2015

BIM and FM
Research & Practice Workshop

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Introduction

On the 1st June 2015, a group of twenty researchers, FM practitioners and construction professionals from the UK, Switzerland, Germany, Denmark, Norway, Netherlands and the US gathered at the prestigious Glasgow Riverside Museum for a "FM and BIM - Research and Practice Workshop" as part of ongoing efforts by the EuroFM Practice Network Group (PNG) to bring together academic researchers and FM practitioners to discuss important issues impacting on FM such as BIM.

Figure 1: Karin Schaad, Chair of the EuroFM PNG welcoming the group and opening the workshop

The workshop was jointly organised by Simon Ashworth from the Zurich University of Applied Sciences (ZHAW), Martin Bänninger (eneco) from Switzerland and Ivor McCauley from Glasgow Life who hosted the event at the Riverside Museum, one of a 168 buildings in their property portfolio. The event was well supported with representation from various international FM professional bodies including IFMA, the Danish FM Network (DFM), the Norwegian FM (NBEF) and STATSBYGG Associations and members of the BIFM Soft Landings group. Academics from the Zurich University of Applied Sciences and the Netherlands Hanze University Groningen joined with FM and construction experts including BAM UK and BAM Deutschland AG, Mace Macro, ISS, Halter AG, eneco, Robertson Facility Management, FES FM, Auwiesen Immobilien AG, UniversitätsSpital Zürich and Glasgow Life.

The Glasgow Life Experience of BIM and FM

Ivor McCauley presented "The Glasgow Life Experience of BIM and FM in practice so far" highlighting how the BIM process was used for the first time on the Kelvin Hall project in Glasgow. Key lessons learnt were:

Figure 2: Ivor McCauley presents the "Glasgow Life Experience of BIM and FM"

- All stakeholders involved found themselves on a steep learning curve as most knew little about BIM and how to implement BIM as a process on a project. The UK PASS 1192 Standards and BIM Task Group BIM Guidelines were used as tools for all to get up to speed.
- BIM should be seen as a process, not as a tool or piece of software. The BIM process required a different way of thinking and working together by all stakeholders involved.
- BIM helped collaboration between the FM and construction teams as FM were actively asked by the construction team for their input and involvement during design.
- Careful consideration should be given as to the Employers Information Requirements (EIR) and when the EIR is issued. For Kelvin Hall it was at RIBA Stage 3 (issued by the design team). The aim for future projects (e.g. the "Burrell Collection") is that FM take ownership and specifies the EIR in agreement with the design team earlier and ideally at RIBA Stage 0.

- For the Kelvin Hall project “the primary purpose of the BIM Model upon completion was to identify service runs and access routes and their interface with structural and architectural elements”. Note: The workshop considered whether this statement was myopic in concentrating on the build and not the functionality of the facility. The discussion concluded that the FM team should take ownership of the EIR to ensure it meets their needs and so that FM get what they need at handover from construction to operation.

BIM and FM - Survey

Simon Ashworth presented the findings of a survey carried out by ZHAW and IFMA Switzerland in March/April 2015 as part of his PhD with Liverpool John Moores University focusing on “BIM and FM”. The aim was to benchmark the current perception of BIM by FM practitioners and key stakeholders in the whole life process in Switzerland. The findings indicate that BIM is seen as important issue for FM with 32% of respondents saying they already had some experience of BIM and 31.7% believing BIM will have a significant impact on FM in Switzerland in the next 1-2 years and 44% in the next 5 years. The intention is to also carry out a similar survey on a larger scale in the UK.

Figure 3: Simon Ashworth presents the findings of the "BIM and FM" survey

Full details of the survey results can be found as an appendix to this report.

BIM and FM Workshop: Focus on EIR FM Outputs

Figure 4: The Burrell Collection

Three working groups discussed the role and needs of FM in the BIM process with a focus on trying to establish “FM Outputs” needed for an FM orientated EIR for the pre-tender process. The workshop was set in the context of planning the FM operation for the new “Burrell Collection” building. The groups were asked to consider the PhD research question:

“*What information do facility and asset managers need from the Capex (capital expenses) phase of a project to deliver maximum added value in the Opex (operational expenses) phase?*”

The three groups focused on one of the FM perspectives/service areas as follows:

1. **Operational:** Use "Space Management" as an example Service – what is needed?
2. **Financial:** What cost data should be included?
3. **Personnel:** What training and skills will FM need?

The groups then reconvened and presented their work to the whole group. A summary is as follows:

1. **Operational:** Space Management

There was a general discussion in the group about the many different needs and the information required to allow FM to efficiently manage "Space Management" as a delivered service. Specific outputs the FM Team would be looking for from the BIM process and models were:

- **Space reporting:** The BIM models should give FM the ability to quickly generate a wide range of management reports to identify all spaces in a building/asset, how they are used and where appropriate who owns the space or is responsible for it. The information should be delivered in a hierarchical manner with a unique and agreed "space naming system" defined by the customer (as opposed to just using construction numbering) to include as appropriate "locations", "zoning" (for fire evacuation and other purposes), defined "space types" (rented, internal etc.) and "functionality" (use – both planned and potential future use for flexibility). It is also important to understand the level of quality of the space and demands to be made on them.

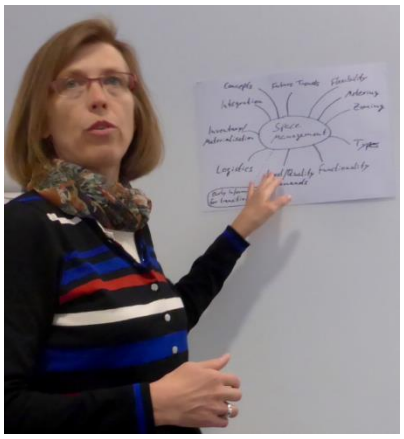

Figure 5: Susanna Caravatti-Felchlin Chairwomen IFMA Switzerland presents the Space Management Outputs

- **Volumes, sizing and cost data:** The outputs should allow easy and flexible reporting for FM planning purposes with the ability to include data on volumes, sizes and costs information etc. associated with each space for calculation of operational costs per metre, the ability to then benchmark performance, use in tenders and for detailed costing for projects.
- **Inventory of assets related to space:** For each space the assets associated with that space should be easily identifiable and relevant cost and operational data attached to each asset to allow FM the ability to manage the space and assets together as a service. The availability of information early will help FM with detailed transition planning.
- **Logistics planning and concepts:** The FM Team should have a clear understanding of the logistics planning for the movement of people/equipment around the spaces to ensure access routes are available for changing pieces of plant and equipment at the point they need to be replaced.
- **Current and future use concepts**: for how buildings/assets are planned to be used at handover and how they could be used in the future should be provided for each space in the model with explanations of how easily spaces can be reconfigured to accommodate flexibility and change of use of the spaces in the future.

2. **Financial:** What cost data does FM need?

The group debated the different financial information that could/should be attached to the BIM models and how this information could benefit FM in both day to day operational management as well as forward financial planning for issues such as asset replacement, maintenance etc. Specific Outputs the FM Team would be looking for from the BIM process and models were:

Figure 6: Reid Cunningham from BAM UK presents the Financial Outputs

- **Commercial model data:** It was acknowledged that there could be sensitivities around the issue of commercial information but having full transparency of the Builders Procurement cost data will allow FM procurement to understand and build their FM operational and asset replacement programmes faster and more accurately for clients
- **Design efficiencies**: as part of the EIR the FM should be involved to ensure that site/building specific Issues such as transport, logistics etc. are thought through from an FM operational perspective to help the design team ensure better control over "change requests" and to provide "live feedback". This allows better and more accurate checks to be made on sensitivity analysis with checks made as appropriate at every stage/phase.
- **Lifecycle cost data:** Information should be included in the model about the individual assets in terms of cost and life expectancy to allow accurate life cycle calculations and to assist FM with asset replacement programmes.
- **Maintenance and Operational Costs:** The data should include information about maintenance frequencies and service and replacement parts costs for FM PPM schedules with appropriate frequencies and rates. The data should be configured to easily feed into the FM Management systems (CAFM etc.) and be compatible with a recognised system such as SFG20.
- **Schedules of elements:** The data should allow FM to run detailed reports with appropriate filters for various types of "equipment" or "systems" such that costs for maintenance of systems and individual items can be easily calculated, as a whole or per square metre. This should help FM to track planned vs actual costs in greater detail.
- **Asset Classification systems**: All assets should be classified using an appropriate and agreed system as defined by the client and their Asset Management System (OIR and AIR) such as Uniclass 2015, NRMJ etc.
- **Energy and Utility data**: Expected costs for energy/utility usage should be included so FM can compare actual vs planned usage. Design calculations and simulations should be included along with a strategy/plan for the metering of the building to clarify how the energy usage can be allocated around the building/asset. This is especially important in cases where the space will be rented out. **Note:** There was some discussion about if staged payments should be introduced based on energy use verification (apparently this is becoming more common in Norway).
- **Marketability (rental values) of space:** There should be a layer within the model that tracks the cost of the space (dependant on size, views, services etc.) which could be easily updated for companies who are planning to rent out sections of a building/asset and may wish to charge different rates for different spaces.

3. Personnel: What training and skills will FM need?

The group debated the issues around the training and skills that would need to be taken into account in the BIM process including the handover and transition process from build to operation as what skills would be needed in the design phase. The FM team need to acquire certain abilities but it is also about attitudes and new ways of approaching their tasks using the BIM models. Specific Outputs the FM Team would be looking for from the BIM process and models were:

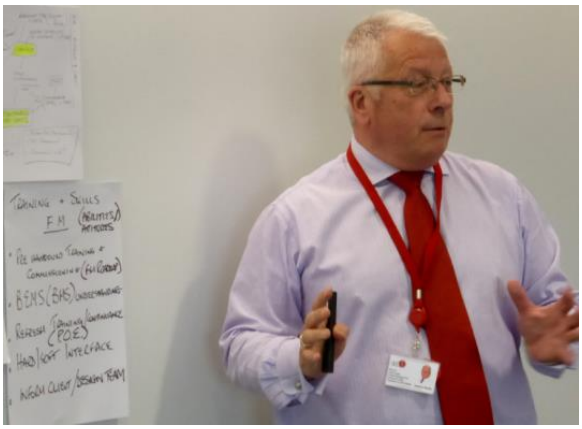

Figure 7: Stephen Beadle from FES FM and the BIFM Soft Landing group presents the FM Training and Skills Outputs

- **Training roadmap:** It was suggested there should be a "FM Training Road Map" put in place in the BIM process to ensure that the FM staff receive the appropriate "pre-handover training" and are fully involved with the "transition commissioning" process at the right time. It is a common experience of FMs that this often gets omitted from planning or is squeezed as people try to meet project deadlines.
- **System Specific Training:** FM staff should have specific training with respect to the BIM models so they understand how to access all the data needed for FM to manage their standard CAFM / BEMS (BMS) etc. systems. It is essential for FM staff to be able to interrogate the BIM models otherwise there is no hope that the models will be kept up to date. It would be a shame if the potential benefits were not realised due to poor training and a lack of understanding as to how the models can be used to FM advantage. The training plans should encompass refresh and continuity training
- **Informing the client and design team:** The FM team should have adequate training and involvement during the design process whilst the models are being developed so that they can give feedback and make suggestions as well as become familiar with the models.
- **Post Occupancy Evaluations (POE)**: The FM staff should be included in the planning of POE from a soft landing perspective to ensure they understand how the BIM process and models will be used to help verify that the building is performing as per the design criteria and also so they can understand any variations that may occur due to occupant behaviour or other factors.

Conclusions and way forward

As a wrap up to the day the group discussed the feedback from the various groups and the plans for further research. The following observations were made:

- The workshop was seen as interesting and a useful day by all participants. It made them realize that as a community FM is on a sharp learning curve with respect to understanding how the BIM will impact on their FM operations.
- It was agreed that BIM is the way forward with respect to how buildings /assets will be delivered in the future. In order to ensure that FM does not fall behind we all need to get to grips with a better understanding of BIM and familiarise ourselves with how it can benefit FM
- FMs need to be actively involved early in the design process and following the logic of PAS 1192-2 we should "start with the end in mind" and think about:
    - What do FMs really need from the BIM process?
    - How should the EIR be structured in such a way that it delivers real benefit to the FM team at the point of handover?
    - Who should take ownership of the EIR? This point was debated and it was agreed as the client representatives FM should inform themselves so they can help pull together the EIR which after all is "the clients requirements"
- The workshop demonstrated how difficult it is to clarify the "FM Outputs" in such a way that they can be succinctly worded and that further work is required in this area. Simon Ashworth explained to the group that the intention of the PhD is to focus in this area. It is the intention to carry out a detailed survey of FMs to get a better understanding about their perception of BIM and what needs to be captured in terms of outputs and then to design models and templates to help FMs create "FM Friendly EIR documents".

Life Sciences and Facility Management
Institute of Facility Management

IFMA Switzerland Chapter

2015

BIM and FM – Switzerland

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5/31/2015

Introduction

As part of the IFMA Switzerland "BIM and FM" Spotlight Event on the 30th March 2015 in Basel, the ZHAW initiated an online survey as part of a PhD research project undertaken by Simon Ashworth ashw@zhaw.ch asking IFMA members to help establish a benchmark regarding the current perception of BIM and FM in Switzerland. The results show how Facility Managers and other experts in Switzerland perceive BIM and how it will impact on the FM industry in the future.

Survey Participation and Findings

The response rate was good with a 52 fully completed questionnaires (33.7%). There was a wide variety of job functions represented (some with multiple roles) as shown in Fig 1. Others roles included: Data Managers, Surveyors and Government Administration roles. Most of the responses (34.6%) were from people working for companies with more than 1000 employees as shown in Figure 2 but there were responses from all sizes.

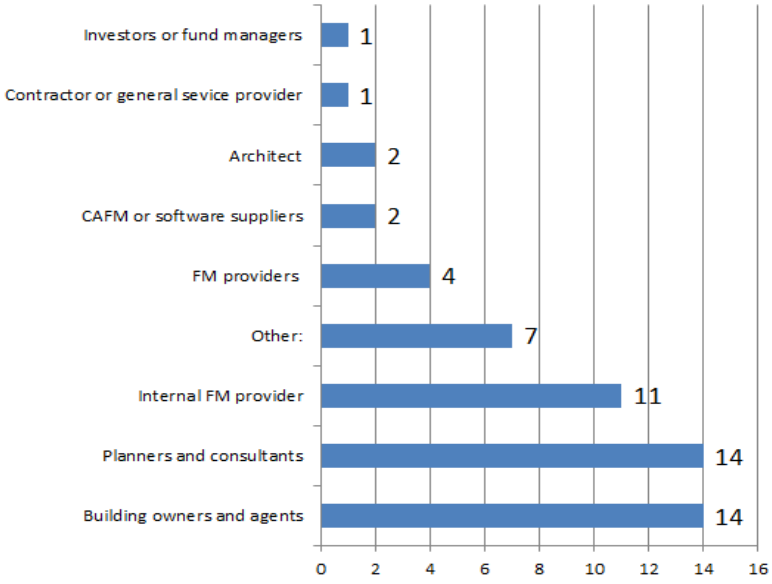

Figure 1: Job functions of participants

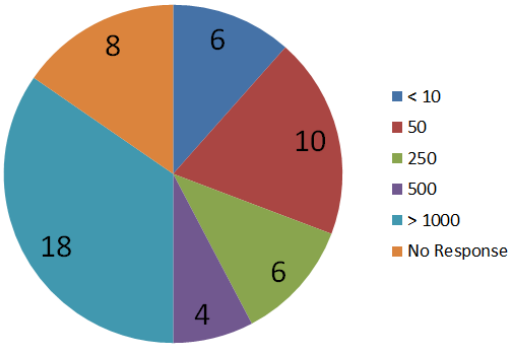

Figure 2: Company size

This indicates there is a wide interest in BIM and how it will impact on business in the future across the different stakeholders responsible for property portfolios and for large and small companies alike. The survey also asked respondents about their responsibility with respect to different types and size of their property portfolios. The most common type of portfolio was not surprisingly Office / Administrative space but there was a good representation across a range of different RE. Table 1 shows the range with the total and average m2 GF for each type.

Table 1: Real Estate Portfolio of Respondents

	Type of Space	Total [m2 GF	Average [m2 GF
A	Office / Administration [m2 GF]	6.516.093	310.290
B	Residential Flats [m2 GF]	1.500.000	251.056
C	Retail [m2 GF]	1.816.500	454.125
D	Hospital or care home [m2 GF]	1.330.000	166.250
E	Public Offices and Buildings [m2 GF]	1.735.025	347.005
F	Laboratories or Industry [m2 GF]	1.889.407	134.958
G	Other [m2 GF]	1.759.500	351.900

The survey also shows that BIM is already a topic of interest amongst stakeholders with 32% of respondents noting they already had some experience with BIM. Although BIM is a relatively new topic to FM 31.7% believe BIM will have an impact on FM in Switzerland in the next 1-2 years, whilst 44% felt BIM will impact on FM in the next 5 years. It was clear from responses that stakeholders are keen to see the establishment of BIM Standards and Guidelines. 34.8% of respondents were already aware of the Swiss Guideline SIA Merkblatt 2051 "Building Information Modelling" currently in development. 18.6% people were also familiar with the ISO 15686 Standard on Life Cycle Costing and some were familiar with the British PAS1192-2 and 1192-3 standards. (It was noted the PAS1192-2 standard will become an ISO Standard for Europe).

The survey also established that although the "FM industry is not yet sure what BIM actually is" respondents perceive BIM as a new way of working in collaboration and not just being about software. They also perceive that BIM can be used for both new and existing buildings.

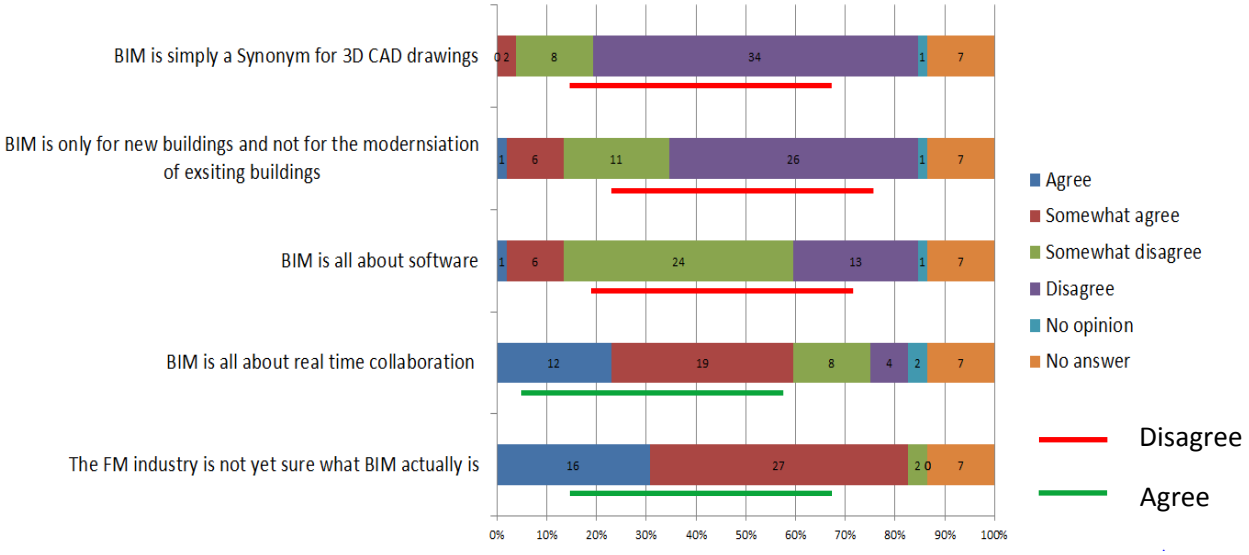

Figure 2: Perception of BIM

When asked how BIM might be used to benefit FM 28.3% of respondents felt that both Cost savings and Life cycle costing would be the key benefits. Feedback also indicates stakeholders are looking for case study evidence for ROI. 26.7% think BIM will help increase operational efficiency and 12.6% felt BIM may impact on reduction of carbon emissions and energy savings. Other potential benefits identified included: building databases, more exact planning, CAFM data input, QS for FM tenders, business continuity and service optimisation.

Several respondents note that there is a need to change "traditional ways of working and approached to contract structures and fee structures" before BIM can be easily implemented in Switzerland.

The key concerns raised by respondents regarding BIM were: data management and the cost of implementation as shown in Figure 3

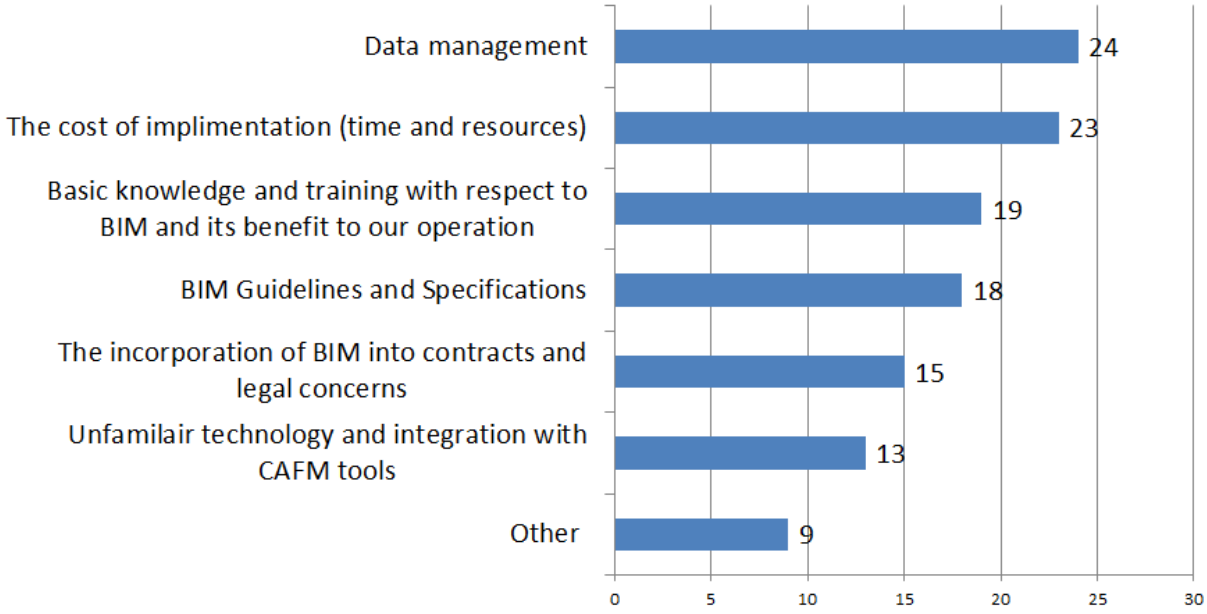

Figure 3: Concerns regarding BIM

Other issues respondents were concerned focused on if BIM will result in the creation of "data cementries" and that there are many different interpretations of what BIM acually is. Discipline with respect to the flow of data, the need to consider standards, laws and legal liabilities, a possible lack of financial investment by customer due to clarity of benefits, buy in by all stakeholders (resistance by some) and the approriate and early involvment of FM were all raised showing that BIM has a way to go before these issues are addressed.

Respondents note that a paradigm change in way people work is required. Figure 4 shows the key barriers respondents raised with respect to possible use of BIM and FM in practice. The key barrier being the lack of internal expertise with respect to BIM showing the need for education and training with respect to BIM as a process and how it can be implemented. Cost was also a key barrier backing up the need to provide case study examples of ROI. This possibly connects with another barrier the current lack of demand from clients although this may change as BIM becomes more established as the norm.

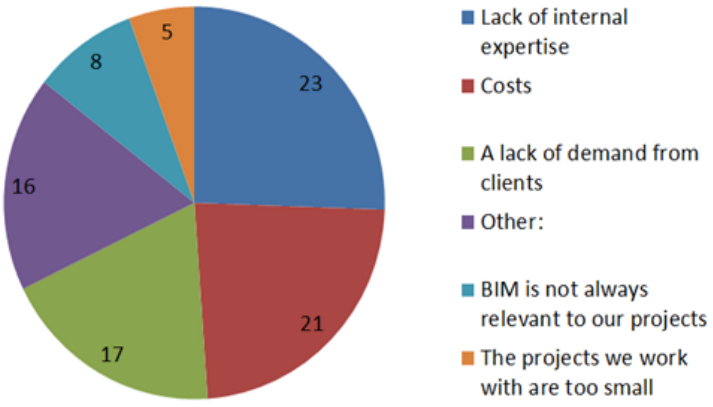

Figure 4: Barriers to BIM

The respondents however felt that there was a wide range of ways BIM may potentially benefit FM. These are shown in Figure 4. It is clear that respondents feel

Figure 5: The Potential Benefits of BIM to FM

In summary the survey indicates that BIM has some way to go before it is fully established in Switzerland. There are concerns and barriers that need to be overcome if BIM is to become the norm. This is normal and requires a paradigm change in thinking to establish BIM as a new way of working together with the associated technology that is part of the BIM process. However the outlook shown by the results indicate that the perception is that BIM is likely to have a significant impact on FM in the next 1-5 years with clients and other stakeholders becoming more aware of the potential benefits of BIM to FM. The survey also indicates there is also a need for further education and training to allow FM and other stakeholders to fully acquaint themselves with the BIM process.

The survey results will form part of an ongoing PhD research project looking at “BIM and FM and the Role of Facility and Asset Management in the BIM Process in Improving Assets for Society”. This project will compare BIM and FM in Switzerland with the more advanced market in the UK and other countries. The intention is to run further versions of the survey and to improve and refine the questions to obtain improved quality and quantity of data. If you are interested in BIM and FM, and would like to help contribute towards the knowledge or have a project which might be used as a possible case study for this PhD please contact Simon Ashworth ashw@zhaw.ch

Event Attendees:

The following is a complete list of the attendees participating in the workshop from the 1st June 2015 with their company and country of operation.

No	Last name	First name	Company	Country
1	Ashworth	Simon	Zurich University of Applied Sciences ZHAW	CH
2	Bänninger	Martin	eneco	CH
3	Beadle	Stephen	FES FM/BIFM Soft Landings group	UK
4	Caravatti-Felchlin	Susanna	UniversityHospital Zurich /IFMA Switzerland	CH
5	Cunningham	Reid	BAM	UK
6	Bort	Bastian	BAM Deutschland AG	D
7	Henderson	Hugh	Mace Macro/BIFM Soft Landings group	UK
8	Jentzen	Gunar	Halter AG	CH
9	Malstrom	Ole Emil	Real FM (DFM)	DK
10	McCauley	Ivor	Glasgow Life	UK
11	McMillan	Gordon	Private Consultant	UK
12	Miller	Ross	Robertson Facilities Management	UK
13	Risse	Robert	Auwiesen Immobilien AG	CH
14	Schaad	Karin	ISS	CH
15	Harv	Haakon	Statsbygg/NBEF	NO
16	Husebye	Eystein	NBEF	NO
17	Reitsma	Albert	Hanze University of Applied Sciences Groningen	NL
18	Whittaker	James	IFMA International	US
19	Keane	Tony	IFMA International	US
20	Jeffrey	Johnson	IFMA International	US

Thanks:

The Author would like to thank Ivor McCauley and Glasgow Life for hosting the event as well as all the attendees for their time and inputting their experience to help the workshop deliver a useful outcome for the next steps in the PhD.

Figure 6: The Riverside Museum, Glasgow