Professionalism in built environment research: beyond integrity and good practice

Abstract

**Purpose**: 'Professionalism' indicates a devotion to, and demonstration of, exceptional performance and achievement in any activity. The built environment comprises the physical items required for economic activity, long-term national development and social well-being. Studies show a need to improve many aspects of the built environment and the sector which creates it. Researchers should contribute to this improvement effort. It is suggested that researchers should demonstrate professionalism but there is no agreement on how professionalism in research is determined. It is necessary to consider what constitutes professionalism in built environment research, and how it can be developed.

**Design**: An exploratory study is presented. It considers major works on the nature of the built environment and its sector, and factors influencing research on them; and works on research ethics, integrity and good practice, to propose a framework for professionalism in built environment research.

**Findings**: More work is needed to improve the built environment and its sector. Professionalism in built environment research will make its contribution to this effort effective. This professionalism should be conceptualised, developed and continuously enhanced.

**Research limitations**: This first attempt to formulate a framework for professionalism in built environment research is based on a review of the major relevant literature. Subsequent works can test this framework empirically.

**Social implications**: The professional built environment researcher will be committed to contributing to society.

**Originality and value**: This is the first work on professionalism in research on the built environment. The framework provides the basis for further studies on the subject.

***Key words****: professionalism, integrity, researchers, built environment, society, assessment framework*

# INTRODUCTION

**Background**

‘Professionalism’ denotes quality in the undertaking of tasks, and the demonstration of expert knowledge and “good practice” (Evans, 2008). The often-highlighted attributes of professionalism include: possessing specialised knowledge, being competent, demonstrating honesty, reliability, integrity and accountability, showing self-regulation, and being worthy of respect and trust (Romme, 2016; Stern, 2016). In some fields, how the professional attains, demonstrates and maintains competence is governed by statute. How professionalism is evaluated varies from one country to another (Gavett, 2014).

Research in the field of the built environment should primarily contribute to improving performance in the built environment sector. For the purpose of this study, “the built environment” refers to all the buildings, items of infrastructure, and other structures which, together, are necessary for production and social activity. The “built environment sector” is the part of the economy which creates, maintains and demolishes items constituting the built environment. The importance of the sector and research on it is further underlined by the advice of medical practitioners that how humans interact with the built environment influences many physical and psychological health concerns, including accessibility, childhood and geriatric safety, the likelihood of injuries or illnesses, mental health, and the quality of environmental resources such as air and water (Farlex, 2009). Much of the research on the built environment sector referred to in this paper concerns the construction industry, the largest part of the sector.

There is much for researchers to address in the built environment sector. For example, it is acknowledged that the level of performance and professionalism in the sector should be improved. Newspaper articles, government reports and research literature reveal the image the sector portrays to its clients and society. Presidents and ministers being impeached or jailed for accepting gifts or payments from construction firms (Watts, 2017; *The Guardian*, 2019). Some public-sector building projects never being completed (Williams, 2016). Buildings collapsing, with loss of life and injury (Starossek, 2017). Proliferation of illegal structures (Varol *et al*., 2019). Settlements subject to flooding, with physical and economic damage and loss of life (FEMA, 2018). Significant proportions of projects having poor outcomes (Barbosa *et al*., 2017). A fragmented industry with a culture of short-termism and adversarialism (NAO, 2001). Focus on initial cost of built items (rather than life-cycle assessment and long-term performance) (Construction Leadership Council, 2018). High occurrence and impact of safety and health incidents (Health and Safety Executive, 2006). Poor worker welfare, especially that of foreign workers (Wells, 2018); and lack of community safeguarding.

Of the 10 biggest construction stories of the decade (2010-2019) in the UK in *The Construction Manager*, three are positive (Gerrard, 2019): the UK’s Building Information Modelling (BIM) revolution began in 2011 when government announced the BIM mandate, leading to a digital revolution; The Shard became the tallest building in the European Union in 2012; and the London 2012 Olympics project was delivered on time and below budget. The seven negative stories included: the Grenfell Tower fire disaster in 2018 (72 people died); the 2018 collapse of the major contractor, Carillion plc; the 2016 Edinburgh schools quality scandal; human rights abuses, including modern slavery, found in construction; and Crossrail, scheduled to open in 2018, delayed until 2021.

The built environment sector needs to prove itself worthy of the confidence of its clients. Killip (2020) notes that construction is characterised by fragmentation, poor quality and poor customer service. Keep (2016) considers construction companies to be operating in low-margin, high-volume markets, keeping costs down by focusing on low quality. It must also regain the public’s trust (Spada, 2009; Morrell, 2020). In the UK, Mann (2019) notes that: "Industry self-regulation and the culture it created will end. It is getting to be indefensible, because of events like Grenfell and Carillion's collapse". Improvements are needed in many aspects of the built environment and its sector. What is the role of research and researchers?

**Research Gap**

Many studies have explored the importance of the built environment; the *Revaluing Construction* study of the International Council for Research and Innovation in Building and Construction (CIB) (Barrett, 2007) is a notable example. Many government reports stress the role of the built environment sector in the economy (HM Government, 2013, 2018). The essential link of research to improvement of performance of the built environment sector is being emphasised (Chan, 2020; Dainty and Leiringer, 2019); journals such as this one require authors to indicate the practice and social impact of their work.

There is a growing literature on research ethics and integrity. However, research misconduct and questionable practices persists (Grant *et al*., 2018). Since the early 20th century, efforts have been made to propose a code of practice for researchers in countries such as the US (Gunsalus, *et al.*, 2019), UK (King, 2007); and globally (WCRI, 2010). The built environment research community has not discussed research ethics, integrity, and good practice. Research on professionalism in the built environment is limited (Foxell, 2018) and focuses on practice in industry. It is necessary to consider the importance of professionalism among built environment researchers to ensure that research contributes effectively to efforts to improve performance in the sector and in its output which have strategic economic importance, and enhance wellbeing.

**Aim and objectives**

The aim of the study is to examine the importance of professionalism in research on the built environment and how the level of professionalism can be determined, assessed and enhanced. The objectives are to:

1. establish the importance of the built environment to any nation and the contribution of research to enhance the performance of the built environment sector
2. consider the need for ethics, integrity and good practice in research
3. consider the nature of professionalism and the importance of professionalism to research generally, and to built environment research in particular
4. propose an analytical framework for assessing professionalism among built environment researchers and suggest how it can be tested and enhanced.

**Research method and structure of paper**

The study is exploratory in nature. It provides a state-of-the-art review of ethics, integrity, good practice, social responsibility and professionalism in research, and relates these to research on the built environment. Figure 1 presents the structure of the paper. The study is further developed from Ofori (2019). It first reviews major works on features of the built environment and how these characteristics shape the performance of, and challenges facing, the built environment sector. This establishes the need for research to address the critical issues in the built environment sector. Studies undertaken on many areas of knowledge and in many countries on ethics, integrity, good practice and professionalism in research are then reviewed. This indicates that efforts had been made to formulate codes to guide researchers to attain these desirable outcomes. The consideration of these research outcomes in built environment research is next discussed. This enabled a tentative framework for assessing professionalism in the built environment to be formulated. A critical analysis assesses key aspects of the study; and the conclusion considers the future.

BUILT ENVIRONMENT RESEARCH

**Need for research in the built environment**

The built environment sector should perform with efficiency and effectiveness, and help to enhance performance in related sectors. Research has a role to play in: investigating, and finding solutions to, the weaknesses of the built environment sector to ensure its continuous development; studying the materials, technologies, processes and procedures the sector utilizes; understanding the items it builds and their performance over time; and studying the sector’s operating context including the statutory, administrative and business regimes.

Today, productivity, affordability and sustainable development are particularly pertinent to the sector. Productivity is recognised to be key to national economic growth (HM Government, 2018); the built environment sector should contribute to efforts to improve productivity (Economic Strategies Committee, 2010; HM Government, 2018). Affordable housing is a key consideration in all countries (Wilson and Barton, 2019; Anacker, 2019); it is largely influenced by the performance of the built environment sector. The built environment is a major user of non-renewable resources and a contributor to greenhouse gas emissions (Ofori, 1994; Graham and Rawal, 2019). Built environment researchers have a responsibility to develop the knowledge required to improve performance in the sector.

**Characteristics of built environment and its sector, and need for improvement**

To determine actions to be taken to enhance the performance of the built environment sector, its features should be understood. The features include (Turin, 1980; Hillebrandt, 2000): the sector’s large size, its significant contribution to the economy, and its linkages with other sectors; the high expense and long period of gestation of each project; the large number of activities and participants in each project; the importance of the government as a client; and the high level of regulation of its activities.

The interdependence of the activities undertaken on projects in an atmosphere of uncertainty, leads to high levels of risks (Higgin and Jessop, 2008). The practices of the built environment sector are also shaped by regulation, government policies, the sector’s operating context, and its stakeholders, especially the attitudes and demands of the risk averse clients. It is suggested that these influences on the sector and how it responds to them, have resulted in a sector which performs poorly in most countries (World Economic Forum and Boston Consulting Group, 2015; Barbosa *et al*., 2017). For example, research shows that by 2030, the world would be paying GBP1.2 trillion a year for projects which have not been delivered effectively (Millett, 2019). Barrett (2007) undertook an international study on construction industry development and noted that the industry’s performance has been criticised for many years in several countries.

Nature of the built environment

Status of the built environment

Importance of the built environment

Importance of the integrity in research

Professionalism – nature and features

Professionalism in research in the built environment

Analytical framework for professionalism in research on the built environment

Future research

Contribution of research to improve sector

Good practice in research

Professionalism in research

*Figure 1: Structure of the paper*

Efforts have been made in many countries to improve the performance of the built environment sector (Barrett, 2007). Designing Buildings Wiki (2019) lists over 90 strategic reviews of the UK construction industry since 1934, including, recently, the Construction 2025 strategy (HM Government, 2013); the Farmer Review (Farmer, 2016); and *The Construction Sector Deal* (HM Government, 2018). However, some measures proposed and implemented appear to be ineffective. Smyth (2018) noted that outcomes from government-commissioned reports on the UK construction industry have been disappointing because they focus on projects whereas the causes of shortfalls may rest with the firms and their management. Green (2011) notes that solutions proposed in the construction improvement debate in the UK such as lean construction, partnering and collaborative working seldom stand up to critical scrutiny. Green (2019) argues that the current focus on Modern Methods of Construction may be similarly flawed. Thus, it has been hard to attain sustained improvements in the performance of the built environment sector. The Construction Leadership Council (2018) outlines actions by the UK government to realise change in the sector. It then shows that the factors which were intended to be addressed still persist. Sweet (2014) notes that: “…despite long-running improvement agendas in …the world’s most developed markets, construction remains a wasteful, tradition-bound industry plagued by delays, cost overruns and contractual disputes”.

Thus, the built environment sector faces challenges resulting from its features and the response of its practitioners and other stakeholders to them, and lack of success of initiatives to address its difficulties and improve its work. Researchers can contribute to the effort to ease bottlenecks in the sector and its processes and practices; and inform the formulation of policies, strategies and measures by government, companies and stakeholders to enhance performance in the value chain.

**Areas of research in built environment**

The areas of built environment research are outlined in the descriptors of the UK Research Excellence Framework (REF) 2021 Unit of Assessment 13: Architecture, Built Environment and Planning. The unit (Department for Education *et al*., 2019):

“covers all forms of historical, theoretical, technical, policy, applied and practice-based research relevant to the planning, design, creation, functionality, use, conservation, interpretation, assessment, management and governance of the built environment in both rural and urban areas. This includes: architecture and related arts, building engineering, building surveying, building sciences, climate change and disaster resilience, communities, construction, construction management, economic development, environment, health and well-being, housing, landscape, manufacture, natural resources and ecosystem services, real estate, regeneration, spatial analysis, sustainability, transport, urban and regional planning and urbanism. It covers the social, economic, legal, financial, environmental, technological, historic and cultural aspects of the built environment”.

The CIB (2019) presents the scope of its commissions under these “areas of scientific interest”: (a) General – broad aspects of research, education, innovation, information, regulation; (b) Building Technique – Construction Materials and Technologies, Building Physics; (d) Buildings and the Environment – Design of Buildings, Built Environment; and (d) Building Process – Management Organisation Economics, Legal and Procurement Practices.

These descriptions indicate that the field of study of the built environment is wide, in terms of the range of subjects it covers. The scope for improvement in the performance of the sector through effective research is evident.

# ASSESSING RESEARCH

To guide the contribution of built environment researchers, it is necessary to establish how the quality and impact of scientific outputs should be assessed. *The Lancet* (2019) noted that the current approach in many institutions and countries is inadequate and creates perverse incentives for poor research conduct; it involves counting publications without quality assessment beyond the journal impact factor (which has deficiencies as a tool for research assessment (*Nature*, 2005)) and grant income. Database tools, Hirsch index (h-index) and other web-impact metrics are also used (Chowdhury, 2016). American Society for Cell Biology (ASCB) (2012) suggests that ways of evaluating scientific research should be improved. ASCB’s (2012) San Francisco Declaration on Research Assessment (DORA) has these themes: the need to eliminate the use of journal-based metrics, such as impact factors, in funding, appointment, and promotion considerations; and the need to assess research on its own merits rather than the journal in which it is published.

The Independent Review of the Role of Metrics in Research Assessment and Management (Wilsdon *et al*., 2015) found scepticism among stakeholders about the use of metrics in research assessment and management. It proposed the notion of ‘responsible metrics’ to frame appropriate uses of quantitative research performance indicators. The metrics were in these dimensions: *Robustness*: basing metrics on the best possible data; *Humility*: recognising that quantitative evaluation should support qualitative, expert assessment; *Transparency*: keeping data collection and analytical processes transparent, so the results can be tested; *Diversity*: accounting for variation by research field; and *Reflexivity*: recognising the systemic effects of indicators, and updating them in response. Principles for assessing research in the Hong Kong Manifesto produced at the sixth World Conference on Research Integrity (WCRI) include (*The Lancet*, 2019): societal need as a goal for research; assessing researchers with responsible indicators that reflect the contribution to the research enterprise; the need to publish or report research completely and transparently; a culture of open research; and improving the research environment.

Other assessment mechanisms are the periodic review of research performance of institutions in some countries (such as the UK’s REF and Hong Kong’s Research Assessment Exercise). REF is intended to “assess the quality of submitted research outputs in terms of their 'originality, significance and rigour' with reference to international research quality standards” (Department for Education *et al*., 2019). Increasingly, assessments of research include the relevance and impact of the work on industry and society (McKenna, 2021). Chowdhury *et al*. (2016) note that measuring the societal, cultural, economic and scientific impact of research is currently the priority of many research funding agencies. The component of ‘impact’ in the UK REF, defined as: “'reach and significance' of impacts on the economy, society, culture, public policy or services, health, the environment or quality of life that were underpinned by excellent research conducted…” (Department for Education *et al*., 2019) increased from 20 percent in REF2014 to 25 percent in REF2021.

How effective have research assessment exercises been? Lansley (2013) indicates that analyses of results of RAEs in 1996 and 2001 confirmed that the grade awarded to a university department can be related to its level of activity in terms of, for example, number of research students, research degrees awarded, external research funding, and the profile of publications. Lansley (2007) also noted that, for many UK academics, the nature and orientation of their research is determined by considerations of how that work will be graded in assessment exercises because the grades awarded can have a significant impact on the individual’s career development, and on the university.

It should be noted that there are unintended consequences of research assessment regimes. Watermeyer (2020) suggests that the REF has created a new policy agenda and culture of ‘competitive accountability’ in UK higher education, characterised by ‘performativity’ and ‘managerial governmentality’ which produces tensions, contradictions and paradoxes in the work of researchers. Thus, research output should be measured appropriately in order to catalyse and provide incentives for work which has impact on the economy, long-term national development, public policy, sustainability and quality of life. Watermeyer’s (2020) observations are echoed in the surveys on research culture of the Association of Research Managers and Administrators (ARMA) (Noone, 2020).

DEVELOPMENT OF PROFESSIONALISM IN RESEARCH: A HISTORY

There have been efforts to conceptualise and develop professionalism in research. Steneck (2008) reviews the historical development of such efforts, mainly in the US. The next four paragraphs are based on that work.

The Committee on Social and Economic Welfare of Scientific Men (CSEWSM) of the American Association for the Advancement of Science (AAAS) (1927) proposed a “Code of Ethics for Scientific Men” including: Assume an obligation to do honest work and to impartially present it to the public, regardless of political, economic or religious prejudice, pressure or tradition; Exemplify in their conduct and work a regard for all people; Recognize and assume a dual obligation to do the best possible work, and to promote the social and economic welfare of their colleagues and themselves; Promote the dignity of their profession; Not to publish the work of colleagues or subordinates without giving them full credit; Avoid hasty and superficial publication, and holding real results indefinitely without publication; and Take the public into their confidence. In the 1950s, concern that many papers were not written so that the work could be repeated led to calls for clearer standards and guidance for authorship, publication and peer review (Pigman and Carmichael, 1950).

Social responsibility drove the discussion of codes of ethics for science in the 1960s. Cranberg (1963) proposed that science should follow engineering and adopt a code of ethics. The code of the Society for Social Responsibility in Science committed members to: foresee, insofar as possible, the results of their professional work; assume personal moral responsibility for the consequences of this work; put their efforts only into work which they feel will be of lasting benefit to humanity; and share their scientific knowledge, and judgments based on it, with government and others so that they may use it (Graham, 1963). Cournand (1977) suggested a combination of a code for scientists with a broader “ethic of development” and recommended this code: intellectual integrity and objectivity; tolerance; doubt of certitude; recognition of error; unselfish engagement; and communal spirit. Many scientists opposed any code as they felt a code constrained their freedom.

Some developments called into question the notion that research is inherently beneficial (Carson, 1962), and that researchers should be allowed to self-regulate. Doubts about the moral character of research emerged with the discovery of unethical and improper practices, such as violations of codes for animal and human experimentation (Steneck, 2007); and research misconduct. Whitbeck (1995) noted that despite several calls for action on research integrity, as in Edsall’s (1975) seminal report, not much happened. Steneck (2008) cited examples of researchers contradicting the ideals including: accepting or demanding credit for authorship they do not deserve; not properly managing and reporting conflicts of interest; not sharing data with colleagues or protecting the privacy of privileged information; allowing bias to influence peer review; overselling findings in abstracts; and fabricating, falsifying and plagiarising results. These instances of research misconduct are still evident today (see, for example, Hofmann and Holm, 2019). US National Academies of Sciences, Engineering, and Medicine (2017) noted that unethical research practices pose significant risks to the validity of, and trust in, science. Nevertheless, studies have found that the careers of some researchers have been advanced partly because of their adopting undesirable research practices (Banks, *et al*., 2016).

There has also been a debate on government’s involvement. Government has mostly taken a hands-off approach, and fostering integrity in research and developing the professional behaviour of researchers relies on universities (through institutional policies), professional societies (through codes of ethics), research institutions, funding agencies and journals.

Thus, efforts to develop a code on integrity and good practice in research date back at least one century. The principles included in such codes transcend aspects of research itself, and highlight the social responsibility of the researcher and concerns with practice, policy and the citizenry.

GOOD PRACTICE, RESPONSIBILITY AND INTEGRITY IN RESEARCH

Guidance on good practice now covers every aspect of research. National Academy of Sciences *et al*. (1992) noted that topics on good practice in research include: data handling, publication, correcting errors, and mentoring; research collaboration; peer review; conflicts of interest; and communicating with the public. Certain fields have additional requirements such as protection of human subjects, care of animals, and prevention of misuse of research and technology. US National Research Council (2002) identified these guiding principles for scientific research: Pose significant questions that can be investigated empirically; Link research to relevant theory; Use methods that permit direct investigation of the question; Provide a coherent and explicit chain of reasoning; Replicate and generalise across studies; and Disclose research to encourage scrutiny and critique. However, Gunsalus *et al.* (2019) note that it is difficult to work out best practice in research, and researchers can be resistant to top-down directives as they value their independence and believe in self-regulation. Thus, conventions adopted for documenting methods and results, conducting analyses and allocating credit are often less than optimal, and can encourage dishonesty.

“Research integrity” and “responsible conduct of research” are developing concepts (Steneck, 2006). Korenman (undated) notes that research integrity is essential for achieving scientific excellence and earning the public's trust. The definition of research integrity of UK Research Integrity Office (UKRIO, 2019) has these elements: honesty in all aspects of research; rigour, in line with prevailing disciplinary norms and standards, and in using appropriate methods, drawing interpretations and conclusions and communicating the results; transparency and open communication in declaring potential competing interests; care and respect for all participants in research and for the integrity of the research record; accountability of funders, employers and researchers to create a research environment in which individuals and organisations own the research process; and researchers ensuring that individuals and organisations whose behaviour falls short of the standards set are held to account.

*Responsible Science: Ensuring the Integrity of the Research Process* (National Academy of Sciences *et al*., 1992) evaluated issues on scientific responsibility and the conduct of research. It originated these core values of integrity: objectivity, honesty, openness, fairness, accountability and stewardship. It concluded that significant threats to research integrity existed in the US and elsewhere. It influenced thinking about research integrity in the US for over two decades. However, as more research misconduct and detrimental practices were revealed, and because technological and social changes, and internationalisation of research had altered the research environment, the framework needed updating. *Fostering Integrity in Research* (National Academies of Science Engineering and Medicine, 2017) followed. It identifies best practices in research and recommends options for discouraging and addressing research misconduct and detrimental practices.

Thus, integrity embodies a researcher’s commitment to intellectual honesty and personal responsibility, and an institution's commitment to maintaining a research environment that engenders responsible conduct. Many universities and research organisations provide guidance on good practice in research for staff members and students (see, for example, University of Cambridge, 2020). The 23-member League of European Research Universities (LERU, 2020) encourages members and others to make issues of research integrity part of their strategy. Universities should: empower sound research; educate researchers in research integrity at all career levels; emplace institutional guidelines and support structures including appointing counsellors or advisors; be transparent and accountable; and foster a research integrity culture. *The Netherlands Code of Conduct for Scientific Practice* of the Association of Universities in the Netherlands specifies these principles (Van Donzel *et al*., 2013): Scrupulousness (unaffected by any pressure); Reliability (in undertaking research and in reporting and knowledge transfer); Verifiability (making clear the bases of data and conclusions, and how they can be verified); Impartiality (heeding only the scientific interest); and Independence (working in contexts of academic liberty and independence).

**Code of ethics for research: recent developments – an international movement**

Steneck (2008) suggested that efforts be made to promote ethical awareness in research by adopting a code of ethics and developing best practices that can be applied in different fields of study, and all nations. *The Universal Ethical Code for Scientists* sought to attain these ends. Proposing it, UK’s then chief science advisor, Sir David King (2007), argued that scientists’ “social license to operate needs to be founded on a continually renewed relationship of trust between scientist and society”. The code was intended to stand over all codes of conduct for specific professions. Its elements are: *Rigour*: Rigour, honesty and integrity; *Respect*: Respect for life, the law and the public good; and *Responsibility*: Responsible communication: listening and informing (UK Government Office of Science, 2007).

UKRIO (2019) seeks to provide a national framework for good research conduct and governance. Signatories commit to: upholding highest standards of rigour and integrity in research; ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards; supporting a research environment underpinned by a culture of integrity and based on good governance, best practice, and support for the development of researchers; using transparent, timely, robust and fair processes to deal with allegations of research misconduct; and working together to strengthen the integrity of research and to review progress regularly and openly. The Royal Netherlands Academy of Arts and Sciences summarized international codes it reviewed into seven principles (KNAW, 2013): *Honesty* – complete reporting; *Fairness* – respectful treatment of colleagues; *Objectivity* – subjective perceptions should not influence research; *Reliability* – using accepted methods of inquiry and analysis; *Scepticism* – professional doubt in exercising control and monitoring; *Accountability* – answering to other researchers and society; and *Openness* – providing access, where possible, to methods, data and results.

Further developing King’s (2007) code, UKRIO’s (2009) *Code of Practice for Research* urges organisations and researchers to adhere to principles which set out responsibilities and values relevant to research and aim to encourage all involved in research to consider the wider consequences of their work and to engage with the practical, ethical and intellectual challenges inherent in doing research. They include: *Excellence –* all should strive for excellence and aim to produce and disseminate work of the highest quality; *Honesty –* organisations should create and maintain a culture fostering and supporting honesty in research; researchers should be honest in relation to their research and that of others, and neither engage in misconduct nor conceal it; *Integrity –* all must comply with all legal and ethical requirements relevant to their field of study, and declare and resolve any conflicts of interest; and *Accountability –* all should recognise that they are ultimately accountable to the general public and should act accordingly, their research should allow for proper governance and transparency.

There are initiatives to formulate international principles of research integrity and good practice. The Singapore Statement on Research Integrity (WCRI, 2010), formulated by researchers, research institutions, funders and publishers from 51 countries at the second WCRI was the first effort to encourage development of unified policies, guidelines and codes of conduct to foster greater integrity in research worldwide. It notes that the value and benefits of research depend on the integrity of research, and certain principles and professional responsibilities are fundamental to this integrity. The principles are: ***Honesty* in all aspects of research; *Accountability*in the conduct of research; *Professional courtesy and fairness* in working with others; and *Good stewardship*of research on behalf of others.** The professional responsibilities in the Singapore statement (WCRI, 2010) include that researchers should: show integrity by taking responsibility for the trustworthiness of their research; be aware of, and adhere to, regulations and policies related to research; disclose any conflicts of interest that could compromise the trustworthiness of their work; and report any suspected research misconduct. Research institutions should create and sustain environments that encourage integrity; and researchers and institutions should recognise that they have an ethical obligation to compare societal benefits with risks inherent in their work.

Thus, greater focus is being put on research integrity and good practice for all disciplines. Work to develop a code on integrity and monitor adherence to it continues in many countries and at the global level. Many of the elements in previous works such as AAAS (1927) underlie current efforts.

# PROFESSIONALISM IN RESEARCH

**What is professionalism?**

Despite the long history of research on the ‘professions’ (see, for example, Carr-Saunders and Wilson, 1933; Abbott, 1988), Kolsaker (2008) notes that professionalism is under-researched, and the existing research is criticised as ambiguous and lacking a solid theoretical foundation. Professionalism is variously presented as: a form of occupational control; a socially constructed and dynamic entity; the use of knowledge as social capital; a normative values system; the basis of the relationship between professionals and their publics; and a basis and determinant of social and professional status. Definitions and determinants of professionalism are identified in all significant fields, including counselling (Woo, 2013); hospitality (Ruetzler *et al*., 2011); and teaching (Brock, 2012). Examples from medicine and allied sciences are used here to explain the concept. American Physical Therapy Association (2019) defines professionalism in that field as: “Physical therapists consistently demonstrate core values by aspiring to and wisely applying principles of altruism, excellence, caring, ethics, respect, communication and accountability, and by working together with other professionals to achieve optimal health and wellness in individuals and communities”. American Pharmaceutical Association Task Force on Professionalism (2000) suggested that one acts professionally when one displays: accountability for one’s actions; commitment to self-improvement of skills and knowledge; conscience and trustworthiness; a covenantal relationship with the client; creativity and innovation; ethically sound decision-making; knowledge and skills of the profession; leadership; pride in the profession; and service orientation.

What counts as acting professionally keeps shifting. For example, the American Board of Internal Medicine (2019) notes that the definition of medical professionalism is evolving – from autonomy to accountability, from expert opinion to evidence-based medicine, and from self-interest to teamwork and shared responsibility.

From the foregoing discussion, principles of professionalism include: excellence, creativity and innovation; ethics; respect; trustworthiness; service-oriented relationship with the client; accountability; pursuit of higher skills and knowledge; and collaboration with other professionals to improve practice. Higher order principles include: conscience; altruism; caring; and leadership. Professionalism is a dynamic concept: the principles become increasingly more demanding. The next section considers professionalism in the academic field.

**Professionalism in the academic field**

Professionalism in the academic field is a new research area (Nixon, 2001). Evans (2008) presents academic ‘professionalism’ as work practice that is consistent with consensual delineations of a profession or occupation and that contributes to, and reflects, perceptions of the profession’s purpose and status and the nature, range and levels of service provided by, and expertise in, the profession, and the ethical code underpinning them. Ibrahim *et al*. (2012) found diverse views on the definition of academic professionalism among Malaysian academics including: Building and enhancing the individuals’ expertise; Providing service to society; and Conforming to employer institutions’ rules and regulations.

Professionalism should embody a ‘hunger’ for growth (Van der Heijden, 2002), a dedication to continuous improvement. To Kolsaker (2008), key characteristics of the academic profession are "shared values, altruistic concern for students, educational expertise, high level of autonomy, generation of new knowledge, application of logic, use of evidence, conceptual and theoretical rigor and the disinterested pursuit of truth". It concerns how one should relate to those not serving proper academic goals; and whether an academic professional has an obligation to question practices not serving "the disinterested pursuit of truth”.

The issue of how to conceptualise academic professionalism is not resolved. To Evans (2008), it is particularly difficult to understand professionalism among researchers. Kolsaker (2008) examines the impact of the managerialist approaches in many universities’ governance systems on academic professionalism; this managerialism differs from the collegial ideology that is characterised by self-management. Universities differ in approaches to policy, employment contracts and reviews, and promotion criteria. For example, depending on the funding model, culture and tradition, teaching, increasing student numbers and industry linkages may take precedence over research. There could be administrative pressures to target prescribed volumes of research output, or journals with certain metrics. Some academics hold negative views on the current state of academic professionalism and consider academics to be losing autonomy and status (Watermeyer, 2020); others are more positive, suggesting that this is the time to redefine and seek to enhance professionalism (Nixon, 2001).

There is much to do to establish a concept of academic professionalism. Its definitions do not yet embrace the higher-order principles of professionalism outlined above. This study focuses on professionalism in the research segment of academic work.

**Professionalism in research**

*Ethics, integrity and professionalism*

Research ethics, integrity and responsible conduct of research are closely linked and growing concepts. The SAGE journal, *Research Ethics*, covers ethical issues in the conduct of research, regulation of research, procedures and processes of ethical review, scientific integrity and end uses of research.[[1]](#footnote-1) Research ethics addresses misconduct which encompasses fraud, fabrication, falsification, plagiarism and failures to follow accepted procedures or exercise due care in research (UKRIO, 2019). Integrity in research transcends ethics. *Nature* (2019) stressed that research integrity is much more than misconduct; and warns that conflating integrity and misconduct is undesirable. It is about creating systems that boost the quality, relevance and reliability of research. Every scientist should aspire to conducting research with integrity, honesty and accuracy, and this capacity can be enhanced. Also, incentives should be continually reworked, and researchers rewarded appropriately for important but unglamorous contributions. Progress will not be easy to achieve. Gunsalus *et al.* (2019) note that building a culture of quality and integrity involves participation by a complex system of funders, journals, academic administrators, scientific societies and researchers with conflicting interests, interactions among whom are constrained.

Several countries have established agencies or mechanisms to promote research integrity. UKRIO, set up in 2006, is an independent charity supporting the public, researchers and organisations to further good practice in research.[[2]](#footnote-2) It promotes integrity and high ethical standards in research, and robust methods to address poor practice and misconduct. The UK House of Commons (2018) recommended forming a national oversight committee to champion research integrity and increase transparency. In Canada, the Panel on Responsible Conduct of Research reviews institutional investigations and promotes research integrity. There are similar efforts elsewhere, including Austria, Denmark, Finland, France, Germany and Japan. Gunsalus *et al*. (2019) note that, in the US, reports by the US National Academies of Sciences, Engineering, and Medicine over a 25-year period called for forums to discuss safety, efficiency, and integrity while facilitating scientific progress; and the formation of a central agency which focuses on robustness and quality and assists in creating and sustaining cultures for reliable, rigorous and efficient research. However, a fragmented, inefficient, inconsistent and competing system has emerged in the effort to protect research quality and integrity. They suggest that focus must extend beyond compliance and individual conduct, to build an overarching culture of integrity and quality; and a national research-policy board focusing on robustness and quality must be established.

Efforts to promote good practice in research have faced obstacles and disagreements; detractors point out rigidities in universal codes, their impact on intellectual freedom and flexibility, and inefficiencies in monitoring them. However, studies have found that the present regime puts pressures on researchers and has negative impact on their mental health (Guthrie *et al*., 2017). A survey of 4,300 scientists in 87 countries (Shift Learning, 2020) found that the focus on performance metrics leads to highly competitive, hostile working environments. This is damaging the quality of research; it encourages researchers to game the system. Researchers consider the situation worsening, and the negative aspects were not offset by job security; ability to work autonomously, flexibly and creatively; and pride in their institutions. In proposals for appropriate action to develop a suitable research culture, an overarching concept built on personal responsibility has much merit.

**Discussion and development of concept of professionalism in built environment research**

*Towards professionalism in research*

Professionalism in research embraces, and goes beyond, ethics, integrity, quality, responsible conduct and good practice in research. Thus, professionalism extends the continuum of desirable attributes and practices in research discussed above. Figure 2 illustrates the relationships among ethics, integrity, good practice and responsible conduct of research and how they result in professionalism. All these directly relate to built environment research, but professionalism would be the most desirable approach.

What is professionalism in research? Merton (1973) identified these basic norms of professionalism in science: *communalism* (researchers should share information with colleagues); *universalism* (researchers should seek a common understanding); *disinterestedness* (researchers should eschew personal gain); and *organised scepticism* (researchers should question every new finding or claim to assure themselves that it is true). Similarly, Korenman (undated) identified these elements of professionalism in research: Intellectual honesty; Excellence in thinking and doing; Collegiality and openness; Autonomy and responsibility; and Self-regulation. Universities UK (2019) recognises that public trust in research is essential: to secure public participation in research; to maintain public support for funding of research; and to ensure that research findings are mobilised effectively. Professionalism in research should be maintained to safeguard this support and implement the findings.

Professionalism means self-transcendence: serving others and seeking to make a difference in the world. An example of researchers striving to serve others is the Inter Academy Partnership (2018) which noted that effective implementation of the Sustainable Development Goals (SDGs) “requires access to, and the application of, the best available evidence from the global community of knowledge providers”. Urgent challenges the global science community must address include: to ensure research and research support systems, including assessment and reward structures, better align with shared global goals; and account for the implications of complex systems science, including how the SDGs can be delivered within the Earth’s finite capacity. Similarly, the US National Institute of Environmental Health Sciences (2018): “strives to conduct and support the very best environmental health sciences in alignment with real-world public health needs, and to translate science findings into knowledge that can inform real-life individual and public health outcomes…”. Finally, International Science Council (ISC) (2019) is committed to promoting international research and scholarship on key global challenges; increasing evidence-informed understanding and decision-making in public policy, discourse and action; and promoting continued and equal advancement of scientific rigour, creativity and relevance in all parts of the world. ISC (2019, p. 4) notes that: “…we as scientists have the responsibility to deliver knowledge that can help find solutions to the complex problems facing societies worldwide” including the 2030 Agenda for Sustainable Development; and The Digital Revolution.

McBean and Martinelli (2017) note that there is a shared vision of advancing all sciences as a global public good. AAAS has convened many groups to bring greater coherence and consistency to science policies and practices across countries, and foster collaboration. Sharp and Leshner (2014) suggest that the products from these multi-national, multi-disciplinary teams must be rapidly translated into practical solutions. The researchers should engage with business, cultural, and political leaders; also, the adoption of national policies addressing global challenges depends on support by an informed citizenry.

The discussion on professionalism in research may be summarised (Korenman, undated): professionalism in research denotes a behavioural pattern identified with integrity. Researchers should behave with intellectual honesty and excellence; behave collegially, teach the skills to others, and put society's needs first in their work. In response, society gives them autonomy in their work including selecting their research problems and methods, allocating funding provided, and reviewing their output. Professional researchers are given responsibility to discipline poor performance or malfeasance. This brings focus to the subject of enhancing professionalism in built environment research.

*Importance of professionalism in built environment research*

Professionalism is important in the built environment field. Everywhere, there is strict determination of the competence and registration of many of the professionals; and designs and key aspects of site construction are subject to approval or statutory inspection. Professionalism in the built environment sector has wide benefits. Ofori and Ceric (2018) suggest that greater professionalism among practitioners will reduce the need for regulation and control of built environment process and its products. Spada (2009) notes that the professions are a source of ethical role models, and contribute to meritocracy.

**Research assessment and evaluation**

Helps to determine quality and impact of research; and to guide the selection, focus, investment in, reward for, and application of research (*The Lancet*, 2017).

**Research ethics**

Addresses misconduct such as fraud, fabrication, falsification, plagiarism and failure to exercise due care in research (UKRIO, 2019).

**Research integrity**

Adherence to core values of objectivity, honesty, openness, fairness, accountability and stewardship (National Academies of Sciences, Engineering, and Medicine, 2017).

**Good practice in research**

Emphasises the importance of integrity and rigour; and covers competence and training, openness, the use of data and equipment, publication of results, intellectual property, compliance with regulations and guidelines, and acting with honesty and integrity (General Medical Council, 2013; University of Cambridge, 2020).

**Social responsibility in research**

Included in principles in AAS (1927); it was stressed in the 1960s (Cranberg, 1963; Graham, 1963) and highlighted in King’s (2007) third principle of ‘responsibility’ and ‘accountability’.

**Professionalism in research**

Incorporates and transcends ethics, integrity and good practice in research. It is the subject of this paper.

*Figure 2: Professionalism in research and its antecedents*

The literature on professionalism in the built environment is thin (Bordass and Leaman, 2013; Hartenberger *et al*., 2013; Jones and Hyde, 2019). There is inadequate knowledge on basic issues such as what is a profession (Abdul-Aziz *et al*., 2020). Challenges facing the UK built environment professions relating to their professionalism include (Morrell, 2020): A performance gap; Lack of attention to climate change; Loss of public trust; Siloed education; Proliferation of ‘professions’; and Low level of member engagement. The professions have declined in public esteem and client loyalty, and face increasing regulation (Spada, 2009). Foxell (2018) discusses the relationship between society, the economic system and professionalism in the built environment. Noting that the responsibilities of professionals and their obligation to act in the public interest are changing, he suggests how the professions can remain an effective and essential part of society and the economy; such considerations should be applied by built environment researchers.

Table 1 presents a summary of the main concepts and works on research ethics, integrity, good practice and professionalism discussed in this study. The analysis in this study further develops the ideas in these works towards establishing the concept of professionalism in built environment research; this is undertaken in the next section.

*Table 1  Chronology of concepts and major works in this study*

|  |  |  |
| --- | --- | --- |
| *Concept or study* | *Author* |  |
| *Importance of built environment sector* |
| Economic theory and construction industry | Turin, 1980; Ofori, 1990; Hillebrandt, 2000 | Nature, characteristics, importance of construction. Role of construction in the economy; elements of industry management. |
| *Revaluing Construction* | Barrett, 2008 | Review of construction industry performance in many countries, notes it is criticised everywhere. It proposes key areas for action: shared vision amongst stakeholders; balancing markets and social capital; and promotion of the value construction delivers to society. |
| Global report on construction industry | World Economic Forum and Boston Consulting Group, 2015 | Structure and performance of construction industry, and their underlying causes. Transformation of the industry |
| Construction in new economy (Singapore); Construction in national industrial strategy (UK) | Economic Strategies Committee, 2010; HM Government, 2018 | Importance of construction; industry’s role in effort to realise national economic and industrial strategy by improving productivity. |
| *Research ethics, integrity, good practice* |
| Code of Ethics for Scientific Men | AAAS, 1927 | First major code seeking to guide scientists and researchers. Highlighted honesty, impartiality, courage, excellence, and taking the public into their confidence.  |
| Call for guidance for standards and guidance for authors | Pigman and Carmichael, 1950 | In 1950s replicability of scientific work was emphasised; standards for authorship, and peer review set. |
| Doubts about moral character of science | Carson, 1962 | Works such as Carson’s *Silent Spring* highlighted negative impact of scientific products. Evidence of unethical, improper research practice, such as in human and animal experiments. |
| Code of Society for Social Responsibility in Science | Cranberg, 1963; Graham, 1963 | Scientists should foresee and take responsibility for its consequences; work for humanity’s benefit; share results with policy makers. Many scientists opposed these codes.  |
| Norms of Professionalism in Science | Merton, 1973 | Early work on professionalism in science; identified norms including c*ommunalism,* *universalism, disinterestedness*, *scepticism.* |
|  Report of the AAAS Committee on Scientific Freedom and Responsibility. | Edsall, 1975 | Applied science seen as having beneficial results and negative ones including nuclear weapons, chemicals which are threats to ecosystems. The report called for action on integrity in science. |
| Combination of code for scientists with "ethic of development" to form a new code | Cournand, 1977 | Recommendations included: intellectual integrity and objectivity; tolerance; recognition of error; unselfish engagement; and communal spirit. |
| *Responsible Science: Ensuring the Integrity of the Research Process*  | [National Academy of Sciences, National Academy of Engineering, and Institute of Medicine Panel on Scientific Responsibility and the Conduct of Research](https://pubmed.ncbi.nlm.nih.gov/?term=National+Academy+of+Sciences+%28US%29%2C+National+Academy+of+Engineering+%28US%29+and+Institute+of+Medicine+%28US%29+Panel+on+Scientific+Responsibility+and+the+Conduct+of+Research%5BCorporate+Author%5D) (1992) | Evaluated issues related to scientific responsibility and the conduct of research. Proposed core values of objectivity, honesty, openness, fairness, accountability, and stewardship. It guided thinking about research integrity in the US for over two decades. |
| Report of American Pharmaceutical Association Task Force on Professionalism | APA, 2000 | Proposed elements of professionalism including: accountability, trustworthiness, innovation, service orientation. |
| US National Research Council report on guiding principles for scientific research | US NRC, 2002 | Guiding principles for research include: link research to relevant theory; use appropriate methods; provide a coherent chain of reasoning; replicate, generalise across studies; and disclose results to encourage scrutiny. |
| Universal Ethics Code for Researchers | King, 2007 | A code meant to stand over all codes of conduct. Its elements are: *rigour; respect* (for life, the law and the public good); and *responsibility*. |
| Code of Practice for Research | UKRIO, 2007 | Organisations and researchers should follow principles on responsibilities and values. Researchers should consider implications of their work, and ethical and intellectual challenges in research. They include: *excellence*; *honesty*; *integrity*; and *accountability*. |
| Research Assessment Exercise, UK | Lansley, 2007, 2013 | Research of most UK academics is determined by how the work is graded in research assessment exercises, as it has impact on the researcher’s career and the university. Assessments reflect an institution’s level of research activity. |
| Academic professionalism | Evans, 2008 | Defines academic professionalism, highlighting profession’s purpose, status, range of service, and ethical code underpinning them. Suggests ways to conceptualise it. |
| Singapore Statement on Research Integrity | WCRI, 2010 | First international effort to develop uniform policies and codes to foster integrity in research. Principles are: ***honesty, accountability, professional courtesy and fairness*.** |
| San Francisco Declaration on Research Assessment (DORA) | ASCB, 2012 | Suggested that research output should be assessed on its own merits, not by metrics of the journal it appears in (such as impact factor).  |
| Summary of international codes reviewed | Royal Netherlands Academy of Arts and Sciences (KNAW), 2013 | Principles found in review include: *honesty in* reporting; *fairness* towards colleagues; *objectivity* in research; *reliability* of methods; *scepticism*; *accountability*; and *openness*. |
| US National Academies of Sciences, Engineering and Medicine Reports | USASEM, 2017 | *Fostering Integrity in Science* is major work on the subject. It builds on the core principles of integrity in *Responsible Science: Ensuring the Integrity of the Research Process* (of 1992), identifies best practices in research and recommends actions to address misconduct and malpractice.  |
| Research Excellence Framework 2021 | Department of Education *et al*., 2019 | UK’s REF seeks to “assess the quality of …research outputs in terms of their 'originality, significance and rigour' with reference to international research quality standards”. |
| Concordat to Support Research Integrity | UKRIO, 2019 | National framework for good research conduct and its governance. Signatories must: uphold rigour and integrity in research; ensure research conforms to ethical and legal standards; support integrity; ensure development of researchers; and deal with misconduct. |
| Practice in US | Gunsalus *et al*., 2019 | Effort to protect research quality and integrity in US has not been successful. Action should build a culture of integrity and quality; a national policy board is needed. |
| Hong Kong Manifesto produced at Sixth World Conference on Research Integrity (WCRI) | *The Lancet*, 2019 | Principles for assessing research include: society’s needs as a goal for research; assessing researchers with appropriate indicators; building a culture of open research. |
| Network of 23 universities encourages members to commit to making issues of research integrity part of their strategy.  | League of European Research Universities (LERU), 2020  | Universities should empower sound research; educate researchers in research integrity; have guidelines and support structures; be transparent and accountable; and foster a research integrity culture. |
| *Impact of current regime*  |  |  |
| Impact of universities’ practices on research | Kolsaker, 2008 | Managerialism in universities’ governance systems does not foster collegiality and self-management. Some researchers consider academics to be losing autonomy and status (Watermeyer, 2020); others are more positive about academic professionalism (Nixon, 2001). |
| Effect on individual researchers | Guthrie *et al*., 2017; Shift Learning, 2020 | Regime in UK puts pressures on researchers, affects their mental health and damages the quality of research. Action should develop a supportive research culture.  |
| *Competitive Accountability in Academic Life* | Watermeyer (2020)  | REF has led to UK higher education policies and culture of ‘managerial governmentality’. Suggests research assessment should encourage work with impact on growth, national development, policy and quality of life. |
| *Professionalism in Built Environment* |
| State of British professions | Spada, 2009 | Studied historical, regulatory, economic, social and political value and scope of UK professions. Professions have evolved to be gain importance in society and are a possible source of ethical role models, but have declined in client loyalty, public esteem and trust and increasing regulation. |
| The Edge Commission Report on Built Environment Professions | Morrell, 2015; Foxell, 2018 | UK built environment professions face challenges including: performance gap; loss of public’s trust; scepticism of young professionals; and low member engagement.  |
| Special issue of *Building Research and Information* on Professionalism | Bordass and Leaman, 2013 | “…considers the roles of built environment professionals and professionalism in creating better outcomes for the common good, and … changes …needed to their practices, institutions, education and knowledge.” |
| *Professionalism for the Built Environment* | Foxell, 2018 | Considers relationship between society, the economy and professionalism in the built environment; offers a plan to help professions to be effective in society.  |

**Assessing professionalism in built environment research**

*Assessing professionalism*

Researchers, mainly in sociology, have attempted to determine appropriate criteria and measurement of the professional standing of individuals. The professionalism constructs constitute areas which include reflections of attitudes and beliefs, perceptions of behaviour, or perceptions of context. Hall’s (1968) conceptualisation measured five scales of professionalism: use of the professional organisation as a major referent, belief in public service, belief in self regulation, sense of calling to the field, and a feeling of autonomy. Hall's scale has been widely studied and frequently reassessed (see Snizek, 1972). Subsequently, there appear to be more works in medicine and allied sciences than in others. ABIM Foundation *et al*. (2002) conceptualised “medical professionalism” and formulated “a physician charter”. Barnhoorn (2015) considered what a professionalism scale measures; and Wilkinson *et al*. (2009) and Klemenc-Ketis and Vrecko (2014) developed different blueprints to assess professionalism.

Studies on assessing professionalism in the built environment are rare. An example is Chan *et al*. (2007) which empirically evaluated Hall's Professionalism Scale as modified by Snizek (1972) for built environment professionals and found that the five scales applied, but needed further refinement.

## *Framework for built environment*

## Society wants built environment researchers to use their knowledge to improve the citizens’ quality of life. This is not yet evident. A UK study analysed 6 million pieces of data and revealed that the knowledge framework underpinning the construction industry is not fit for purpose (Designing Buildings Wiki, 2017). Practitioners lack easy access to critical knowledge, and do not have much use for the research done. While the volume of research output and arguably its quality, has been increasing, much of the industry’s challenges are not being investigated and there is no strategic leadership to co-ordinate the creation and dissemination of knowledge. Built environment researchers should systematically contribute to practice and society in their work.

A tentative framework for professionalism in built environment research, based on the foregoing discussion, is now proposed. It considers the attributes a built environment researcher must show in order to be considered to be professional.

1. *Social responsibility*: the researcher should be committed to contributing to the progress and well-being of the community. This is most relevant in the built environment owing to its process, product and stakeholders (Wolfe, 2019). Researchers should consider, and be responsive to, the needs and interests of society in their work.
2. *Intellectual honesty*: honesty is important in research; it is even more so for built environment research because much of such work is not easy to verify or replicate; the projects and items studied are widely dispersed; context has an influence on results from some studies; and the accuracy of the results is critical as they can have life and death consequences.
3. *Excellence, creativity and innovation*: all researchers should be creative, and aim for excellence. This is even more necessary among built environment researchers, as many of the subjects are complex; innovation is required to find solutions to the sector’s challenges.
4. *Collegiality and openness*: most aspects of the built environment involve the combination of many subject areas; multi-disciplinary studies are needed. Transparency is another necessary attribute in built environment research, again considering the life and death implications of the products and methods.
5. *Autonomy, responsibility and accountability for one's actions*: the researcher might be collaborating with others or receiving support from supervisors, mentors or colleagues, but the researcher should take responsibility for, and ownership of, the work. This is relevant to built environment research because of the possible negative implications of the results.
6. *Self-regulation*: the built environment sector is highly regulated and its professionals have institutions monitoring standards, but researchers do not have organisations enforcing a code of practice. Thus, self-regulation should be an individual attribute of the researcher.
7. *Commitment to self-improvement*: all researchers should be dedicated to continuous improvement of their knowledge and skills to keep pace with developments in their fields. In the built environment, studies show the pace of change, driven by technology, increasing (Balfour Beatty, 2017; Sheffield, 2020).
8. *Commitment to the advancement of the field*: built environment researchers should be dedicated to further development of knowledge, to enable them to contribute effectively to the sector and society.
9. *Conscience and trustworthiness*: trust is an essential but scarce commodity within the built environment sector and between the sector and its stakeholders (Spada, 2009; Ofori and Ceric, 2018). Researchers should maintain the trust of their counterparts, the industry and society.
10. *Ethically sound decision making*: research ethics is stressed in most countries. The possible impact of the results of built environment research on people’s health, safety and well-being makes ethics a major consideration for researchers.
11. *Altruism:* researchers should have a higher calling than the possible direct benefit from their work. Enhancing quality of life and seeking society’s interest should be among built environment researchers’ motivating factors.
12. *Honour and integrity*: as it is difficult to verify the results of most non-technical built environment research because of the uniqueness of contexts, other researchers should trust the results of each study. Thus, integrity is most important in the built environment.
13. *Service orientation*: researchers should seek to provide a service to society, to justify its investment in education and research, and according researchers respect and rewards.
14. *Respect for others*: considering the many stakeholders in the built environment and the potential for, and benefits from, multi-disciplinary research, researchers should have due respect for other contributors’ work and the interest of stakeholders.

**Gatekeepers**

The gatekeepers of research include journal editors, funding agencies, researchers’ employers, and peer reviewers. Other gatekeepers in the built environment field include groupings such as the CIB and Association of Researchers in Construction Management (ARCOM). Journal editors now guide built environment researchers to address relevant subjects (Dainty and Leiringer, 2019); editors of *Construction Management and Economics* are commissioning special issues on “some of the pressing matters that matter in construction” (Chan, 2020) because “…in a field that should also produce contributions with practical utility such that we better anticipate and influence the kinds of management knowledge to prevent future disasters like Grenfell, we have not succeeded as a community”. Singapore’s Building and Construction Authority (BCA) is an example of a public agency which is a gatekeeper of research; it has produced research roadmaps and technology guides (BCA, 2018, 2019) and used them to target funding support.

There are significant developments. Some professional institutions, such as the Royal Institute of British Architects (RIBA) and Royal Institution of Chartered Surveyors (RICS), have set up research programmes including funding and award schemes. Professional groupings dedicated to developing the built environment field of knowledge include The Edge, a UK multi-disciplinary group. The Edge Debate, a process of thinking about how the built environment could be better, involves these questions relevant to researchers (The Edge, undated): *Where* are we headed as an economy, a society and a polity, and does the built environment help or hinder it? *What* society can we afford to build with the ever-diminishing amounts of carbon to which it is entitled? and *Why* have we not been able to improve the built environment in the ways we know we should have?

**Critical analysis**

Despite the greater understanding of the characteristics, complexity and importance of the built environment and its sector (Hillebrandt, 2000), the performance of the sector and its products is poor (World Economic Forum and Boston Consulting Group, 2015). The sector fails to deliver value for money (Construction Leadership Council, 2018), lags behind other sectors in efficiency and productivity (Barbosa *et al*., 2018), and has a poor reputation (Bowen *et al*., 2015). Thus, research to improve the planning and design of built assets, the inputs, project outcomes and efficiency and durability of the built item has the potential to improve practice and contribute to society.

Efforts to develop a code of ethics, integrity and good practice to guide researchers started one century ago (AAAS, 1927). There have been major works on research, such as *Responsible Science* in 1992, and *Fostering Integrity in Research* in 2017. There are efforts to develop an international code of integrity in research (WCRI, 2010). *The Lancet* (2017) notes that there is now more discussion and awareness of research misconduct, more research into research integrity and inappropriate practice, and more guidance and support for researchers, funders, institutions, and journals. Yet, there is a long way to go to strengthen research integrity and publication ethics, citing the rise of predatory journals and conferences; in 2017, Springer retracted 107 papers from one journal (Tumor Biology) because they had been accepted after fake peer review.

## Professionalism in research is not yet defined and not well researched. For example, Van Donzel *et al*. (2013) used “scientific professionalism and integrity” as a synonym for responsible conduct of research. Professionalism in built environment research is much needed owing to the importance of the sector. Research in the field often falls short of good practice. For example, Runeson and De Valence (2015) suggest that research standards in building economics are poor; it lacks rigour and critical analysis. Researchers fail to use existing theories, and apply poor research design and methods. There is little quality control or replication. Sherratt *et al*. (2020) note that researchers continue to examine ways of increasing Public-Private Partnership projects and encourage their use worldwide whereas studies show that they often fail to lead to realised value, contribute to economic inequalities, opportunism and exploitation, and result in social dissatisfaction. Built environment research fails to address industry’s challenges; it has had little impact.

## What difference will the proposed framework make? Integrity, good practice and social responsibility in research have not been debated much by built environment researchers. To attain progress, it is necessary to go beyond stressing integrity to ensure and enhance professionalism in built environment research and train and motivate researchers to strive for it. The framework will guide such action. This study is based on a review of literature rather than having an empirical foundation but it has merit as it starts serious discussion of the subject.

**Further research**

Some possible topics for research on the professionalism of the built environment researcher are now briefly outlined.

1. Establish the importance of research in improving performance in the built environment sector and find effective ways of realising the improvement.
2. Determine the state of research integrity in built environment research.
3. Establish the concept of professionalism in built environment research.
4. Develop the framework of professionalism in built environment research into a measurement scale. Test the components empirically for applicability (with appropriate indicators), establish the level of importance of each of them, and map relationships among them.

# CONCLUDING REMARKS AND RECOMMENDATIONS

The built environment is of critical essence everywhere. Its importance transcends the needs of shelter, economic activity and social functions to include enhancement of the environment, universality of access, health and psychological wellbeing. It is necessary for researchers on it to contribute to improving the items built and the performance of the sector which creates them. Built environment researchers should undertake work which practitioners need, and would benefit from. They should be concerned about, and seek to influence for the better, the practices, procedures, and eventual performance of the built environment sector and the value chain.

There have been long and ongoing attempts to formulate a code for scientists to ensure good quality research that is useful to society. Ethics, integrity and good practice in research are now being accorded greater importance. However, research misconduct and bad practice persist. Some countries have introduced codes for researchers, and some have established research integrity agencies. A programme to develop global research integrity and good practice codes is underway. However, some researchers oppose codes, standards and control systems because of perception of restriction of their intellectual freedom. Moreover, there are many stakeholders with conflicting interests. Professionalism in research incorporates and extends ethics, integrity, quality and good practice, and adherence to it can make greatest difference. A suitable set of principles and attributes for assessment of professionalism would benefit researchers by setting benchmarks for them to attain, enabling them to attain higher order researcher attributes and contributing to society.

The objectives of the study have been accomplished and extended. In built environment research, there has not been much discussion of ethics, integrity and good practice. Concern for these principles and for the needs of the sector and society in built environment research should be built through the more far-reaching lens of professionalism.

The attributes of professionalism of the built environment researcher presented in this paper should be the subject of further work and development through empirical research. Considering the local nature of the built environment, national specificity in many regards, such as in interpretations of norms of ethics, and what is possible and enforceable is necessary. However, the key principles are widely applicable. Built environment researchers should seek to be responsible and professional researchers. Each researcher, before embarking on a study, should consider these questions: What questions in the industry does the research address? What improvements in the wellbeing of society will it result in? The researcher should continually ask: “What am I doing to help create the most appropriate built environment for my country and the world?”

There is need for effective gatekeeping of professionalism in built environment research. This can be realised through collaboration among government, industry and research, for example, to identify relevant research topics, disseminate findings, monitor their implementation, and propose follow-up action. A multi-disciplinary, multi-stakeholder organisation in-country and globally, is required. Such gatekeeping and monitoring should still allow for, and facilitate, excellent, reliable and efficient research. Thus, stress should be on researchers’ personal responsibility. Establishing and propagating professionalism among built environment researchers will help to attain individual responsibility.

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