

Are you ready and do you have the skill sets?

A look into the skill, knowledge and competency requirements needed for the future design, installation, commissioning, approval, maintenance and/or operation of Life/Fire Safety systems.

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0. Introduction

Digitisation is the big revolution. When we put all the marketing aside and think about the impact of the technical developments in recent time, we are clearly not just in a hype. It is a period of disruption, revolution and redefining for the Life/Fire Safety industry and the markets it serves. The future we discussed 5 to 10 years ago is now tangible. The plans we made then can now be deployed, because the accessibility and affordability for the broader markets is a reality – and it continues to evolve. The promises we made to make everything better and easier seem within reach.

But is there something we are overlooking? What about the know-how to make it happen in a way that is safe. Our industry mission contributes towards keeping people and assets safe, and this mission encompasses also how.

The content of this paper is based on opinions and insight collected from industry experts as well as numerous articles on digitisation including such outside of our industry. The approach has been empirical, because we are looking at a future that is still to be defined. As with any evolution, we are limited to the identification, observation and study of facts we deem to be relevant and hence indicators of what we need to do.

This paper makes no claim to providing answers, but it does point out many of the questions we need to address. Its purpose is to communicate a sense of urgency to the Life/Fire Safety industry stakeholders to extend the discussion of intelligent buildings and infrastructure to include the evolving Know-how of the women and men designing, installing, commissioning, approving, maintaining and/or operating these systems. Only so can our industry continue to meet the objective of its mission.

This paper reviews in broader context two areas on skill set development:

1. Identifying, building and developing the knowledge and competencies required to apply the new technologies in a safe and secure manner for all involved.
2. Developing and evolving new communication skills which increase the level of collaboration thereby bringing forth the best possible solutions.

1. Knowledge and competencies required to apply the new technologies

Reflecting on a future of buildings that will provide an environment for occupants that is safe, secure, comfortable and simple, we need to take a long good look at the people that are involved in the various tasks surrounding the systems and solutions of these fantastic buildings. Of course, those people will have tools in place to make this happen. It is all part of the greater plan. But ask yourself how prepared you are today and - most of all - for a future, where there are still more questions than answers?

Are you ready and do you have the skill sets? Are you focussing on the exciting challenge ahead for yourself, our industry, for our customers and for society? How will our industry continue on its mission in a technological and knowledge environment that is changing faster than ever before?

The "E-Skills Manifesto from the European Commission 2017" looks at the needs for a society that is impacted by the technologies that have disrupted and changed the way we live, play and work. There is hardly an area that is not affected.

"In the coming years 90% of jobs will require digital skills and competences at a higher than basic level. These are jobs not only in, but also outside of the office. Farmers, electricians, car mechanics, police detectives, teachers and doctors, among others use digital tools in their everyday tasks."

Source: <http://ec.europa.eu/DocsRoom/documents/21341/attachments/1/translations/en/renditions/pdf>

Regarding skill sets, the report makes it clear that as individuals, organisations or even whole industries, we have two choices:

1. We continue as we are only to be replaced and left behind.
2. We grab the initiative and begin to define this new future. In doing so, we grow our knowledge, extend our experience and broaden our competencies.

To better understand what these future skill sets could be, we need to look at the workplace environment and tools, capabilities during the Life/Fire Safety system lifespan, and additional educational needs resulting from the applied technologies (e.g. ICT).

1.1 Workplace Environment and Tools

Already today, most of us are experiencing in private and work life the new environment, tools and devices made available to us. Our basic needs to plan, communicate, coordinate, confirm, etc. have not changed, but how and when and with what is very different. There are challenges in the growing number of tools/apps and devices along with the speed at which they are modified. A common source of frustration and helplessness comes from the never-ending bugs and glitches – an unfortunate and highly unproductive part of the changing world. At the same time, it is a learning process expanding our knowledge.

The positive side of today's digital workplace is what we achieve across time and space, that which was not possible years ago (e.g. Telex, Fax). The accessibility of information through the Internet introduced in 1989 and the use of email since before are in a sense the building blocks of today's digital workplace. The availability and affordability of telecommunication and mobile devices are the catalysts that have driven innovation.

Focussing on the new workplace environment from the user's perspective, we have the following:

1. Integration of communication (as in social networks) enabling to follow and participate in an information exchange with written, audio and/or visual content however in an asynchronous approach.
2. Mobile and fix devices that interface us with our "virtual" worlds that in fact are made up of real people – Bots excluded.
3. Growing number of applications that act as assistants in the areas of planning, scheduling, organising, executing, reporting and – for most of us – reminding.

At our doorstep are "contextually aware apps" that make use of several information sources to streamline information flow, keep us focussed on what really needs to be done and already look ahead at what the next tasks are. Artificial Intelligence!

As stated before, our basic needs to plan, communicate, coordinate, confirm, etc. have not changed. However, we have acquired skill sets to meet these basic needs using means that were not there before. We have adapted and will continue to do so.

1.2 Upcoming demands on the capabilities within our industry

From the basic digital workplace, envision a digital twin of the real world – a repository of information that allows us to virtually create and test a building with all its infrastructure and design characteristics. Long before construction begins, a multi-disciplined team is simulating fire development, smoke spread and evacuation to find inconsistencies in design requirements or just simply physical characteristics of spaces. As construction progresses, changes in the real world are fed back into the virtual world cascading through a multitude of interdependencies that are analysed for possible issues to be addressed.

This clearly and significantly changes how we conduct our business, execute our work, and serve the market meaning new skills are needed across the whole building lifespan. Buildings will still have fire protection, but how we achieve that objective will change drastically. Add artificial intelligence with the use of virtual models to deal with complexity and the risk of mistakes.



Source: <https://www.siemens.com/customer-magazine/en/home/buildings/light-and-building/faster-better-cheaper.html>

The key message is that we will need to know how to utilise these tools wisely. To do so, we must understand what they do and what the output tells us. As you go through the following table, keep the above picture in your mind. You should identify two big changes being a) all contributors working in a predominantly parallel approach as opposed to the more sequential approach of today, and b) higher levels of collaboration (to be discussed in the second part of this paper).

Phase	Roles	Required capabilities
Concept	Customer	- describe the desired functions of the building in respect to occupants, processes and operations in and around the building (complex)
	Consultant	- utilising the virtual model of the future building (digital twin), integrate requirements provided by customer, standards, regulations and laws
	Authorities	- pre-review the project using virtual model to make a broad assessment of conformity with relevant legal (and possibly normative) requirements
Design Specifying	Consultant	- extend and elaborate the details of the technical infrastructure (e.g. life safety systems) to establish a working virtual model - run overall simulations to confirm, improve or even correct design aspects - verify compliance with legal and normative requirements - create specification requirements for suppliers
	Suppliers	- provide specific data to the virtual model - run specific simulations to assess performance and make necessary adjustments - extract initial data that would be used to engineer (program) and commission the real system
	Customer	- review design and function (including simulations) of the infrastructure using the virtual model - verify compliance with design requirements
Approvals	Authorities	- review the project using the virtual model - assess conformity with all relevant legal (and possibly normative) requirements - issue permit(s) based on the virtual model
Bidding	Design	- publish tender in fully electronic form - provide virtual model to allow perspective suppliers
	Suppliers	- develop and test offering using virtual model - run necessary simulations to assess performance, requirements conformity and interaction with other systems (both desired and un-desired interactions) - produce offering

Phase	Roles	Required capabilities
Installation	Electrician Installer	<ul style="list-style-type: none"> - based on data from virtual model: <ul style="list-style-type: none"> - install cabling, mount and connect devices - verify installation and test communication using intelligent instruments - amend data in virtual model to reflect “as-built” status - hand-over to engineering and commissioning
Engineering	Project Engineer	<ul style="list-style-type: none"> - based on data from virtual model, build programming of system - run simulations and make corrections and improvements - review any cost impacts
Commissioning	Field Technician System Engineer	<ul style="list-style-type: none"> - commission system in accordance with virtual model, and all relevant legal and normative requirements - test any changes using virtual model prior to implementation - feedback changes into virtual model
Acceptance Handover	Authorities	<ul style="list-style-type: none"> - conduct review of system using virtual model as reference - mark any deficiencies or non-conformity issues - issue final approval
	Customer	<ul style="list-style-type: none"> - review design and function (including simulations) of the infrastructure using the virtual model - verify compliance with described requirements
	Field Technician	<ul style="list-style-type: none"> - correct deficiencies and non-conformity issues - confirm back to all parties using virtual model
Maintenance Update Upgrade	(Field) Technician	<ul style="list-style-type: none"> - remote servicing as far as allowed by technology, safety regulations and standards - system analysis using historic data and virtual model - feedback any changes to system into the virtual model (Question: Could one day be automated by linking the real system with the virtual model.)

Note: The above list of phases and roles are neither an extensive nor complete list.

To summarise, there is an abundance of information being exchanged between the roles using the virtual model as a platform to experiment, test, improve and verify solutions prior to implementation in the real installation. Contextually aware components of the tools we work with will assist and guide us. Some of these are already in use today.

1.3 Impact of ICT on Education Needs

Additive to the expertise in Life/Fire Safety systems is the application and use IT landscapes and tools. This quickly, evolving world is still somewhat new to our industry, and it is here to stay. No longer are we only in contact with fire engineers, authorities, installers, etc., we are engaging with experts from the ICT world. To do so effectively and efficiently, we need to understand their language. In this way, we can make the best use of the infrastructure, and “best use” means most value and safe application for the system owner/operator.

There are crucial reasons to integrate this knowledge into our existing expertise:

1. We understand best how Life/Fire Safety systems contribute to saving lives and protecting assets.
2. We are the professionals in assuring that these systems achieve their objective.
3. We cannot depend on an ICT industry to fill that gap for us. That is our responsibility.

This is both a unique and pressing opportunity providing the kind of challenge that heightens the attractiveness of our industry. Some believe that the digital disruption will reduce the amount of training needed. This would be true if we limited the application of digitisation to remote service or remote support. Due to the broad dissemination of digitisation in all aspects of our industry, the situation is exactly the opposite – as outlined above and substantiated by the European Commission report.

2. Communicating and Collaborating in a digital work environment

This brings us to the second aspect of this paper that focuses on communicating and collaborating skills in a digital work environment. Information is crucial for us to exist let alone to complete our tasks. With digitisation, we have significantly changed the characteristics of information such as content reliability, volume, life span, availability, speed of dissemination – just to mention some. It is ever more difficult to capture and extract relevant information. We speak of “information overload”, when I think what we mean is entropy – a lack of order or predictability.

There is an additional phenomenon that we need to be highly aware of, and that is complexity. One perspective is technical such as how various systems will interact with each other and not create glitches. However, before this area of complexity is addressed, we need to look at the complexity of the social system we establish when working together on a whole project or just one small aspect thereof. We can easily find ourselves in a Babylonian status because of barriers due to language, trust, differences in values and experiences, and so much more.

So, if the premise is that both entropy of information and complexity in our social systems hinders us, how do we define successful communication and collaboration in this challenging digital work environment? The simple answer would be to develop a common mindset and a common vision.

This new world is bold, and so must we be as well. It is too complex to solve on our own, meaning success is dependent on pro-active communication, collaboration and team work. The change we need to make is reaching out and including those that can help us to understand how to apply new technologies in our work to design, install, commission, maintain or operate the Life/Fire Safety systems that assure intelligent buildings are fire safe.

2.1 Communication

Depending on which reference source, the term “communication” has a multitude of definitions. For the purpose of this paper, I choose to focus on the descriptors “exchange”, “share” and “invoke understanding”, all of which contribute to establishing

transparency and building trust. Often, we are tied up in transmitting and not paying attention to receiving. It is a sign of the times to express oneself, but that is only half of communication. To be successful here calls for emotional awareness and mindfulness; for others and yourself.

2.2 Collaboration

If Communication is a discipline, then Collaboration is an instrument – a platform to engage, share and understand the knowledge, expertise, experiences, and more of those involved. In doing so, we utilise the resources around us, reaching out to the right people to achieve the mission successfully. This assists us as individuals or organisations to develop the best possible solutions – find the best possible answers. Collaboration gets the priorities on track, to focus on what is important and not just on what is urgent. In the long-term, regular collaboration enables the development of a collective vision and collective mindset.

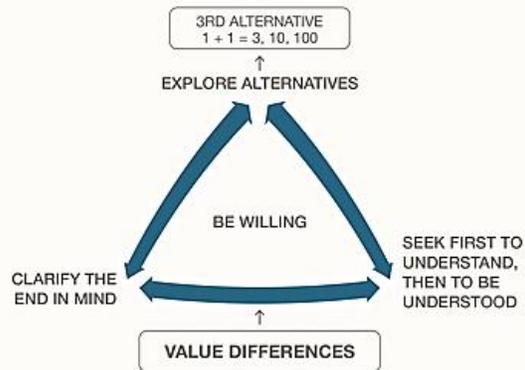
2.3 Communication and Collaboration to Synergy building

The term “synergy” has unfortunately been repeated so many times that it has lost its meaning – in German it has become an Unwort (non-word). If we set this aside, then let’s focus on its true meaning being two or more people or entities cooperating to achieve collective results, greater than if approached individually.

Note that the basis of Synergy building is communication and collaboration. There are a number of models that can be used to make this clearer. The following has been taken from FranklinCovey – a US based company providing training to modify behaviour in organisations. The so-called 6th Habit is Synergize.

The following is just an example to outline key areas to be aware of in synergy building, or what Stephen Covey called the 3rd Alternative. Key aspects of this model are the valuing of differences (in place of challenging them), clarifying what is to be achieved (commonly agreed and understood objective), and asking questions to understand the other side(s).

The Path to Synergy



YOU KNOW YOU'RE IN SYNERGY WHEN YOU:

- Have a change of heart.
- Feel new energy and excitement.
- See things in a new way.
- Feel that the relationship has transformed.
- End up with an idea or a result that is better than what either of you started with (3rd Alternative).

Source: <https://www.franklincovey.com/the-7-habits/habit-6.html>

3. Summary

Digitisation is not just about the new technologies and the impact they will have on the solutions we provide to our markets. It is equally important and crucial to recognise the impact it has on the skill sets of all the stakeholders – the skill sets they will need to make best use of and safely apply what comes out of the innovation pipelines.

This paper has attempted to address two key areas of needed action:

1. Identifying, conveying and consistently developing the technical skills to successfully function in the digital workplace of our industry.
2. Modifying our communication and collaboration skill sets with a view to synergy building, hence enabling our industry to produce the best possible solutions for customers.

This is a call to individuals, trade associations, educational institutions and the industry to cultivate a mindset of continuing education addressing both the person and the technology. And as technology evolves, so must the training. As complexity evolves, so must our communication and collaboration skills.

Are you ready and do you have the skill sets? Is your focus set on tackling the new challenges and turning changes into success for you, your customer and your company?