve of using PAS 1192-2 in Australia/New Zealand.

Interviewees 2 and 3 concur about the important aspects of PAS 1192-2, that it is part of a suite of documents and the important elements are the BEP and the MIDP. The MIDP confirms that the right information is delivered at the right project stage and all project stakeholders know what they require and what is required of them. Interviewee 4 also comments that PAS 1192-2 is a guide on how to deliver a project.

Interviewees 2 and 3 agreed that PAS 1192-2 can and should be used in Ireland. Interviewee 2 discusses that the UK and Irish industries are linked by companies working in both markets and states that Irish industry does not have the capacity or appetite to develop an Irish standard. He also states the RIAI has adopted PAS 1192-2 and advised other industry bodies to do the same, warning of the danger of others adopting other standards.

iii) Future of PAS 1192 and ISO

Interviewee 2 stated that “the British Government are looking to an international standard” for PAS 1192-2, and he is part of an international “working group at the moment that is trying to harmonise standards for BIM across Europe; once the standards are harmonised across Europe then an EU state cannot go off in a different direction.”

Interviewee 3 believed “the UK standards are going to be the basis for the new ISO that’s going to be coming out; there’s an international standard being developed and a lot of that will be based around the UK standard. PAS 1192-2 will be well adopted in lots of other countries,”

It is forecast by all interviewees that PAS 1192-2 is on track to become an ISO standard and will have widespread adoption across Europe and the rest of the world.

b) Questionnaire

The questionnaire consisted of 10 questions, which was piloted to 7 industry/academic colleagues. After the pilot study was completed the questionnaire was then distributed on LinkedIn. The purpose of the survey was to investigate BIM standards and their international context, with data gathered on company locations, types and markets. There were 140 international respondents which included 58 respondents from Irish companies. The data was collected using google forms and collated in excel with the output graphs created using pivot charts.

The following data has been extracted from the questionnaire results to best suit the subject of this paper.

i) Question 1: What is your company's secondary location for work?

60% of Irish companies responded that they already work internationally with a secondary market, Fig. 1 illustrates the locations of this market. 15% of Irish companies responded that their primary market is outside Ireland, with the majority of these companies stating that their primary market is the UK, this accounts for the 9% of Irish companies shown Ireland as their secondary market.

The data also shows that 56% of Irish companies are looking for international work and 29% of Irish companies have a desire to expand onto an international market outside the UK and Europe.

This question shows that a large amount of Irish companies already work internationally and also shows that the UK is their biggest market. With these strong links to the UK, it makes it an obvious choice to follow the UK’s standards.

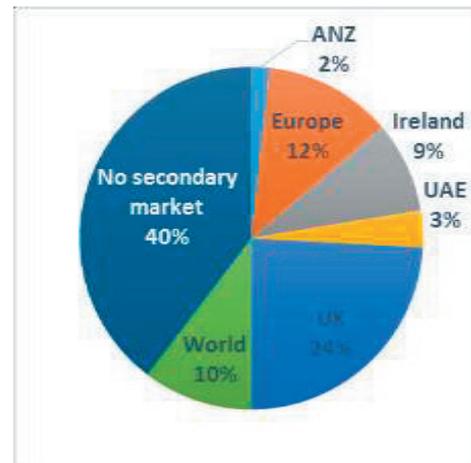


Fig. 1: What is your company's secondary location for work? (Ireland)

ii) Question 2: What is the current BIM standard based on in your company?

This question investigates what BIM standards are being used in an international context and aims to identify the leading standards. The respondent had a choice of various standards that are available from around the world and also had the option to add a response under ‘Other’. The “Other” responses were rationalised with most responses falling into a new “In-House” category.

The data shown in Fig. 2, shows 28% of the respondents are using PAS 1192-2 with 16% using NBIMS. Of the respondents that use NBIMS, 86% of them are located in the US. PAS 1192-2 and NBIMS were the main industry standards identified, with other industry standards only polling 1% each. Fig. 3, shows in Ireland the percentage of respondents that have adopted PAS 1192-2 has risen to 41%, NBIMS usage drops significantly to 2%, while the Norwegian Association is also at 2%.

This data clearly shows that internationally PAS 1192-2 is the most widely used BIM standard, with NBIMS mainly being used within the US. Within Ireland PAS 1192-2 is nearly the only industry standard being adopted, which gives a clear signal that PAS 1192-2 works in and is being used in the Irish industry.

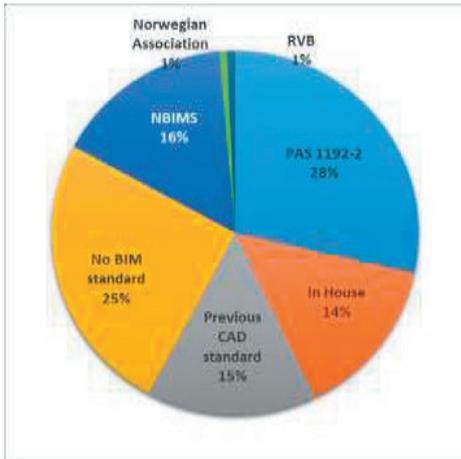


Fig. 2: What is the current BIM standard based on in your company? (International)

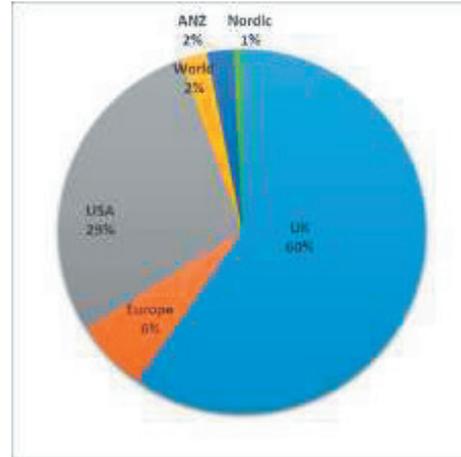


Fig. 4: What country's BIM standard most influences your company? (International)

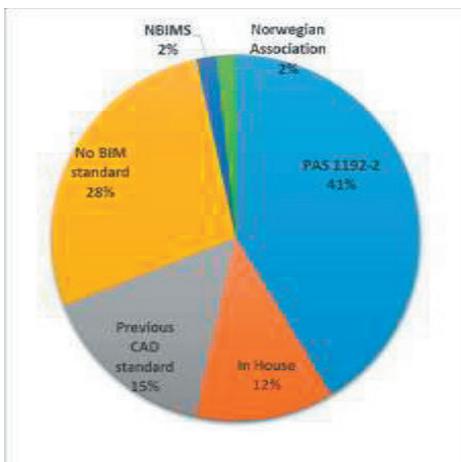


Fig. 3: What is the current BIM standard based on in your company? (Ireland)

iii) Question 3: What country's BIM standard...

The purpose of this questions is to investigate who is the most influential country regarding BIM standards. This will help identify where companies believe that BIM standards are strongest. It was found as illustrated in Fig. 4, which most organisations internationally look to the UK for guidance, with 60%.

The data shows that 91% of respondents in Irish companies indicate that the UK is the most influential country regarding BIM standards.

This clearly shows that the UK internationally is the most influential country regarding BIM and again as with BIM standards, Ireland look's towards the UK for guidance.

iii) Question 4: Ireland currently has no BIM standard.

Respondents from Irish companies were asked if "Ireland does not need any BIM standard". 63% strongly agree or agreed with this statement. This was further explored by enquiring if "Ireland should adopt PAS 1192-2 as advised by RIAI". It was discovered that 72% strongly agree or agreed with this statement. Finally 63% strongly disagree or disagreed that "Ireland should start from the beginning with a BIM standard". This results would indicate that that PAS 1192-2 is the preferred approach to BIM with in Ireland. Irish respondents claim that PAS 1192 is the preferred standard to be used in driving the BIM process.

V THE TRIANGULATION OF RESULTS

A number of sources in the literature review state that standards will aid Irish companies in bidding for work internationally [4][3]. Forfás state that Irish AEC companies should prepare for international work in which the UK construction 2025 report forecasts [1][2]. The questionnaire also reflects on 56% of Irish companies looking for international work and 29% are looking outside Europe.

Ireland looks to the UK for influence and does most of its international business in that market; this is shown in the literature review [4][3] and is echoed in the interviews. Also stated in the interviews is that Irish regulations are typically born from British regulations. Further evidence of this is found in the questionnaire with 91% stating the UK as their chief influence in regards to BIM standards.

PAS 1192-2 is a very comprehensive document for the CAPX stage of a project and items outside the scope of PAS 1192-2 e.g. the BIM protocol, are reference by this standard. The standards also from part of a suite of documents that cover the full life cycle of an asset. The interviewees described the

elements in detail and the EIR is considered a very important part of this standard. Interviewee 2 refers to PAS 1192-2 as a “How-to guide” - not just what is required to achieve the standards. Interviewee 3 agrees that all required elements are present and continues that “it’s hard to find a hole in PAS 1192-2.”

The Irish industry is already using PAS 1192-2; this is clearly shown with 42% of respondents using PAS 1192-2. Respondents also show a desire to adopt PAS 1192-2, as demonstrated through the high agreement rate. Interviewees 2 and 3 agree that PAS 1192-2 can and should be used in Ireland.

As discussed in the literature review, PAS 1192-2 is to become an ISO in the near future, which will give it international status. Howard and Björk state that a standard needs to have ISO [6]. All of the interviewees discussed PAS 1192-2 becoming an ISO standard, this should give confirmation that adopting PAS 1192-2 will not be a redundant act.

VI CONCLUSION

The global construction market is growing as shown in the UK construction 2025 report [2]. Irish AEC companies that have survived the recession are strongly advised by Forfas to compete to procure work overseas.

The UK is Ireland’s largest international market and this has seen a number of traditional links created. The UK is shown as the most influential country regarding BIM standards worldwide and the UK’s BIM influence within Ireland is shown to be particularly strong.

PAS 1192-2 is shown to be a comprehensive standard covering all aspects in the CAPX stage of an asset. The Irish industry already heavily uses PAS 1192-2 as a standard as it is a suitable standard for the Irish market moving forward, as regulations are similar between both jurisdictions.

With PAS 1192-2 on its way to ISO adoption this standard would correctly position Irish companies in competing for BIM governed work in the UK. Adopting this standard will put Irish companies at an advantage in winning work overseas and in turn prepare them for the UK mandate.

It may prove advantageous to adopt the standard, as soon as possible, to have a working knowledge of it before it is referenced in contract documentation.

REFERENCES

- [1] Forfás (2013) Forfás Report: Ireland's Construction Sector: Outlook and Strategic Plan to 2015, Forfás, Dublin.
- [2] Oxford Economics (2013), Global Construction 2025: A Global Forecast for the Construction

Industry to 2025, Global Construction Perspectives.

- [3] McAuley, B., Hore, A. V., West, R., & Kehily, D. (2012) Addressing the Need to Reform Construction Public Procurement in Ireland through the Implementation of Building Information Modelling, Dublin Institute of Technology, Dublin.
- [4] CITA (2012) BIM Report 2012, CITA, Dublin.
- [5] Hore, A.V. and West, R.P. (2008) CITAX: A Collaborative ICT standards model for the Irish construction industry, 25th CIBW78 Conference, Improving the Management of Construction Projects through IT Adoption, Santiago, Chile, 15th-17th July, Edited by Rischmoller, L., CRC Press, Florida.
- [6] Howard, R., and Björk, B.-C. (2008) Building Information Modelling – Experts’ views on Standardisation and Industry Deployment, *Advanced Engineering Informatics*, 22(2), 271-280.
- [7] BSI (2013) PAS 1192-2:2013 Incorporating Corrigendum No. 1 Specification for information management for the capital/delivery phase of construction projects using building information modelling, BSI Group, London.
- [8] BIM Task Group (2014) [http://www.BIM Task Group.org/](http://www.BIMTaskGroup.org/). [Accessed 05 June 2014].
- [9] Fraser, S. (2013). The adoption of BIM within the Public Works Contracts (PWC) suite of construction contracts in Ireland. Proceedings of the CITA BIM Gathering, 159-162.
- [10] Creswell, J. (1994) *Research Design: Qualitative and Quantitative Approach*. Sage, Thousand Oaks, CA..