



## Flood risk to commercial property: Training and Education Needs of Built Environment Professionals

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## Flood risk to commercial property: Training and Education Needs of built environment professionals

### Purpose

Improved management of commercial property at risk from flooding may result from well targeted advice from built environment professionals, such as surveyors, valuers and project managers. However, research indicates that the role of these professionals in providing such advice is currently limited for a variety of reasons. This research aimed to investigate the (perceived and real) barriers and opportunities for providing such advice in a number of international locations. In particular the research sought greater understanding of the link between regulation and guidance; perceived roles and capacity; and training and education needs.

### Design/methodology/approach

In order to cover different international settings an illustrative case study approach was adopted within the selected countries (Australia, UK, US, China and Germany). This involved a qualitative approach using semi-structured interviews of built environment (BE) professionals with experience of advising on commercial properties at risk of flooding. Due to the specific nature of these interviews, a purposive sampling approach was implemented, leading to a sample of 72 interviews across the five international locations.

### Findings

Perceived barriers were linked to regulatory issues, a shortage of suitably experienced professionals, a lack of formal guidance and insurance requirements. BE professionals defined their roles differently in each case study in relation to these factors and stressed the need for closer collaboration among the various disciplines and indeed the other key stakeholders (i.e. insurers, loss adjusters, contractors). A shortage of knowledgeable experts caused by a lack of formal training and education was a common challenge highlighted in all locations.

### Originality/value

The research is unique in providing an international perspective on issues affecting built environment professionals in providing robust and impartial advice on commercial property at risk of flooding. Whilst acknowledging the existence of local flood conditions, regulatory frameworks and insurance regimes, the results indicate some recurring themes, indicating a lack of general flood risk education and training across all five case study countries. Learning across case studies coupled with appropriate policy development, could contribute towards improved skills development and more consistent integration of BE professionals within future flood risk management practice, policy and strategy.

### Keywords

Flood risk; training; education; commercial property; international, built environment (BE) professionals, surveyors, valuers

### Classification

Research paper

## **Flood risk to commercial property: Training and Education Needs of Built Environment Professionals**

### **1. Introduction**

Flooding is a growing problem and the financial and physical damage to properties is increasing worldwide. In recent years, flood management has shifted from flood protection to the more comprehensive approach of integrated flood risk management (FRM) (Merz et al., 2010; Bubeck et al. 2015). An important component is property level flood mitigation measures, which requires that property owners are both aware of their risk and risk reduction measures. In Germany for instance, everyone who could be affected by a flood is obliged to undertake appropriate actions that are reasonable and within their means to reduce flood impacts and damage (§ 5 of the German Federal Water Resource Act (WHG, 2009). In other places, such action may not be required but is prudent to maintain property utility. Thus there is a potential role in flood risk reduction for the built environment (BE) professionals (Ingirige et al., 2012, RICS, 2017), a broad term which, here, includes building surveyors, insurance experts, valuation surveyors, property managers, facility managers, project managers, and property investment surveyors to assist in reducing flood losses and to build resilience. Risk management literature regarding restoration and risk reduction activities surrounding dwellings and their supportive infrastructure (Property Care Association, 2009; ICE, 2001; Garvin et al., 2005; and Gayan and Bingunath, 2012), has centered on residential properties. In contrast, this research focuses on commercial properties and the development of effective mitigation strategies for commercial property.

Damage from flooding can be direct (a result of the direct physical impact) or indirect (for example, lost production due to delays in supply because of transport disruption). Alternatively, damage can be tangible (measurable in monetary terms) or intangible (not easily measurable because they are not traded on a market) (Kreibich et al., 2014). For commercial premises, it has been observed that indirect impacts can be more expensive than direct damage, wherein for example claims against business disruption can be far more costly than that of property insurance (Heite and Merz, 2009, Kleindorfer and Saad, 2005). Although tangible direct and indirect damage resulting from flooding may be quantified and reimbursed through insurance, in contrast, intangible impacts (such as loss of reputation, issues around insurance renewal) may lead to unsustainable pressure on a business, rendering it vulnerable to closure. Indeed, researchers have raised concerns regarding the impact of flooding on the utility, maintenance, recovery, reinstatement, insurability and sale-ability of commercial properties (Kreibich et al., 2011, Bhattacharya-Mis and Lamond, 2016, Bubeck et al., 2012). Commercial property owners and occupiers would therefore benefit from advice to mitigate against all forms of loss and damage.

However, earlier research in the UK, (Pottinger and Tanton (2012) has found that understanding of flood risk and mitigation among BE professionals is lacking and so this

limits the extent to which such professionals are able to provide relevant advice. Various constraints have been identified including the difficulty in providing BE professionals with appropriate education and training in such a multidisciplinary area (Ingirige et al., 2012; Siriwardena et al., 2013) with limited scope for the addition of new topics such as flood risk. Therefore to improve BE education and training it is critical to examine specific advisory roles associated with commercial properties and flood risk in different international regulatory regimes.

UK commentators including Haigh and Amaratunga (2010), and Boser (2008) have argued that the BE professionals have invaluable roles to play at every stage of disaster management for enhanced resilience. Research has emphasised the importance of the due diligence process for professionals (such as property valuers) to identify risks, reduce uncertainties in property value and provide a sound base for dealing with the problems associated with property transactions (PwC, 2010; Pottinger, 2012; Defra, 2016). It is important for BE professionals, for example, to provide appropriate advice in terms of physical, environmental and technical due diligence because the buyer is at risk during and after the transaction (Pottinger, 2011) and failure to advise appropriately may lead to the charge of negligence. Studies have also highlighted that improved sustainability of property can be achieved by limiting damage from flood events and this can be supported by BE professionals with core competencies in this field (Ingirige et al, 2012; Sayce & Quinn, 2013). There is a dearth of research addressing the development of competencies through education and training in the field of flood risk (e.g., asset management, cost of damage, insurance claims advising etc.), particularly in an international context and with respect to commercial entities. The objectives of this study are divided into three themes, namely:

- To investigate the perspective of BE professionals in providing professional advice in relation to flood risk and mitigation assessment for commercial property;
- To understand the knowledge and skills required for BE professionals dealing with flood affected commercial properties; and
- To develop an international perspective on these issues to help inform future policy and educational provision including professional competency development.

## 2. A review of education and training needs

Education and training for BE professionals and in particular RICS professionals is structured to provide skills and knowledge associated with required professional competencies to perform their professional roles (Perera et al., 2016). Technical expertise and a thorough knowledge of relevant standards and guidance are pillars common to BE education globally. Evolution of required competencies over time can be driven by technical innovation but equally due to changing priorities in the construction and property industry. Sustainability and climate change are a growing element of BE education (Holdsworth and Sandri, 2014) and arguably flood risk and disaster management via adaptation of property could become an emerging theme as increased frequency of flooding drives demand for suitably competent professionals (Bosher et al., 2016). Kenney et al. (2006) indicated the need for designing the education and training contents of courses in such a way that will enable BE professionals to

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6 respond effectively to flood risk issues in the built environment. Therefore it is important to  
7 understand the drivers for international professionals with respect to their potential role in  
8 FRM and the regulatory drivers for increased involvement.  
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10 The process of post-flood recovery requires specialist knowledge, for instance physical  
11 damage assessment and specification of an appropriate remediation strategy. Risk mitigation  
12 advice during recovery (i.e. building back better) further demands that advisors should have  
13 knowledge of property level measures appropriate for commercial premises, (Kreibich et al.,  
14 2015b, Kreibich et al., 2015a, White, 2013, Defra, 2008).  
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16 Variations and inconsistencies in processes of damage assessment may occur due to  
17 subjective perceptions of BE professionals and a lack of benchmarks and guidelines  
18 (Penning-Rowse et al., 2000). Improved guidance on the technical aspects of flood  
19 damage assessment has been recommended in the UK by organisations responsible for FRM  
20 (Defra, 2016). The Code of Practice for Flood Damaged Buildings (Property Care  
21 Association, 2009) highlights the need to engage trained and competent contractors and BE  
22 professionals involved in recovery of buildings affected by flooding. The main repair and  
23 mitigation guidance available to BE professionals in the UK is moving towards certifiable  
24 standards, eg., PAS 1188 (2014) for property level protection and BSI 85000 (2015) for  
25 property level resilience. None is specifically targeted at advising on commercial property. In  
26 the case of Germany, the flood passport (<http://hochwasser-pass.com/>) from the flood  
27 competence centre (HKC e.v.) or guidance sheets from the Association of Environmental  
28 Engineers (BWK, <http://bwk-bund.de/publikationen/regelwerk/>), are the only reliable sources  
29 available for public use. Currently, there are no legislated policies for flood risk professionals  
30 in China (e.g. Technical memorandum, Building Guidance or Code of Practice) that require  
31 BE professionals to take any major roles in FRM.  
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33 A lack of guidance targeted at professionals on the range and suitability of flood risk  
34 reduction and mitigation measures globally is widely acknowledged in the literature. This is  
35 one of the critical barriers in providing advice related to mitigation options, and this leads  
36 professionals to rely on their own, sometimes limited, experience and any generic guidance  
37 available (Defra, 2015, 2016).  
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39 Insurance is another potential driver. Companies may employ surveyors to identify loss  
40 liability, however providing advice on measures (resistance and resilience) to mitigate flood  
41 risk and investment on properties located in risk affected areas is not traditionally requested  
42 (Pottinger and Tanton, 2011). Lambert et al (2009) explained that corporate flood claims can  
43 involve complex technical and financial issues, requiring expert advice from structural  
44 engineers, accountants, and quantity surveyors. This is especially true when the insurer has  
45 limited technical capacity inhouse.  
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47 Assessments of susceptibility require consideration of flood impacts on the value of the  
48 property and contents. Therefore, advice is needed on reduction in damage and disruption  
49 leading to lower direct and indirect losses, faster recovery and greater utility for property. In  
50 turn this should support the maintenance of property value and sustainability of commercial  
51 districts (Bhattacharya-Mis and Lamond, 2016, Bell, 1998, Kreibich et al., 2015b). However,  
52 an understanding of commercial property valuation is required. Such expertise requires  
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6 appropriate knowledge in the specified field and experience in dealing with commercial  
7 properties at risk of flooding. While technical competence is seen as one of the major driving  
8 forces in developing confidence among advisors, there is a lack of experts who provide flood  
9 related protection and re-instatement advice within the commercial property sector (Ingirige  
10 et al., 2012). Thus, there is a need for formal training and education through lifelong learning  
11 (Siriwardena et al, 2013) to reduce the gap between demand and supply of experts. These  
12 considerations illustrate the important roles various professionals play in managing flood risk  
13 for commercial properties. The importance of BE professionals to play a proactive and vital  
14 role in improving resilience requires systematic integration of training and professional  
15 expertise within the overall realm of disaster management (Boser, 2007; Haigh and  
16 Amaratunga 2010).  
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18 The next section describes the methods used to investigate the perceptions of BE  
19 professionals in providing professional advice in the field of flood risk assessment for  
20 commercial properties. Further it also identifies how the different experiences, perceptions,  
21 and perspectives responds to the challenges they face in terms of upskilling themselves to  
22 reduce the identified gap in knowledge and training.  
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### 26 3. Methods

27 An illustrative case study approach was taken to broaden the research base previously  
28 focused in the UK. Countries were purposively selected based on prior knowledge of  
29 prevalent flood risk and variation in insurance and regulatory regimes (Lamond and Penning-  
30 Rowsell, 2014). Review of literature informed the identification of key themes to attain the  
31 research objectives described above. There were twelve over-arching interview questions  
32 addressing four main themes on experience, perception on the role of flood insurance,  
33 perspectives on the impact of flooding on property value and challenges and barriers faced,  
34 and how the professionals overcome them. These questions were used as a guidance  
35 outlining the domains of interest and were slightly tweaked to make them specific to the  
36 profession of the respondent and the country.  
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38 A purposive sampling technique was chosen to identify the sample population in each  
39 international location (Sekaran, 2000). In order to capture the perspectives of BE  
40 professionals through their experience of providing flood risk mitigation advice in all five  
41 locations, the research called for a qualitative approach consulting with experts dealing in  
42 commercial properties. To understand their perspectives and outline the scope required for  
43 improving the level of awareness within the industry, it was essential to undertake in-depth  
44 interviews with the target population of BE professionals with understanding of commercial  
45 properties. This sampling strategy allowed for compilation of existing knowledge in the  
46 selected locations and enabled comparisons relating to the barriers and opportunities for the  
47 these professionals in providing advice on risk mitigation. The interviewees also helped in  
48 identifying required capacity-building skills based on the emerging demand and practices, the  
49 heterogeneity among types of flooding, laws and regulations in respective building industries,  
50 the role of government, and expectations from the BE professionals in a post-flood situation  
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in different international locations. Thus, this exercise provided a holistic view of the practices in the commercial property sector (Silverman, 2013, Robson, 2011).

Identification of the target population was challenging due to the lack of systematic databases providing the details required for identification of relevant BE professionals. It was necessary to employ multiple strategies such as social media, snowballing and publicly available databases to engage relevant participants. RICS regional offices [assisted](#) in the identification of sample participants as well. An interview schedule (see appendix 1) was developed and ethics approval was gained for conducting the research according to the local protocol of each individual region. Identified participants were informed how interviews will be undertaken (supported by information sheet, invitation letter, consent form and questions) and their consent was obtained. A target sample of fifteen (15) semi-structured interviews in each international location was considered to be appropriate given the focussed nature of work of advising commercial properties for flood risk mitigation and the small number of professionals working in this area. The profile of interviewees varied from risk mitigation and re-instatement, valuation experts and property adaptation and management as summarised in Table 1.

Table 1. Profile of Respondents

Country	Valuation and investment	Risk mitigation (property management)	Reinstatement	Risk mitigation (Property adaptation)	Other	RICS	Non RICS	Total
Australia	2	1	0	0	3	5	1	6
China	4	7	0	2	1	14	0	14
Germany	3	8	2	2	0	2	13	15
UK	5	3	4	3	0	12	3	15
US	4	5	5	3	0	5	12	17
Overview	2	0	1	1	1	5	0	5
Total	20	24	12	11	5	43	29	72

Literature on qualitative research supports this selection of sample size by indicating that sample size is the function of the point of theoretical saturation (Strauss, 1998). Data for analysis was obtained from interviews with 72 qualified BE professionals (68% of the interviewees were surveyors) from the five different countries. It was not possible to gain the intended number of professionals working in flood risk advising in all five countries. For example, in Australia the number of respondents was six, however based on population of the countries included in the study this number is reasonable. The number of interviews is often considered in qualitative research to be a function of the type of research problem and the variables involved as well as the researcher's own judgement of what is needed to understand the context critically, commonly achieved after approximately 6-12 interviews (Gubrium, 2001).

The collected interview data was then transcribed at individual locations and translated as necessary. A set of common themes (see Figure 1) was developed [iteratively](#) and employed to code the interview data using software including NVivo and MAXQDA. The entire process was performed in a systematic manner; [themes were determined through comparison of the country specific analysis](#) based on discussion [among](#) the country specialists [and the coding](#)

was adopted by all. Sub-themes were developed after initial coding from the interpretation of common aspects from the country by country narrative under each theme.

Name
01 Experience (2)
02 Knowledge-Capacity
03 Potential role of surveyors (2)
04 Potential role of others (2)
05 Barriers-Challenges (2)
06 Enablers-good practice (2)
07 Standards & Guidance (2)
08 Training needs (2)
09 Demand factors-cost-pricing (2)

Fig 1. Coding structure for BE professionals role in advising commercial properties at risk of flooding from Nvivo 11 software.

Figure 1 indicates the different themes (major) developed after the transcriptions of the interview data from all five countries. A concept map (Fig 2) is generated using the themes (knowledge and capacity, barriers and challenges and training needs) contributing towards barriers in upskilling of the professionals in FRM of commercial properties. The identified nodes in response to country specific criteria are shown separately for each country. The identifiers (nodes) that were common for more than one country were linked together to show the commonalities and the other factors that were unique for the specific country were kept as separate nodes with a single link to the country of emergence. The summary section will further show in detail the interrelationship between different relevant themes for this study and how the diverse roles played by BE professionals and the challenges faced by them helped in emergence of the understanding around the need for further professional training and education.

#### 4. Results and discussion

Analysis first took place within each case study country and then cross-country comparisons were made. The following section on country specific results first discusses the role played by surveyors and other BE professionals in FRM advising and subsequently explains how the theme of improving the skills and knowledge base among surveyors and other BE professionals came out as a subtheme of the pre-determined themes of knowledge and capacity, barriers and challenges, and training needs using interview texts from different countries in NVivo database. The interviewees did not provide a straight-forward response to how their roles can be improved through education and training, but they indicated the scope for development through professional education, directed towards knowledge gaps within the industry, emphasized the lack of competencies among professionals and highlighted different barriers and challenges that shape the roles they play in various geo-political settings.



#### 4.1 Australia

In Australia, a knowledge gap exists among developers and occupiers with regard to the potential payback of the investment in upfront costs to provide resilience against flooding. The lack of knowledge is exacerbated by regional variation that may cause confusion. For example, in Sydney and Brisbane many development sites need significant earthworks, culverts and channels to be flood compliant, and these will take many years to return the investment. But the inundation scenarios referred to in Sydney and Brisbane differ, and regulations in Queensland prompt more investment in flood prevention measures compared to New South Wales.

There is also a knowledge gap around land value and flooding that may result in fewer projects maximising the opportunity to build in resilience. Australian BE professionals have not traditionally been involved in flood services as engineers have dominated the field; however engineers are less well versed in land valuation. This participant stated *“when I went university, there was no course material on flooding hydrology at all, that just didn't enter the equation. Make hydrological work part of the course, it would then encourage a few of the surveyors, I mean a few, to gain a knowledge equal to the engineers”*.

Such examples were rare in Australia because flood advice and flood risk assessment are perceived as specialist knowledge. If surveyors offer specific flood risk advice, they need to be fully qualified to provide that advice so as not to put their professional indemnity insurance at risk. Professionals often see their role as being mindful of flood issues and recommending the procurement of appropriate specialist advice where another professional is suitably competent and insured.

With regards to education and training, Floodplain Management Australia (FMA) with the New South Wales Office of Environment and Heritage, initiated Australia's only industry based **FRM** course tailored to technical and land use planning staff and elected council representatives in 2009. Few, if any, property surveying courses feature flood prevention or flood risk currently in Australia. The property manager noted **both** a lack of continuing professional development (CPD) events relating to flood risk for surveyors to expand and update their knowledge and education in Australia and unmet needs as *“it's definitely an area that needs a bit more attention, particularly if you've got climate change, there is more possibility of floods or inundations just through climate change”*.

#### 4.2 China

In the People's Republic of China (PRC) and Hong Kong, respondents had indicated that the role of surveyors in FRM is not significant and normally they are not involved with such practice in the region. As one of the interviewees (building surveyor) responded *“We (surveyors) cannot interfere the drainage system of that street or district, as that is not our responsibilities, but that is the job for municipal water bureau...”*. For most surveyors, the responsibility of FRM lies **with** the municipal government, and their duties are **mostly** focusing on surveying the trustworthiness of pipes (inside the property) and the level of

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6 | maintenance and the connection pipes with [storm water](#) drainages or manholes (surrounding  
7 the property).  
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9 | Most of the interviewees shared their views that current flood risk [concerns](#) of commercial  
10 properties are not a major issue. One respondent mentioned, “*You know the commercial or*  
11 *residential properties in Hong Kong and other Chinese cities are high rise buildings, also*  
12 *normally developers and the government are not foolish, they will not put developments into*  
13 *a high (flood risk areas), such as in Hong Kong and Shanghai. As far as I understand, in*  
14 *most occasions, they are not affected by major flooding”.* Therefore, they implied that major  
15 flooding from coastal and river flooding rarely occurred, but if the commercial properties are  
16 flooded, it is mostly because of surface water flooding [or waterlogging](#). However, surveyors  
17 mentioned property owners and landlords still want to avoid flooding because if the main  
18 concourse and the escalators or lifts are flooded, the repair cost is normally high and the  
19 premium of property insurance will be raised for the coming year. A surveyor noted, “*as far*  
20 *as I know in many cases, if it is needed to repair or fixing a lift/escalator in a commercial*  
21 *building (with 30th to 40th floors/levels - common height in the Greater China region) will*  
22 *approximately cost at least with \$1 million (or more) Hong Kong Dollars (HKD) (equivalent*  
23 *to £100,000)...*”.  
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26 Despite the lack of a regulated role, surveyors are keen to engage with FRM practices, as one  
27 respondent noted, “*we (surveyors) can contribute on flood-proof infrastructures and advices*  
28 *on improving resilience of the properties...*”. There is certainly room for BE professionals to  
29 take up more roles or responsibilities on FRM practice of commercial properties in the [region](#);  
30 however this would need to be supported by people with appropriate technical and local  
31 knowledge and skills as well as governmental support.  
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### 35 4.3 Germany

36 Companies may consult BE professionals to estimate potential consequences of flood events  
37 and their probability of occurrence. For companies, an individual approach is required. One  
38 surveyor stated “*these nice lump-sum approaches, which result in estimated damage per*  
39 *square-meter at a certain flood depth [...] are not applicable for industry”.* Additionally, BE  
40 professionals can indicate the advantages that implementation of flood precautionary  
41 measures would have for the company, e.g. in avoiding or reducing interruption of  
42 production. One interviewee stated, “*the task of the surveyor is to identify the most cost-*  
43 *effective measure [...] as well as suitable types of measures with which he [the company] can*  
44 *live with”.* Surveyor advice may also cover possibilities on how to reduce business  
45 interruption times and support a quick recovery as well as advice on suitable insurance  
46 coverage and to improve insurability of the property. After a flood, insurance companies  
47 commission surveyors to assess the level of damage and the legality of the claims made by  
48 the insured parties. BE professionals can detect structural damage which was caused by the  
49 flood event and which can reduce the lifespan of a building. BE professionals also provide  
50 assessments of the value of a property for credit ratings or mortgage applications for banks.  
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The interviewees agreed that BE professionals need to fulfil certain requirements to be able to effectively provide flood risk advice; they should have adequate local knowledge about the flood hazard as well as about previous flood events, and they should also have relevant engineering knowledge to assess and analyse weaknesses and to suggest efficient flood damage mitigation measures. BE professionals should be able to apply different approaches, not only quantitative ones, but also be able to consider qualitative aspects like well-functioning risk management in a company. The interviews revealed that there are not enough BE professionals who are sufficiently familiar with the topics of flooding and hydrological engineering, and that training and education should be improved. One interviewee wishes, that *“the training programme of the federal chamber of architects and of engineers shall contain the topic of reconstruction after a of flood damage as certifiable advanced training course”*. Interviewees stated that university lectures for degrees in technical disciplines should have more focus on the consequences of climate change in general, and on the impact that hydrological extremes may have on buildings. In architecture, engineering and economic engineering, there is too little teaching on flood adapted construction and flood protection. Additionally, there was an agreement among the interviewees [regarding](#) lack of suitable guidelines [for different types of commercial properties](#). Many of the available guidance sheets on property flood risk mitigation focus on residential properties and offices [only and they are difficult to transfer to other commercial buildings which often need tailored decisions](#).

Interviewees also indicated that many businesses consider the advice too expensive and find the individual advice too time consuming. Companies often consider protection measures a waste of money due to a lack of understanding of flood risk. It is easier to provide advice to a company which already has a risk management department than [to](#) a company with no risk culture. However, companies are sometimes hesitant to commission BE professionals, since they fear that due to a poor assessment, high investments into protection measures might be required.

#### 4.4 UK

In the UK, according to the interviewees, the [surveyors](#)' roles in offering advice to commercial properties frequently involve the process of assessing damage loss and reinstatement strategies in a post flood scenario, risk assessment during property transfer, and valuation for investment purposes. For risk mitigation purposes, currently surveyors use background information to advise about mitigation measures, insurance and compliance. However, some interviewees noted the gap in case by case (property specific) understanding of available information and risk needed to provide advice on appropriate mitigation measures. They stressed that understanding the nature of risk for individual sites and providing mitigation advice require adequate background knowledge and training.

Respondents had mixed views on matter of education and training, as one of the interviewee (building surveyor) responded *“...there's 2,000 surveyors being trained at the moment, we're going to suggest that each of them does some research, or does some training on flood risk assessment' - they might never, ever get to use it in the whole of their career-...”*. On the other hand, another respondent reacted differently by pointing out, *“The younger surveyors*

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7 *have comparatively higher awareness regarding flooding and flood risk as sustainability of*  
8 *property is included in the training". Most interviewees agreed that there are not enough*  
9 *experts in the field and to overcome the challenge of providing appropriate advice to clients,*  
10 *training is a prerequisite. Some interviewees pointed out that there is a lack of awareness in*  
11 *the administrative levels of the government where the perception is that the "RICS has*  
12 *hundreds of flood risk assessors" where in reality as the practitioner mentioned "we might*  
13 *have a few, but they're not on a register or anything, they're just people doing it off their own*  
14 *bat." The practitioners feel that there is a need for certified flood risk assessors and there*  
15 *should be increased training opportunities to enhance their capacities; however, often even*  
16 *with available trainings, there is lack of interest from surveyors to invest money on such*  
17 *courses unless "there is a return at the end, or they see benefits". In the words of a building*  
18 *surveyor "as a profession, we are well placed to give the advice, it's something that building*  
19 *surveyors, by the very nature of our training, the sort of passions that we have, issues of*  
20 *building detail, issues of preventative maintenance and suchlike, it fits within our wide*  
21 *philosophy and culture, but there isn't the pull from the wider client base for us to exploit that*  
22 *skillset". To become an expert flood risk assessor which was mentioned by one interviewee*  
23 *as "quite a task," there is a requirement for understanding numerous issues including the*  
24 *nature and types of floods, available and suitable mitigation measures, processes that will*  
25 *enhance resilience, and understanding the insurance industry and what might be required for*  
26 *an affordable premium and so on.*

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28 Another barrier pointed out by some of the interviewees, is that there is a lack of consistency  
29 and professionalism at certain levels. One interviewee pointed out that *"despite being slow,*  
30 *the situation in the industry is improving in terms of training and provision of CPD's for*  
31 *professionals". It was also suggested that documentations of surveyor's roles in dealing with*  
32 *risk assessment and other related environmental activities and distributing this through*  
33 *magazines/ journals by reputable institutions like RICS within the industry might be useful to*  
34 *motivate the professionals. According to the experience of a valuer, often it happens that lots*  
35 *of reports mention the risk of flooding as a major issue in terms of property value, although*  
36 *perhaps in insufficient detail, the difficulty is "getting the knowledge out there, equip people*  
37 *to advise properly.....in that way it's a kind of issue that's on the periphery that could*  
38 *usefully be brought more into the core of training". In terms of using the guidance and*  
39 *standards one of the experts interviewed responded that "there are some important gaps.*  
40 *There is a BS standard on resilience measures, the built environment, which my colleagues in*  
41 *building surveying fraternity are looking at, but in global RICS guidance, we need to bring a*  
42 *lot of that up to date. The 2010 guidance (in the UK) is now 6 years out of date and this needs*  
43 *to be re-vamped". Therefore upskilling people with all-round knowledge in the industry,*  
44 *through appropriate training is a primary need to build awareness and reduce bottlenecks*  
45 *among professionals.*

#### 4.5 USA

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50 In the United States, the National Flood Insurance Program (NFIP) sets the foundation for  
51 flood mitigation of all properties in the 100-year floodplain. The Program requires Elevation  
52 Certificates of all such properties, indicating the elevation above Base Flood Elevation  
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6 (BFE), or the level of the 100-year flood, upon which flood insurance rates are determined.  
7 Approved mitigation can serve to lower the insurance rates, and even eliminate the  
8 requirement for insurance if the property is elevated above the BFE. The Elevation  
9 Certificates are usually completed by land-surveyors, giving them an opportunity to provide  
10 advice on mitigation that can reduce insurance rates. However, this opportunity is often  
11 missed. As one interviewee stated, *“Generally surveyors are not involved in the concept of*  
12 *flood risk reduction, they are being asked to provide necessary elevation or topo data to get a*  
13 *project moving forward”*. Part of this is because they are not asked, as noted by another  
14 interviewee: *“No one has ever asked ‘what can I do to lessen my risk?’”* This seems to be a  
15 double edged sword wherein one interviewee asserted that surveyors are *“...not really*  
16 *involved in design of flood risk reduction. They are interested and are familiar with*  
17 *regulations, but not involved in decision-making process”*. Yet, this is not necessarily because  
18 of a lack of interest or concern on the part of surveyors. One surveyor interviewed, who is  
19 heavily involved in flood management issues pointed out that *“In just about every state, I am*  
20 *asked a lot to teach floodplain management courses; [there is] lots of interest”*.

23 The need for training surveyors about the NFIP has been embraced by the state of North  
24 Carolina, which has a program to certify floodplain surveyors. Originally the result of a  
25 partnership between the Federal Emergency Management Agency (FEMA) and the state, the  
26 goal was to allow surveyors who were so certified to fast track elevation certificates. With  
27 changes made by FEMA to the submission process, the benefits of this were minimized, so  
28 FEMA lost interest. Others have not, including the National Society of Professional  
29 Surveyors which is looking to build on this process to provide certification opportunities for  
30 surveyors nationwide. Benefits of the training include more accurate elevation certificates  
31 being filed by those who have gone through the program. In addition, there are knock-on  
32 effects in communities that have certified floodplain surveyors. They are much more likely  
33 to look at the “big picture” and some strive to understand the insurance implications of their  
34 work. In addition, some *“individuals do training for local governments. Surveyors sometimes*  
35 *catch areas that local officials’ training misses”*.

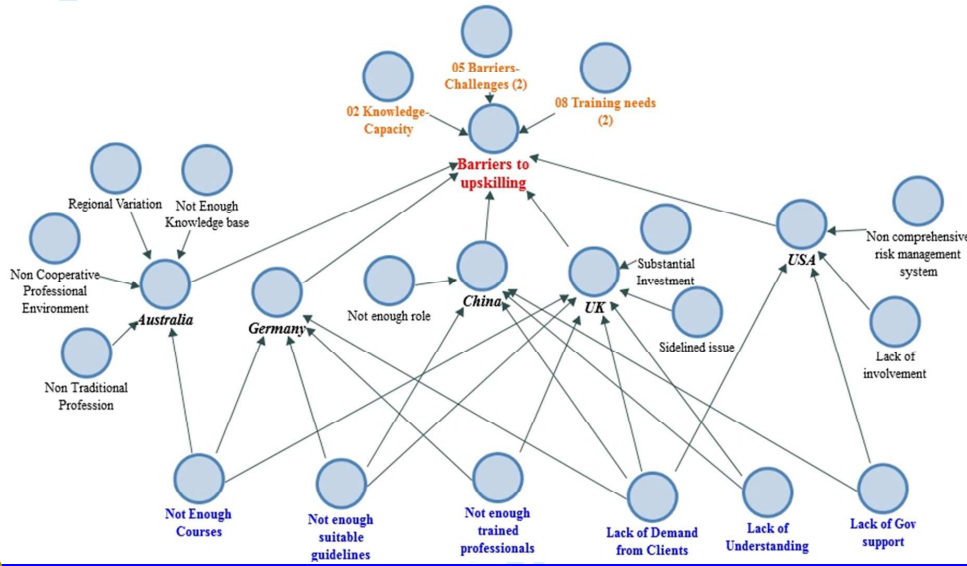
38 The process for commercial properties can be particularly complicated as it can involve  
39 appraisers, bank lenders, engineers, architects, and surveyors. One interviewee suggested  
40 that, for an appraiser, flood risk is simply one among a number of concerns (*“...a box to*  
41 *check on a list”*), suggesting that theirs is a disclosure role. An interviewee in the banking  
42 industry admitted that *“banking is a highly competitive industry -- so to go beyond is a*  
43 *problem. From a flood perspective everyone just follows the NFIP”*. Thus, to be most  
44 effective, the process requires assembling the team early in the process, which can be quite  
45 difficult, so there is unlikely to be a comprehensive evaluation of needs and opportunities for  
46 mitigation. *“People are brought in along the way as other issues are uncovered.*  
47 *Coordination between the various groups is really important”*, but many who were  
48 interviewed admitted that this rarely occurs. It takes a serious event, such as Superstorm  
49 Sandy, to bring the need for this coordination to light. Opportunities exist around the NFIP.  
50 Having professionals’ sensitive to both flood risk and the needs of the client is the key. The  
51 responses from those interviewed signalled the need for more training and education in the  
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6 field of FRM for professionals in the commercial property sector. Although the government  
7 has taken some steps, there are insufficient opportunities for surveyors and BE professionals.  
8 Due to little involvement in the risk management process apart from BFE determination and  
9 lack of demand from clients, the knowledge gap is building up. Both a non-comprehensive  
10 risk management system and little support from the government make it difficult to motivate  
11 the professionals to build up their capacities through training in FRM.  
12

### 13 14 15 **5. The Concept Map of Barriers**

16 Figure 2 illustrates the concept map from NVivo showing the relationship between different  
17 themes and their links with the barriers to upskilling sub-theme in an international context.  
18 The commonalities are shown with linked arrows between specific nodes and the countries at  
19 the bottom of the figure, while the unique factors were linked to specific countries with single  
20 connections. It is important to note that the unique factors may not be truly unique and it is  
21 possible that the factors are present in other countries as well. However during the interviews,  
22 those factors did not play a prevalent role or did not come up at all as these were emerging  
23 themes and not asked about directly. Therefore it would not be possible to rank factors  
24 according to their importance by quantifying the number of times those factors were  
25 discussed by the interviewees. Not surprisingly, the results of the interviews illustrate  
26 differences among the countries with respect to opportunities for BE professionals to  
27 contribute to flood risk mitigation advice relating to different government regulations,  
28 policies, and processes. At the same time, there are striking similarities, such as the shared  
29 recognition of the costs of flooding to commercial entities and the need for training (courses)  
30 , lack of both appropriate guidelines and government support as well as not enough demand  
31 from clients to upskill professionals with adequate knowledge who can play an active role in  
32 building resilience and thus provide a foundation for developing guidance that will have  
33 widespread application.  
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Figure 2: [Concept map showing country specific identified subthemes \(common and unique\)](#) of barriers in upskilling based on primary themes using NVivo

[Table 2 extends the different points on figure 2 and summarizes the the main issues arising from the interviews affecting the motivation of BE professionals in upskilling increasing their knowledge with further training and education.](#)

Table 2: Key issues affecting upskilling of professional in commercial property flood risk management

Country	Issues affecting motivation for acquiring knowledge and skills in FRM among surveyors and other BE professionals
Australia	<ol style="list-style-type: none"> <li>1. Regional variation that may cause confusion in mitigation measures, activities and regulations</li> <li>2. Involved in <a href="#">advising in flood mitigation services considered non-traditional</a></li> <li>3. Lack of knowledge exchange and <a href="#">collaboration</a> among different <a href="#">BE professionals</a></li> <li>4. Very few surveyors <a href="#">and BE professionals</a> are involved in professional advising as they require specialist knowledge</li> <li>5. Lack of surveying courses- featuring flood prevention</li> </ol>
China	<ol style="list-style-type: none"> <li>1. Insignificant role in <a href="#">FRM</a></li> <li>2. <a href="#">General dearth of</a> legislated policies/ surveying guidance that relates to FRM</li> <li>3. Ignorance and lack of understanding of FRM <a href="#">among surveyors and other BE professionals</a></li> <li>4. Growing interest among professionals but lack of demand from clients</li> <li>5. Not enough support from the <a href="#">municipal</a> government</li> </ol>

Germany	<ol style="list-style-type: none"> <li>1. Growing interest among professionals to participate in FRM however not enough trained professionals</li> <li>2. More focussed FRM university courses required/ not enough courses</li> <li>3. Lack of <u>suitable</u> guidelines for <u>all types of</u> commercial property FRM</li> <li>3-4. <u>Not enough demand from clients</u></li> </ol>
UK	<ol style="list-style-type: none"> <li>1. <u>Not enough demand from clients</u></li> <li>2. <u>Not enough trained professionals due to lack of motivation, demand or investment</u></li> <li>3. <u>Not enough return for the professionals to go through training</u></li> <li>4. <u>Bottle neck among professionals due to lack of awareness/understanding</u></li> <li>5. <u>Issues that are considered importance (e.g. property value) are side lined in training programmes</u></li> <li>6. <u>Lack of up to date knowledge and guidelines</u></li> <li>7. <u>Not enough training programmes/courses for different types of BE professionals</u></li> </ol>
USA	<ol style="list-style-type: none"> <li>1. <u>Little</u> involvement of <u>surveyors and other BE professionals</u> in flood risk mitigation</li> <li>2. Lack of clients asking for advice (<u>i.e., demand from clients</u>)</li> <li>3. Lack of governmental intervention <u>to enable BE professionals with the knowledge required for providing advice in FRM</u></li> <li>4. Non-comprehensive risk management system (<u>non-inclusion of BE professionals in the process of decision making</u>)</li> </ol>

In all countries, there are opportunities for surveyors to offer professional advice on flood risk reduction for commercial properties, as the need for such information appears to cross economic, political and cultural contexts. There is a recognition of the need for collaboration among all BE professionals as early in the process as possible. Among the most critical barrier in the process of acquiring further professional training and guidance is the basic awareness of issues related to flooding. It came out as a recommendation from some interviewees that basic training is essential for all BE professionals in order to fulfil their current advisory roles. Opportunities for more specialised flood risk education (including risk assessment, recovery and reinstatement) and training on best practices in each profession to upskill professionals providing mitigation advice would be beneficial in all geographical regions. Such courses could support improved access to and interpretation of risk information and improved understanding of the specification of appropriate measures. Given the perceived lack of demand or legislated role in some countries, a balance within the surveying profession may be appropriate with key specialists collaborating with and backed up by general awareness from experienced BE professionals, including detailed and up to date guidance and CPD to ensure professional capacity building where and when required.

## 6. Conclusions

BE professionals were found to provide an important role in dealing with flood risk to commercial property including advice and guidance on: adaptation strategies and precautionary measures, reinstatement processes and the future maintenance of building

structure, management of surface water drainage systems, risk and damage assessment, and elevation and flood proofing certificates. Further, there is scope for broadening this advice around other areas of FRM, risk mitigation, flood insurance aspects, property value and the impact of flooding and so on. However, a lack of trained and knowledgeable professionals and the associated need for further education are common problems across all case study countries.

There is evidence from the interviews that BE professionals could benefit from specific education and training on FRM which enhance their skills and expertise in providing advice for commercial properties at risk. The findings provide added impetus to the demand for flood risk education and training for BE professionals generally. Further, the development of specific FRM policy that recognises the role of BE professionals would help to raise awareness and support the development of capacity and capability across the relevant disciplines. The development of trust and confidence in the advice provided by BE professionals will help to increase the demand from clients.

Therefore it is recommended that there should be increased provision of education and training for BE professionals around the assessment and mitigation of flood risk. Such education should be delivered through a range of lifelong learning, targeted training and/CPD opportunities for existing professionals in the field. For future professionals, these flood risk related aspects need to be integrated into the professional competency requirements as well as in-to the curriculum of undergraduate and post-graduate courses.

## Acknowledgement

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### Appendix 1. Interview schedule

<p>Interview Schedule for semi structured interviews : An International Evaluation of the Role of Surveyors in Providing Professional Flood Risk Advice on Commercial Property</p>
<p>Main Question: to be shared in advance with participants</p>
<p>Pre-amble: Thank you for agreeing to take part in this survey, I hope you have had the chance to read the information sheet and are happy to proceed. This interview is concerned with your views and experience with regard to the role of surveyors in providing flood risk advice. We are going to record the conversation as agreed so we can record your responses accurately – the recording will not be shared with anyone outside the research team.</p>
<p>PART A: Your own experience and role providing advice about flood risk</p>
<p>1. Can you tell me about your level of experience in providing advice about flood risk ?</p>
<p>2. Now can you tell me under what circumstances you give this advice - how you are approached?</p>
<p>3. When you give the advice are there any standards or guidance that you use?</p>
<p>PART B : The role of flood insurance in promoting effective flood risk mitigation in the commercial property sector</p>
<p>Now thinking about things that might prompt mitigation, particularly flood insurance or compensation schemes and the incentives to take risk reduction measures within the commercial property sector.</p>
<p>4. Can you tell me a little bit about the ways commercial property owners and occupiers can get insurance or compensation for flood damage and disruption?</p>
<p>5. What effect do you think these arrangements for flood insurance or compensation have on promoting risk mitigation?</p>
<p>6. Can you tell me about any specific property level flood risk mitigation measures that are known to be efficient or are promoted by insurance companies or by you ?</p>
<p>7. Can you suggest ways that the insurance or compensation schemes could be improved to promote mitigation?</p>
<p>PART C : Your experience of impact flood risk has on future value of commercial portfolios</p>
<p>Now thinking about the valuation of properties and advice about investment we are interested in knowing your views about whether risk or actual flooding affects market value or has the potential to do so and why you hold these views</p>
<p>8. Can you tell me about the ways flood risk affects the value of commercial property at present?</p>
<p>9. Can you tell me about the ways flood risk might affect the value of commercial property in the future?</p>
<p>Part D: The challenges and limitations the surveying profession faces ways of overcoming them. This last section is to talk about practical challenges for surveyors in giving advice, ways of overcoming challenges and anything else you might want to bring up about low cost resilience.</p>
<p>10. What is the biggest challenges surveyors face in giving advice?</p>
<p>11. What ways have you found or can you suggest that might overcome these challenges?</p>
<p>12. Is there anything else you would like to talk about that we have not discussed?</p>