

4. Government Needs to Encourage and Support this Transformation

4.1 Regulation and policies

As a regulator and policy-maker, a national government can influence the E&C industry in various ways. Primarily, it acts as a warden of health, safety and environmental conditions in and around construction, and it should perform this task as efficiently as possible to mitigate adverse effects on productivity. It also impacts on firms' strategies and operational practices by preventing or supporting competition nationally and internationally. And it can influence the speed and direction of technology development and diffusion.

Harmonized building codes/standards and efficient permit processes

Smart regulation is the key: it ensures that standards are met in an efficient and effective way. In addition, the regulatory framework should leave room for technological progress and should anticipate emerging needs. To achieve these objectives, it is crucial to have well-designed building codes and standards, as well as transparent and streamlined permit processes.

Regarding building codes and standards, the following best practices stand out:

- *Strive for more uniform regulations.* Multiple overlapping or highly fragmented standards can cause builders and local authorities to become confused. This results in delays, uncertainty and disputes. To reduce complexity, it is therefore crucial to harmonize building codes and standards at a national (or international) level, while at the same time taking into account location-specific requirements concerning geography, climate and traditional building practices. For efficient application, building codes and standards should also be easily accessible; ideally, they should be freely available online and through electronic devices.

EXAMPLE: The *Eurocode initiative* harmonized methodologies for design and calculation for construction projects in the EU, though specific rules and detailed standards still remain at the national level.

- *Update provisions regularly.* Building codes and standards need to be adaptable and up-to-date to appropriately reflect economic, societal and technological change. This regular updating is particularly important in the light of growing environmental concerns and the emergence of new digital tools such as BIM.

- *Implement outcome-oriented standards where appropriate.* Performance-based building codes are an effective means to encourage innovation in construction techniques and materials. The codes specify the performance standards that a building must abide by, rather than specifying the ways of achieving those standards. The codes do involve a cost: to maintain control, it is imperative to ensure the adequacy of every single design and construction path selected. This can be an intricate task, especially if there are a great many alternatives and if their performance is difficult to measure.

EXAMPLE: *New Zealand's building code* is exclusively performance-based. For example, it prescribes that in the event of fire, the evacuation time must allow occupants of a building to move to a place of safety without being exposed to a fractional effective dose of carbon monoxide greater than 0.3.⁹⁷



Construction-permit processes are a major source of project uncertainty and delay in many countries. A government can apply measures such as these to improve efficiency:

- *Make approvals more convenient and faster for builders.* Building plans often need to be approved by multiple different agencies. To coordinate their efforts better, and to increase the speed and convenience for permit seekers, regulators should strive to ease any bottlenecks and reduce bureaucracy associated with processes. For example, they could establish “single-window” systems and one-stop centres that combine the required competencies under a single roof and commit to specific timelines for approval.
- *Differentiate approvals by risk.* Different assets vary in their social, economic and environmental impact. Simple or low-risk projects require fewer checks and can be approved faster than more complex structures. Effective regulations therefore involve rigorous yet differentiated approval processes, which treat buildings according to their risk level.

EXAMPLE: The *European standard* defines three “Consequence Classes” based on parameters such as size, construction method and final use. Each building category lists recommended interactions with the authorities, including fast-track approval procedures for low-risk buildings.

- *Digitize construction permits.* A proficient deployment of IT not only reduces the costs of approval processes, but also enables regulators and practitioners to cope with increasingly complex building standards and additional policy objectives (such as those related to energy efficiency). Particularly promising in this context is the development of BIM-based software tools that are capable of automating the verification of building-code compliance.

EXAMPLE: In the *United States*, advanced e-permit systems and mobile inspection technology have reduced approval times by 30% and the number of required on-site inspections by 25%.

Finally, governments should establish appropriate control mechanisms and sanctions to help enforce their statutory provisions, and thereby better protect public health, improve safety and safeguard the environment. In many developing countries, 60-80% of buildings (generally referred to as “informal housing”) continue to evade any form of building-related controls, which imposes significant risks and costs on the community.⁹⁸ The problem arises in developed countries, too: in the United States, the team assessing the aftermath of Hurricane Katrina concluded that a major cause of the amount and magnitude of damage to buildings along the coast was, in fact, non-compliance with the building code. Strict implementation can pay off financially: a task force led by the Institute for Market Transformation found that every dollar spent on strengthening building-energy-code compliance and enforcement efforts will return six dollars in energy savings.⁹⁹

Market openness to international firms and small and medium-sized enterprises

Market openness to foreign firms stimulates trade as well as the movement of capital, technology and skills across the global E&C sector. It also increases the opportunity for economies of scale and scope, and for specialization of firms – two important sources of competitiveness.

Most countries have now removed legal bans on the operations of non-domestic companies, but there are still some other, equally effective barriers to foreign market entry that restrict international competition. Among the most prevalent impediments are tariffs and duties (such as fees for imported construction services); an insufficient recognition of foreign professionals’ qualifications; and strict capital requirements for foreign firms (for instance, financial reserves that cannot be used during the duration of the project). All of these barriers need to gradually be eliminated by national governments; only then can the fully open, global E&C market become a reality.

EXAMPLE: Within its Construction 2020 initiative, the *European Commission* plans to take action in three main areas to enhance international competition: a more open trade in building materials; a more straightforward recognition of the qualifications of foreign architects; and support services for EU-wide operations of small and medium-sized construction companies.



In addition, public procurement has traditionally inhibited foreign companies' market entry – particularly because governments have often tended to favour their domestic industry when awarding contracts. Local implementation of multinational agreements, such as the Agreement on Government Procurement within the framework of the World Trade Organization, can help to liberalize government procurement markets. Such agreements establish rules that require less discriminatory and more competitive forms of tendering among participating countries.

EXAMPLE: *Brazil* – a non-signatory to the Agreement on Government Procurement and historically a relatively closed construction market – has recently launched an infrastructure investment programme that explicitly encourages international participation. All infrastructure concessions of this programme are open to foreign firms, while airport concessions actually require the participation of foreign airport operators.

In addition to international market openness, regulators should promote diversity and competition in the local construction sector by encouraging participation from a broad variety of small and medium-sized enterprises (SMEs). In this regard, local authorities could take the following measures:

- Put in place a simplified licensing system for SMEs (such as the one recently introduced in Indonesia)¹⁰⁰
- Promote the formation of alliances between international, national and local construction firms
- Provide financial support for SMEs in E&C (such as partial risk cover for SME loan portfolios)
- Ensure equal treatment of SMEs in public-sector tenders, particularly by reducing the bureaucratic burden of procurement

Promotion and funding of R&D, technological adoption and education

Given the economic significance of the construction sector, R&D investments among E&C companies are surprisingly small. In fact, the 2014 EU Industrial R&D Investment Scoreboard ranks construction among the least R&D-intensive sectors, with a mere 1% of net revenues allocated to R&D.¹⁰¹

National governments can create a more fertile environment for developing technological innovations by providing appropriate support to companies and academia. In particular, they could take the following steps:

- Establish centrally funded research institutions and joint industry-academia funds and technology centres
- Provide venture capital for E&C-related start-ups
- Offer tax incentives and establish schemes for contested R&D funding (by open competitive tendering, for instance)

EXAMPLE: In 2015, the *US Federal Highway Administration* provided – through multiple schemes – funding of almost \$500 million for hundreds of research projects related to improving the design, construction and operation of roads, tunnels and bridges.

Promoting R&D is just the first step: technological advances realize their full potential only when they are widely adopted across the industry.¹⁰² In a highly fragmented, multistakeholder industry such as E&C, it is therefore equally important to foster the diffusion of innovations, by such steps as these:

- Providing financial support for demonstration projects involving new technologies and processes
- Setting up incentive schemes for innovation deployment and capability development

EXAMPLE: *Singapore*, through its Construction Productivity and Capability Fund, partly reimburses the cost for:

- (i) BIM software/hardware, consultancy and training
- (ii) equipment and machines that improve productivity by at least 30%
- (iii) development projects featuring process innovations

Finally, project managers and the entire construction workforce need to be upskilled appropriately with regard to new technologies and processes. A government can support workforce education through the following policy measures:

- Offer training programmes at job centres and in cooperation with companies
- Implement effective and leading-edge curricula in universities, technical colleges and apprenticeship schemes
- Enhance the attractiveness of E&C professions through image campaigns

EXAMPLE: The EU-wide construction-sector initiative *BUILD UP Skills* provides a joint platform for national programmes and projects aimed at training and educating the current and future construction workforce on energy efficiency and renewable energy.

