

Design – ‘the art or action of conceiving of and producing a plan or drawing of something before it is made’.

Management – ‘the process of dealing with or controlling things or people’.

– Oxford Dictionary of English

Introduction

For as long as humankind has existed we have been making things. Someone has an idea, and then someone makes it. Different people might be involved at different stages.

This process of conceiving an idea, designing, planning and making something a reality has always been managed by someone, perhaps at first only intuitively. The master-builders of old had to provide information in some form at the right time for the craftsmen to carry out their work. The Pyramids, the Pantheon, the Acropolis, St Paul's Cathedral – all required a designer, but also needed someone to convey and translate that information over to the craftsmen and builders.

Where there is a design process happening, a management process needs to be happening in parallel to enable the design to reach fruition successfully. However, sometimes this does not happen, because there is a vacuum through lack of recognition of the issues or through a lack of understanding or expertise.

There is a whole area of discussion around the necessity for a discipline or defined role of the 'Design Manager'. Does a DMer add value to a project? Is this a new discipline, or is it a part or a subset of an existing skill set?

When design is happening as a process, then ***Design Management as an activity needs to take place***. I will leave the discussion about who should do it until a little later!

I have found that there is too much focus on roles. If instead in looking at these we focus on activities – ***‘What needs to happen?’***, ***‘Who is then best placed to do it?’*** – that gives clarity to structuring an approach.

This Handbook is the culmination of several years' work within the CIOB, principally within the Faculty of Architecture and Surveying. It is specifically written for those brave souls actually carrying out the DM role within the Construction and Built Environment Sector. You might be based on a construction site, or in an office working on tenders or pre-construction stages, or in a designer's office or perhaps as part of a customer's in-house team. You might be a young graduate just starting

out on your first job, or someone much older and more experienced. Most of the terminology and perspective I have used derive probably more from a contracting viewpoint, which reflects my experience, so I make no apologies for that. Whatever your role is in the project team or that of your organisation, I am sure you will bump into a lot of this on a daily basis!

Nevertheless, whatever stage you're at in your career, this Handbook is for you. I hope you will find it of use as an aide-memoire and that you will dip into it to see what the growth and development areas for DM in the future might be, as well as finding some ideas that will help in your daily job.

So . . . what is Design Management?

Definition

The CIOB DM working group, after much discussion, settled on the following working definition:

A definition of Design Management – The Activity

Design Management includes the management of all project-related design activities, people, processes and resources:

- Enabling the effective flow and production of design information
- Contributing to achieving the successful delivery of the completed project, on time, on budget and in fulfilment of the customer's requirements on quality and function in a sustainable manner
- Delivering value through integration, planning, co-ordination, reduction of risk and innovation
- Achieved through collaborative and integrated working and value-management processes.

We need to recognise that all sorts of people now populate the territory of 'Design' – traditionally the realm of professional designers such as architects, technologists, and structural, civil and MEP services engineers. However, we have seen the rise of specialist subcontractor designers, particularly in the fields of cladding, building envelope design, MEP building services and latterly environmental technologies. Also there are the specialist consultants, such as those for planning, acoustics, environmental matters and so on. The finished design of any building project will be the result of the efforts of possibly hundreds of people involved at various stages. All of these people need leadership and co-ordination to achieve the end result. This is the stage on which DM performs.

So who is the Design Manager?

Traditionally the architects would have seen themselves as natural leaders of the project team, organising, co-ordinating and administering the contract – taking the brief from the customer, organising the team and leading the design and contract processes through to completion. However, as we know, on all but the simplest and smallest of projects, the process is no longer that simple!

Procurement of building projects has become more complex and technically demanding. It seems that at the drop of a hat, another specialism appears. The Quantity Surveyor, Project Manager, Construction Manager, CDM-C, Planning Consultant, Party Wall Surveyor and others all have to be integrated into the project delivery process. In this context, is DM simply just another 'discipline'?

The role and activity of Design Management has gained ground and risen in profile, particularly through the widespread adoption of Design and Build-style procurement, and the rise of the specialist subcontractor. Is it significant that over this time span, as the education of the architect has moved into the realm of academia, the need for the DMer has emerged? Could there be a link? As a consequence of this shift in education and training, the architect's influence on the design and construction processes has declined. The role of architects has become distanced from the actual process of building through the education process and a lack of practical experience and knowledge. Looked at in this way, the disconnect between design and construction is revealed and, strangely, it is precisely this 'gap' that the Design Manager can fill.

The professional designers such as architects and engineers are now incredibly reliant on specialist subcontractors to realise their visions. Much of the procurement process is about selection of the right supply-chain members with the necessary expertise to complete the design for manufacture, installation and construction. The supply-chain resources and expertise are marshalled by the main contractor, and within their team will probably be a Design Manager helping to manage and co-ordinate all these inputs.

Consumer contractor

Several years ago, on a large commercial building project in central London, the client's project manager explained it to me thus:

'As the main contractor, you are the consumer of the design information produced by the design team. Therefore it is appropriate that you (i.e. me!) manage the process.'

So from that time on, I chaired all the meetings, produced the minutes, and followed up on the actions – he had a point!

Irrespective of how a project starts, the execution and delivery of the building phase will be led by the contractor, who carries most of the attendant risk. There is a strong argument for the contractor dictating the nature of the design process to enable information to be produced correctly and on time, and to ensure that the procurement and construction processes proceed as efficiently and economically as possible. I know that some designers will disagree, but rarely are designers exposed to anywhere near the magnitude of commercial risk to their business that contractors generally carry in the delivery process.

Perhaps the jury is still out on the matter, but I think over the last decade the pendulum has swung decisively in this respect. Most major projects are now delivered by contractor-led teams, supported by an army of specialists including designers and subcontractors. We have seen this particularly on public-sector frameworks and with major commercial-sector clients. I suspect it will be a long

time before the pendulum swings back, if it ever does. Clients require certainty of delivery, in terms of time, cost and quality. Early engagement of the contractor in the process is one of the main ingredients in providing this certainty and reducing the client's risk.

Project circumstances vary, but probably for a large proportion the DM role sits with the contractor. Whether this is a defined role, or part of, say, a project manager's brief, is another discussion; but the role and the activity need to take place for the project to be successful. Certainly anecdotally, probably most 'design managers' in the UK are within contracting and supply-chain organisations.

Production of design information that is accurate, co-ordinated, buildable and in line with the budget is a mission-critical activity – so it is an activity that is probably best left in the hands of someone who understands the processes, the requirements and tools needed to deliver successfully. If the design fails at any stage for whatever reason, be it poor quality, late, over budget, etc., then the results of that failure will impact on the project delivery, sometimes with catastrophic effect.

Design quality

Detractors of contractor-led delivery will cite the dumbing-down of design quality for design-and-build contracts. That opinion might have held some weight several years ago, but now there are numerous examples of high-quality buildings delivered through Design and Build-style procurement with leading architects as part of the team, and also those projects are winning design and industry awards in the process.

Sadly there are still exceptions, and usually they are the result of conflicting project drivers for the scheme. What is most important to the client? Finishing early, being under budget, or having a building designed with a world-class signature architect? In defining the parameters for delivering the project, sometimes something has to give and frequently the contractor, after a hard-won tender process, is the bearer of bad news on the cost plan!

Most major contractors are now exemplary in their approaches to corporate social responsibility, sustainability, the environment and health and safety. Indeed, they have to be, as these are frequently part of the scoring criteria for awarding contracts.

Where contractors perhaps need to step up and catch up with their design brethren is in articulating and understanding their impact on the built environment, with regard to the quality of the urban fabric they leave behind. If contractors are to credibly lead the team, transforming our towns and cities and the environment, then they need to understand urban design and consider the bigger picture.

If up to 70 per cent of the buildings that we are constructing now, together with those already existing, will still be standing in 2050 and beyond, what sort of legacy are we leaving to future generations? What impact will the homes, workplaces, civic buildings that we produce now have on people in the future and their daily lives? Are we making life better? Do we care? We all play a part in this realm of

Is it enough to say: 'We did what we were asked/instructed/told to do,' and walk away at completion?

the built environment, no matter what role we have in the project, and therefore we have to take responsibility.

It is these sorts of issue that intelligent contractors should be able to discuss openly with architects, planners and urban designers. Perhaps an indication here would be to say we have achieved 'working towards' on this aspiration! The DMer with a foot in both camps is able to help in taking this aspect forward.

The DM role

As a construction role, DM is a relative newcomer, probably gaining prominence in the 1990s and arising from the need for better co-ordination and delivery of design information from design teams to main contractors – particularly on design-and-build contracts and also on CDP-style procurement routes (*CDP – Contractor's Design Portion – is a subcontract works package with specialist design responsibility*). The increasing use of contractor-designed packages using specialist subcontractors has also increased the demand for the role, particularly as related to MEP services, structures, cladding/envelope solutions and other specialist areas.

Working with BIM increases the need for co-ordination, and management of design process and collaboration. Some will argue that BIM will solve a lot of our problems in this area. However, it is only a tool, operated by people – people who still need to produce the right information and inputs and complete their activities at the right time for BIM to be effective, which is DM in action.

Any building project of a reasonable size is the result of the work of hundreds of people both on and off site, ranging from designers, engineers, subcontractors, specialist consultants and suppliers and manufacturers, and – owing to global sourcing – probably from around the world. Never has the need been greater for a facilitator of the integrated and co-ordinated design process.

The DM role encompasses managing internal and external design consultants, controlling the development of the design concept into manufacturing and installation and construction status information. This type of role also exists in other industries besides construction, such as branding, manufacturing and industrial design, software development, automotive, petrochemicals and space engineering – essentially any process where design is involved in producing a finished, built or manufactured product. It is about process and people management, requiring a blend of technical and commercial awareness, mixed with project management and people and communication skills.

All leading UK contractors have design management teams. Management consultants sell design management services, and some design consultants, have their own in-house design managers to help with their design processes – effectively project managers of design.

DM in its broadest sense also includes management of mechanical and electrical plumbing (MEP) services design, which is mainly carried out through specialist MEP contractors. MEP packages represent a significant proportion of the content of most building contracts – typically as much as 25–35 per cent

Owing to its position in the design and construction processes, DM sits very closely with other roles in project teams, such as bid management, estimating, pre-construction management, and planning/programming. This includes being 'customer-facing' – for instance, dealing with briefing, managing compliance with the employer's requirements, and communication relating to design issues and progress.

Site-based DM roles are usually much more focused on construction information, maintaining and co-ordinating the flow of design information to enable construction work to proceed efficiently, as well as facilitating cost control and constructability review processes.

So that is a whistle-stop tour of the territory: but what about the person carrying out the role?

The Design Manager

People enter this field from all sorts of backgrounds, including architects, technologists, engineers, surveyors, administrators, construction managers and site managers. Qualifications in the role vary from none, to construction and design degrees or BTEC/ONC/HNC. There are now a few DM degree courses available, for example at the Universities of Greenwich, Loughborough, Northumbria and Robert Gordon.

Just as it is not easy to categorise people in the DM role, so job titles are equally diverse, although the actual role can be essentially the same (but not always!). Examples include Design Manager, Design Co-ordinator, Technical Manager/Co-ordinator, Building Services Manager, MEP Manager, Pre-construction Manager (which might be the same role or a different one!); they could even include Bid Manager or Project Manager, with a DM brief as part of their role. Career grades could be Assistant, Senior, Principal, Lead, and possibly in some cases Director. The increasing popularity of BIM has now brought us the BIM Manager, Co-ordinator, Leader, etc. – perhaps the Design Manager of the future?

To add another layer of complexity, every business has a slightly different approach as to how their project and business structures accommodate DM, as well as variations in the processes and procedures they follow. But what about the people themselves? What skills, knowledge and experience do they need?

The role

Their competency set could cover (in no particular order of importance):

Technology

- Basic understanding of the industry and how it works
- Building technology and systems, including structures and MEP
- Codes of Practice and Regulations, e.g. Planning, Listed Buildings, Building Regulations, BS/EN standards
- Design quality and urban impact
- Health and safety, including CDM
- Sustainability and the environment.

Process

- Construction process and logistics
- Design process
- Management tools and strategies
- Planning, programming, time-management techniques.

Commercial

- Commercial/cost/estimating
- Contract, legal
- Procurement routes.

Personal

- Dealing with people, communicating, influencing, negotiating, managing
- Presentation, communication
- Telepathy (so you can actually understand what people mean, rather than what they say) and necromancy (so you can predict the future, and avoid all those mistakes that you should have known about beforehand) – *I'm just checking that you're paying attention!*

And the list could go on!

After examining several job profiles for Design Management roles, I feel that the DMer needs to be some kind of Superwoman or Superman – there is an element of being all things to all people and knowing everything about everything! In a typical week, you could be in front of the client, meeting the local planning officers, leading a design team meeting, meeting subcontractors to discuss details and then walking round the site to check on built work for compliance with the design information. So it can be extremely varied, and the mindsets, knowledge and skills required in these different situations are as equally diverse. It's quite a challenge on a personal level for the Design Manager, let alone the technical and business knowledge involved.

At first sight all this could seem quite daunting and challenging, and yet there are so many positive aspects to the DMer role: being part of a team; developing relationships that sometimes can last a lifetime; becoming knowledgeable about all aspects of the design and construction processes; always learning; seeing a project come together in design, and then going out to watch it being built; and the thrill of handing over the finished building to a satisfied customer. It's definitely a role that is challenging, but also extremely fulfilling, with never a dull moment and I think a great future – something to aspire to!

The person

Let's develop this further; let's think about how people 'occur'. Our personalities, moods, personal agendas all affect how we work, collaborate, communicate or not, as the case may be. I am sure that we have all experienced personality clashes and difficulties in our lives; then sometimes, in other situations, it is no effort at all to work with certain people. Awareness of self and of others is another strand to this equation.

Depending on your entry route into the construction industry and your qualifications and background, some of the above competencies listed will be covered, but there will still be gaps elsewhere. If you have come through the trades, then you might not have a great deal of experience of working with designers. Similarly, as a designer you might not have spent much time on site, understanding how buildings really come together physically and how site-delivery teams work.

It's no surprise, therefore, that there is some confusion around the DM role. Different businesses have different emphases, the role and requirements are not universally understood, and the skills, qualifications and experience of the people actually doing Design Management represent a hugely diverse spectrum.

Hallmarks of DM

For many years I have held the belief that there are generic hallmarks and principles of good Design Management. These hallmarks set the framework for how DM should work, and as a result they scope the role of the Design Manager. Also, the different challenges that the many stages of the design and construction processes pose to the DM are significantly different, requiring appropriate and relevant skills and understanding and differing mindsets.

Is it realistic to expect someone to excel at every stage of the design, procurement and construction processes? As individuals we naturally gravitate to those stages of the process that we are best at, are interested in or even passionate about. And this is not just about construction-oriented people: in design practices also, there is recognition of interest and ability, allowing people to specialise at different stages of design, ranging from concept to detail and delivery, and in some cases business administration and contract.

Stages of DM

Pre-construction and site delivery can be different worlds, requiring different skill sets and mentalities. Pre-construction is a world of possibilities, options and alternatives, while construction is very much about certainty of delivery – following the delivery process logically, step by step, to complete the project. The very earliest stages of a project can be just as different again – it's the world of feasibilities, business cases and value-management options. For someone who is more com-

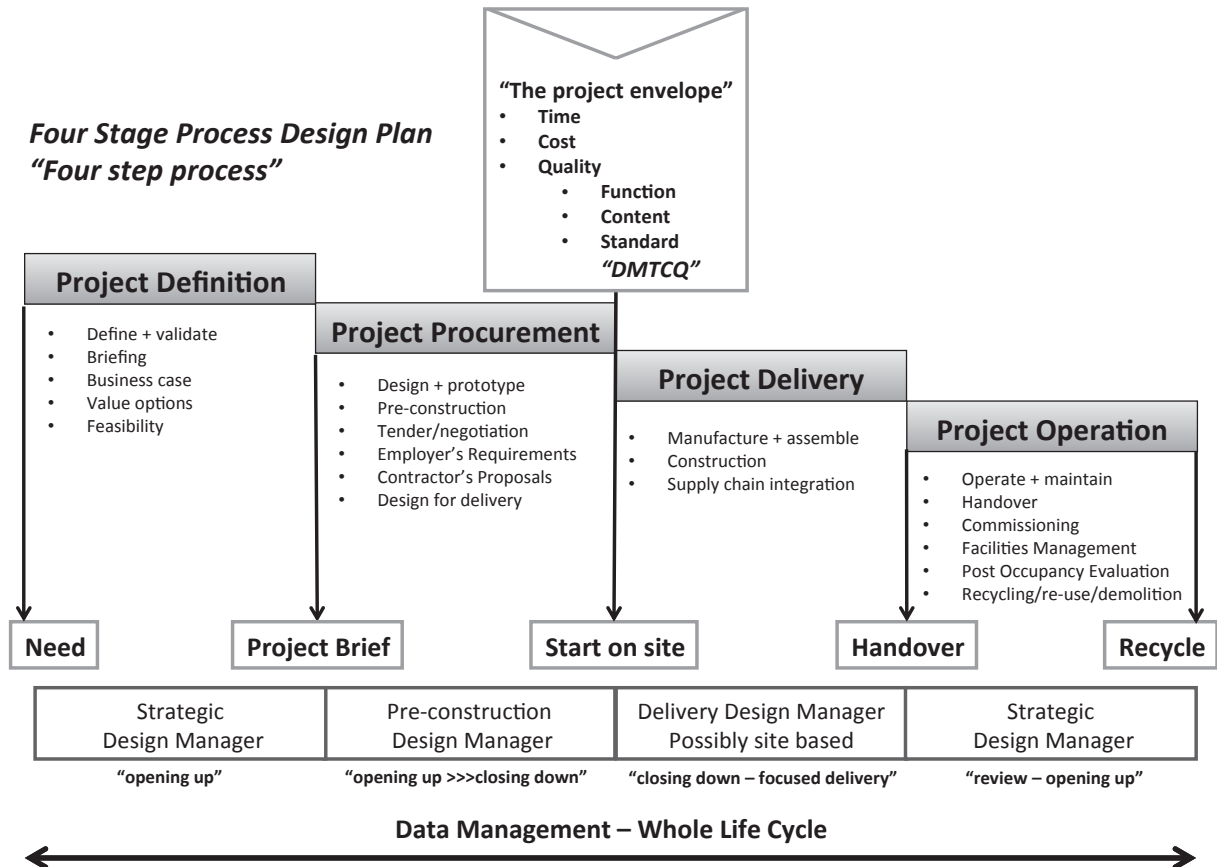


Figure 1.1

fortable with the building stage, just wanting to get on and build something, this can be a scary place! Within these broader fields Design Managers can also become expert, because of their training or experience in cladding, structures, or renewable technologies, for example.

Therefore I think it is realistic to recognise different flavours of DM or **modes** of operation; refer to the Four Stage Process in Figure 1.1. The DMer role changes in nature from stage to stage.

Design Management operates in:

1. Project definition
2. Project procurement
3. Project delivery
4. Project operation

The commentary on these four stages is as follows, and sets the scene for the discussion of the role of the Design Manager in Section 2: Process.

Project definition

What does the client want? What do they need? This could involve establishing the business case, pinning down the brief, perhaps managing the production of options or feasibilities and their review and assessment; then defining what the project is actually going to be, and the parameters for its delivery, such as the intended timescales, budget limits, and the facilities and standards to be provided.

Project procurement

Once the project direction has been established, then the design is developed for submission for planning approval and further developed for Building Regulations approval. There may well be the need for further value-management exercises to be held to ensure the project is within budget and delivering what the customer wants – but that will usually be within the now-established project parameters. Sometimes it will become necessary to go back in the process, because requirements change, budgets are exceeded or other external factors apply. Other activities here could include early supply-chain input, review of key aspects and risk mitigation. The objective of this stage is to put in place all that is required to enable delivery of the project in the next stage.

Project delivery

Once the scheme is defined, and approvals obtained, the project moves into delivery mode, with the contractor having been appointed through a tendering process, which will have established the boundaries for the project in terms of time, cost and quality (function, content and standard). The objective of this stage is to feed the construction machine the information it needs to complete the project according to programme and budget. This involves the integration and co-ordination of all the stakeholders, including designers and the supply chain. Programming, cost, 'buildability' and compliance issues all come into play, and at this stage the site-based Design Manager has to deal with them all.

Project operation

During the completion stage systems are commissioned, the project is handed over, defects are rectified and the project moves into operational mode. Training may need to be given to building managers and the FM team, and potential end users. Aftercare is becoming increasingly important in the project delivery. There are opportunities to enhance the customer's experience at this stage, as well as to develop lessons learned for future projects through Post-Occupancy Evaluation. In addition there will be ongoing operational evaluation of the project in use – say, of the adequacy of the facilities, energy and resource use and carbon emissions, for example.

Eventually the project may require alteration, extension, or perhaps demolition and recycling. Strategic input from a suitable Design Manager will assist in this process and so the cycle begins again (or ends for this particular project).

Activities, not roles

Note that I have described above the activities that need to take place. Time and expertise allowing, these activities could be carried out by a Project Manager, Bid Manager or Pre-construction Manager, as part of their skill set, for example. In terms of site delivery, the DM function could be fulfilled by a Package or Site Manager responsible for the construction of the design elements involved. Cladding, MEP service, structures would be good examples of where a suitably able and skilled Package Manager would deal with the package from design through to final completion as part of their responsibility. This could equally be applied to any aspect of the construction, once the overall parameters have been set.

The CIOB Design Manager's Handbook

So, having sketched out the field we are going to look at, this is how the Handbook is structured and the areas it will cover. It is worth keeping in the back of your mind the Four Stage Process (Figure 1.1) and DMTCQ (Section 3). These set the principles and the overall context of the Handbook.

The Handbook sections cover:

- **Process**
Consideration of the project context and timeline, looking at some key strands of the overall process, and examples of leading industry processes, and other aspects.
- **DMTCQ**
Guidance on the key DM aspects that form good practice for Design Management. A framework of principles that the DMer can use to manage and also analyse DM activities.
- **Tools**
Identification of some generic tools that can be used to control design development and information production. Some simple examples and ideas on key tools to manage design successfully.
- **Procurement**
How DM process requirements flex with procurement routes, discussion and observations. Different contract forms generate different drivers, which affect the DMer in practice. Discussion around the Employer's Requirements, Contractor's Proposals and Novation.

- **Value and innovation**
The relevance of value management to Design Management. How VM can benefit the project in practice through Design Management. Some thoughts about how the DMer can be a catalyst for innovation.
- **People**
Perhaps a neglected aspect is the person – how we interact, factors affecting our behaviour and the roles we take up in situations. Exploring how aware we are of the people element in the way we work.
- **Training**
How do people find their way into DM roles? An overview of academic, professional, trade and off-the-tools routes.
- **Quality**
Consideration of project quality, leading to a discussion around design and urban quality. Is this the province of designers only, or do contractors need to step up?
- **Stories**
Case studies of where DM has added value and also stories of people in DM actually doing it. Their background, education, how they started out.
- **Future**
Potential changes and trends in the industry, and impact of external factors such as climate change, resources use and demographics. Impact of BIM and technology on the role and the process.
- **Some contributions from CIOB DM working-group members interested in DM or related subjects**
Contributions on process, value management, lean planning, tools, people skills, education and further resources for learning.

Conclusion

Just as in life, there is a connectedness about DM that means that strands intertwine and overlap. Successful DM takes in all sorts of factors: time, cost, quality, sustainability, environment, safety, logistics, buildability and so on. If there is such a thing as the 'Zen of Design Management', then it comes from the holistic harmony of all these factors resulting in the whole process flowing efficiently and productively, with no waste – perhaps rather like the concept of flow in lean construction.

However, a successful project itself is the result of many inputs and activities, and DM is but one subset of these. So for the purposes of this Handbook, focusing on inputs and areas individually for DM is necessary, but inevitably there will be some overlap and repetition due to this interconnectedness of strands and issues.

In conclusion it is difficult to say what the future might be for DM, but there is no doubt that it is here to stay, and already there are clues as to the next evolutionary step.

Remember: Wherever 'Design' is happening, DM will need to take place for the project to be successful. The questions will always be: who should do it and who is best placed to do it?

The increasing complexity of design and delivery models cries out for a leader/co-ordinator/integrator. BIM and technology will also have a huge impact. Who knows where this may lead? Today's Design Manager could be the next generation's BIM manager or technologist, dealing with compiling *n*D BIM that provides all design, manufacturing and construction information, as well as financial and procurement information, while still providing an ongoing vehicle for controlling carbon emissions, energy consumption and facilities management, and in addition acting as a lynchpin for design facilitation and collaboration.

'May you live in interesting times . . .' as the Chinese proverb goes, and we certainly do! There is no doubt in my mind that the rate of change and innovation in our lives is increasing. In my own lifetime so far I have seen mobile phones shrink from the size of a concrete block to almost a credit card, whilst personal computers have gone from covering the desktop, to being capable of being carried around in your pocket. It is a cross between James Bond and 'Thunderbirds', and it is all on my iPhone! Who was it at IBM that said no one would be interested in personal computers?!

For the design-and-construction industry, the next ten years will be even more exciting and challenging than anything we have seen before. Technology; the impact of Generation Y with their ingrained networking and IT skills, as they move forward into leading our businesses; the silver surfers living and working longer; the subcontractors becoming even more expert and specialist; plus the economic environment, as well as the immediate challenge of climate change. All these factors and more are going to drive the transformation of the way we work and the buildings that we design and construct.

Construction is an amazing industry in which to work. The opportunities are diverse and immense. Every day great things are accomplished in the UK and all over the world by people just doing their job, in design offices, on site, and in supply-chain workshops.

We all know the immensity of the challenges that the industry faces; they confront us every day. The solutions will not be delivered by one discipline, one institute or one sector of the industry on its own. It is only by working together, collectively and collaboratively, that these challenges and more will be met and overcome. We are all part of the problem. Conversely, we are all part of the solution.

This is totally in the spirit of Design Management.

BIM will have a huge impact on our industry. It will eventually prove to be a generational step change. It will impact on all aspects of the design, construction and delivery processes and will fundamentally affect the role of the Design Manager, bringing DM to the very centre of project collaboration and integration.

My experience of people involved in design and construction is that that they willingly share and talk about what they do, and are open to other people's ideas. Certainly my experience of Design Managers very much supports that notion.

The DM role and activity is about bringing ideas together, connecting, integrating, communicating, innovating and collaborating.

And finally for this section

As can be seen from all the previous discussions, the world of Design Management in the construction industry is wide, diverse, far-ranging, complex and multi-layered.

On the board of the CIOB Faculty of Architecture and Surveying we have been discussing this for some time. Out of that discussion has arisen the project to develop the CIOB approach to Design Management and to provide some focus. The production of this Handbook is the first step in the process and I am hoping it will be relevant and useful and will contribute to developing DM in this great industry of ours in the future.

Whatever your role, site-based or in an office, working for the customer, designer, contractor or subcontractor, the Handbook is for you. It is based mainly on UK principles, but from an international perspective; aside from differences related to local code and compliance issues, process remains largely the same. Differing procurement and contract models mainly hinge upon the degree and the stage at which the main contractor becomes involved in the process.

This Handbook provides a focus on who and where we are, what we do, where we could go and how we might get there. My hope is that this will contribute to raising the profile of Design Managers, and getting DMers talking, collaborating, innovating and exchanging ideas across our industry. Just as importantly, it is to assist you in whatever role you face on a daily basis.

Connect – integrate – communicate – innovate – collaborate!

Let's go!

