

ADVANCEMENT OF THE DESIGN OF AEC-RELATED BUSINESS MANAGEMENT CONCEPTS ALONG THE COMMON GOOD DIMENSION

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The background involves the reviewing of AEC-related business management (BM) concepts since 1999. The aim of this focused review is to advance the design of AEC-related BM concepts along the common good dimension. A BM concept is herein defined as an abstraction representing a firm managing its business with contexts embedded within AEC sectors. The high, medium, low or no degrees of the design of 73 AEC-related BM concepts (published between 1990 and 2019) along the common good dimension were assessed. It turned out that the seven areas of common good have been designed as part of 17 AEC-related BM concepts, i.e., environmental sustainability, networked communities, community engagement, social capital, social responsibility, fair trading and use value. In the future, many areas of common good can be incorporated into extended offerings (e.g. diversity in planned communities, beneficent owners and signature outlooks) as part of architecture (A)-related BM concepts, into core offerings (e.g. eco-efficient life cycles, energy resilience and circular materials) as part of engineering (E)-related BM concepts and into business processes (e.g. multi-year sub-city phasing, community roles of buildings and non-harmful uses) as part of construction (C)-related BM concepts. Indeed, ARCOM-related experts, business managers and other actors are invited to join the advancement of AEC-related BM knowledge, concepts and practices.

Keywords: AEC, business management, common good, environment, sustainability

INTRODUCTION

This author has been reviewing research on business management (BM) concepts with contexts related to architecture, engineering and construction (AEC) sectors since 1999. The eight review rounds have been carried out in 1999-2003, 2006, 2010-2012, 2014, 2017, 2018, 2019 and 2020. The coherent nature of managing firms and their businesses is maintained by focusing on research on firms that are based in the OECD countries. Exceptionally, references originating from Singapore and Hong Kong have been included due to these authors' British Commonwealth heritage and interests in AEC sectors across the globe. The planning and use of the method for the reviewing of conceptual research, i.e., ways of searching, browsing, in-/excluding, retrieving, coding, describing, analysing and interfering have been reported upon (Huovinen,

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2003 and 2008). Hart’s (1998) guidelines have been relied upon. The search for eligible BM concepts has been conducted comprehensively within the volumes of 28 AEC-related journals published between 1990 and 2019 and those of 47 journals on business administration published between 1990 and 2013. Concerning the other formal channels, the degrees of the comprehensiveness of the search have varied markedly. The original rules of relevance, elimination and inclusion (Huovinen, 2003a) have been re-adopted to maintain consistency and eliminate non-eligible concepts. Cooper’s (1998) approach and the original limitations have been re-adopted to protect the review validity during the rounds. This author submits the detailed report on the conduct of the reviewing process during 1999-2020 on request.

Aim and Units of this Focused Review

The aim is to advance the design of AEC-related BM concepts along the common good dimension. It is herein posited that the desired advancement be based on the revelation of the current degrees of such designs along the common good dimension via the focused review of AEC-related BM concepts published between 1990 and 2019.

An AEC-related BM concept is defined as an abstraction representing an object or a phenomenon, i.e., a firm is managing its business with contexts that are embedded within one, more, or all architecture, engineering and construction (AEC) sectors, i.e., the contracting, design, construction and project-based aspects of capital investments in natural resources usage, energy supply, telecommunications, transportation, infrastructure, manufacturing and general building concerns.

When an AEC-related BM concept is being designed, it is herein interpreted that a concept designer at the same time replies to the fundamental question “What is a principal way of managing a business entity that enables to set challenging goals and also to attain them?”

Along this line of conceptualisation, there are the four types of units of this focused review (Fig. 1). The 1st-tier management involves (1a) concepts for the creation and capture of value by a business entity, clients, and other stakeholders that are directly causally related to the setting and/or attainment of a business entity’s goals and (1b) concepts for supporting the same. The 2nd-tier management involves (2a) concepts for the development of competitiveness of a business entity that are necessarily enabling, but indirectly related to goals management and (2b) concepts for supporting the same (Huovinen, 2008).

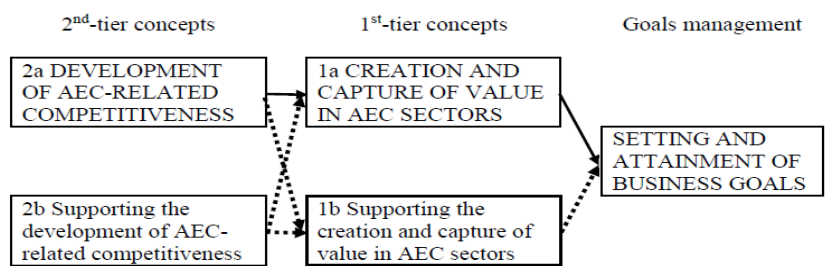


Figure 1: Four types of AEC-related BM concepts as the units of the review

The term "a business entity" accommodates (a) a single-business firm, (b) a business unit as part of multi-business corporation and (c) a business network consisting of two or more members and being managed by a leading member or all members on an equal basis.

Moreover, authors may design eligible BM concepts for contexts embedded within one, more, or all AEC sectors, or sub-sectors.

Conduct of this Focused Review

OED (2020) defines common as “belonging to more than one as a result or sign of co-operation, joint or united action, or agreement; to make common cause, to unite one's interests with those of another, to league together” and common good as “the public property of a community or corporation”. For this focused review, the two generic definitions are adopted as the broad scope of AEC-related common good containing various areas, such as community engagement, environmental sustainability, fair interactions, stakeholder value as well as social capital, citizenship and responsibility. For the actual assessment, the four degrees were pre-specified for the linking of common good and BM conceptually. An authorship may have designed an AEC-related BM concept along the common good dimension to:

- a high degree: common good is explicitly and extensively assigned to both the demand side (e.g. to enable owners to deliver social good) and the supply side (e.g. to adopt environmentally sustainable operations) of BM of AEC firms
- a medium degree: common good is explicitly assigned to either the demand side or the supply side of BM of AEC firms
- a low degree: common good is only mentioned (e.g. to be socially aware)
- no degree: the authorship has written nothing about common good.

The results of the common good-focused, concept-specific assessments have been compiled in a set of tables. The corresponding sentences, phrases or single terms were quoted and coupled with the related page numbers within the references, respectively (see Tables 3 and 4). This author submits the common good-focused tables on request.

The focused review has been protected against the four biases as follows. Concept Inclusion Bias 1 involves this author perceiving that an author(ship) has designed an AEC-related BM concept along the common good dimension even if the authorship has not done so. This bias has been minimized by assessing each reference in the same way based on the quoted words that necessarily depict the focal area within each BM concept. Future reviewers can test the inter-concept consistency of inclusion by repeating the assessments, i.e., reading the references and confirming the quotations that this author has selected or rejecting some of them and, thus, excluding the same.

Concept Exclusion Bias 2 involves this author perceiving that an authorship has not designed a BM concept along the common good dimension even if the authorship has done so. A no-degree assessment indicates that this author did not identify any areas of common good. Future reviewers can test the inter-concept consistency of exclusion by repeating the assessments, i.e., reading the references and confirming the exclusions or identifying eligible elements in some concepts and including the same.

After the inclusion, Degree Assessment Bias 3 is related to this author's reliance on the pre-specified scale of the three analytical degrees instead of a quantitative scale. The 3-degree lens corresponds to the explorative nature of the focused review. This author could assign one of the three degrees to each of 13 BM concepts without hesitation. Future reviewers can request this author to submit the concept-specific quotations and assessments to them and test the inter-concept consistency of degree assignments by reading the references and confirming the same degrees or assessing

changes in some of the included BM concepts and justifying such changes with quotations. Or, they could adopt one of quantitative scales.

Concept Designer-Reviewer Bias 4 is related to a fact that this author has designed 12% or 9 out of 73 AEC-related BM concepts. Therein, I have designed 2 high-degree areas, 0 medium-degree area, 3 low-degree areas and 5 no-degree areas along the common good dimension. Future reviewers can carefully test the inter-concept consistency of my assessments versus each of the three other biases in the case of my 9 AEC-related BM concepts. Other reviewers may come up with some explanations for this reviewer being, so far, the only designer of 2 high-degree AEC-related BM concepts along the common good dimension.

Degrees of the Design of 73 AEC-Related BM Concepts Along the Common Good Dimension

Overall, this author has identified 73 AEC-related BM concepts that have been published between 1990 and 2019. This author submits a complete list of 71 references containing these 73 AEC-related BM concepts on request. In turn, this focused review reveals that the majority or 56 (77%) AEC-related BM concepts have not been designed along the common good dimension. So, 17 (23%) authorships have designed their AEC-related BM concepts along this dimension (Table 1).

Table 1: Results of the assessment of the designs of 73 AEC-related BM concepts (published between 1990 and 2019) without and along the common good dimension

BM concepts designed without the common good dimension No. (%)	BM concepts designed along the common good dimension No. (%)	All AEC-related BM concepts No. (%)
56 (77%)	17 (23%)	73 (100%)

Moreover, these 17 authorships have designed 20 areas within their BM concepts, i.e., 2 high-degree, 2 medium-degree and 16 low-degree areas (Table 2).

Table 2: Results of the three-degree assessment of the designs of 20 areas within 17 AEC-related BM concepts (published between 1990 and 2019) along the common good dimension

High-degree areas No. (%)	Medium-degree areas No. (%)	Low-degree areas No. (%)	All areas No. (%)
2 (20%)	2 (20%)	16 (80%)	20 (100%)

The converging authorships have designed 13 environmental sustainability areas within their AEC-related BM concepts along the common good dimension (Table 3). Huovinen (2011a) has implanted 23 high-degree sustainability drivers into life-cycle contracting and property development businesses (e.g. the coupling of object development ideas with sustainability advantages), design-build contracting business (e.g. the re-engineering of value chains with all tiers of stakeholders), design business (e.g. the transformation of design firms into long viewers, path dependency breakers, stock-specific programmers and object-specific planners) and building products supply business (e.g. cradle-to-cradle certifications and product formula renewals).

Huovinen (2011b) has designed a high-degree, 5-element BM concept by (i) customising sustainability into offerings and competitive strategies, (ii) leveraging sustainability into processes, (iii) crafting sustainability into the core of competitiveness, (iv) fusing sustainability into a business frame and governance, and (v) linking a focal firm with highly sustainable collaborators.

Chinowsky with Meredith (2000) have designed medium-degree competency spectrum and maps, including sensitive core designs based on support strengths, enabling solutions, engineering as a surface characteristic as well as environmental area and testing as a competency (150).

Table 3: Degrees of the designs of the environmental sustainability areas within 13 AEC-related BM concepts (published between 1990 and 2019) along the common good dimension

Author (year)	BM concept and its focal context	Assessed degree of the design of the environmental sustainability area (quoted page No.)
Huovinen (2011a)	4 environmentally sustainable businesses in 8 competitive arenas in construction markets	High: Implanting of 23 high-sustainability drivers into each of 4 businesses via 23 competitive arenas (6-12)
Huovinen (2011b)	BM concept as a 5-element system for managing businesses with contexts embedded within construction markets in highly environmentally sustainable ways	High: (1) customizing sustainability (S) into offerings and competitive strategies, (2) leveraging S into processes, (3) crafting S into the core of competitiveness, (4) fusing S into a frame and governance, and (5) extending the frame, linking with highly sustainable collaborators (11-13).
Chinowsky with Meredith (2000)	7 areas of strategic management, feedback with a competency spectrum and maps in US civil engineering organizations	Medium: Sensitive core designs, based on support strengths, enable solutions (130, 142), engineering as a surface characteristic (146), and environmental area and testing as a competency (150).
Hawk (1992,2006)	Continual learning system based on a learning capability in international building	Low: Growing environmental concerns are among 6 most promising ideas over the next 10 years (741).
Flanagan (1994)	Successful construction company in the year 2000 based in the UK	Low: Consciousness, sustainability among 11 forces driving strategies (312). Impacts of design on surroundings become important (316).
Veshosky (1994)	Framework for AE firms in the USA	Low: Systems (43), facilities (44) as projects, hazardous waste as core competencies (45).
Løwendahl (1997/2000)	Resource-based strategies for US professional service firms	Low: Environmental protection as a market (106).
Huovinen (2001)	Competitive strategy in technology-intensive contracting	Low: Solutions' environmental impacts as one of clients' 9 decision criteria (73)
Love <i>et al.</i> , (2002)	Model for alliances based on TQM and supply chains in Hong Kong	Low: To take ethical consideration of environmental responsibility in alliances (12).
Anderson, Merna (2005)	Business development process in PM services in the UK	Low: Environment management is one of 11 domains of development (175).
Mutka, Aaltonen (2013)	Business model for managing a (metallurgical) processing technology supplier based in Finland	Low: Mission involves life-cycle solutions for the best returns on clients' investments. Environment-friendly, safe, ergonomic technologies (170-171).
Brege <i>et al.</i> , (2014)	3-block and 5-element business model for industrialized building of N-storey dwellings in Sweden	Low: Frame system supplier with climate-proof structural frame offerings is one of 5 empirically identified business models (221).
Aliakbarlou <i>et al.</i> , (2018)	Contracting services+client values assessed by traditional, service and personnel attributes in NZ	Low: Low rate of environmental impact is specified among 8 client values of the category of service attributes (1019).

Among 10 low-degree environmental sustainability areas, Hawk's (1992, 2006) business ideas include growing environmental concerns. Flanagan's (1994) environmental consciousness is driving strategies. Veshosky's (1994) core competencies include hazardous waste. Løwendahl's (1997/2000) markets include protection. Huovinen's (2001) solutions with environmental impacts are among

clients' 9 decision criteria. Love *et al.*'s (2002) alliance involves environmental responsibility. Anderson and Merna's (2005) domains of development include management services. Mutka and Aaltonen (2013) case firm offers life-cycle solutions. Brege *et al.*'s (2014) business models include climate-proof structural frames. Aliakbarlou *et al.*'s (2018) client values include environmental impacts.

Besides environmental sustainability, the diverging authorships have designed many other areas within their 7 AEC-related BM concepts along the common good dimension, respectively (Table 4). Bennett (2000) has envisioned the medium-degree, 7-pillar paradigm of partnering with a goal to balance competition and cooperation.

Table 4: Degrees of the designs of the other areas within 7 AEC-related BM concepts (published between 1990 and 2019) along the common good dimension

Author (year)	BM concept and its focal context	Assessed degree of the design of the area (quoted page No.)
Bennett (2000)	A third way, a new paradigm's 7 partnering pillars balance competition and cooperation in the UK construction industry	Medium in memberships in networked communities: Industry is seen as richly interconnected networks. Lasting success can come only from the success of the extents of communities of which the industry is part (82-83). Organizations try to involve local communities in their decisions (83).
Flanagan (1994)	Successful construction company in the year 2000 based in the UK	Low in community engagement: Concerns about the community (318).
Love <i>et al.</i> , (2002)	Model for alliances based on TQM and supply chains in Hong Kong	Low in social responsibility: To take ethical consideration of social responsibility in alliances (12).
Huovinen (2003b)	Systemic concept for managing a 5-element, capital investments-based business in knowledge management (KM) -based ways	Low in social dimension: Among 5 elements, the governing framing takes place along social and other interrelated dimensions (378).
Huovinen (2011a)	4 environmentally sustainable businesses in 8 competitive arenas in construction markets	Low in fair trading, stakeholder (incl. human health and rights) impacts on communities: The implanting of 2 drivers into design businesses and 1 driver into supply businesses (8-11)
Bos-de Vos <i>et al.</i> , (2016)	Trade-off framework of use, professional, and exchange value creation and capture in Dutch architectural firms	Low in use value creation and delivery: To create the use value of buildings for clients, users and society, to offer unpaid services to highlight the use value from a user's and societal perspective, or to create sustainable buildings (27).
Goh, Loosemore (2017)	Adoption of off-site technologies based on 6 VRIN resource categories by subcontractors in the Australian residential construction market	Low in social capital: Networks do not translate automatically into intangible social capital located outside business in relations with others. Social capital is a critical resource for engagement in off-site prefabrication (292), but the social resources of local subcontractors were project-based (301).

Accordingly, the UK construction industry would become the tapestry of richly interconnected networks within societies. Lasting success can come only via a focal organisation's memberships to multiple communities.

Among 6 low-degree areas, Flanagan's (1994) concerns include also community engagement. Love *et al.*'s (2002) alliance involves social responsibility. Huovinen's (2003b) governing framing takes place along social and other interrelated dimensions. Huovinen's (2011a) drivers include also stakeholders' impacts on human health and rights in communities. Bos-de Vos *et al.*'s (2016) use value depicts architects who are

creating the value of buildings also for society. Goh and Loosemore's (2017) external relations-based social capital is a critical resource in the case of subcontractors that are engaging in prefabrication.

Designing AEC-Related BM Concepts Along the Common Good Dimension in the Future

It is herein posited that highly theoretically advanced and highly practically applicable AEC-related BM concepts be designed at the same time along the core business dimensions and the common good dimension. Ex ante, this dual effectiveness can be achieved when concept designers become aware as well as prefer and incorporate the specific areas of common good into BM concepts.

Readily, this focused review reveals that 13 authorships have designed the environmental sustainability areas as part of their AEC-related BM concepts, respectively. In addition, 7 authorships have designed the other key areas of common good, i.e., networked communities, community engagement, social responsibility, social capital, fair trading and use value, respectively.

Consequently, the design of common good-based, AEC-related BM concepts could be advanced segment by segment as follows.

When architecture (A)-related BM concepts are advanced, many areas of common good can be incorporated into extended offerings, such as (i) urban and regional plans with all-inclusive programmes for natural, built and social environments, diversity in communities, employment and entrepreneurship, well-being and safety, and the inspiring blending of public, private and third sectors and (ii) architectural solutions for various uses of buildings and spaces, both over life cycles and shorter periods, with the requirements of beneficent ownerships, signature outlooks, aesthetic values, easy orientation and smooth people flows, the affordability and flexibility of spaces.

When engineering (E)-related BM concepts are advanced, many areas of common good can be incorporated into core offerings, such as (i) infrastructures for transportation and logistics with options for eco-friendly use, upgrading and extension, (ii) frames and other structures in buildings with load bearing capacity and eco-efficient life cycles, (iii) technical building solutions and services with clean air and spaces, energy resilience, optimal water consumption, extensive waste management and real-time monitoring and (iv) the first uses and re-uses of construction materials with circular specifications.

When construction (C)-related BM concepts are advanced, many areas of common good can be incorporated into business processes, operations or functions, such as (i) city development processes with multiple balances between households, public organisations and private stakeholders, multi-year sub-city phasing, external and internal integration and green financing, (ii) building-specific development processes with the community role assigned to each building, early involvement of good preferred by owners and users, multiple common functional spaces, private and public services, (iii) infrastructure development processes with the blending of the life cycle perspective, user need fulfilment as well as environmental and social impacts, (iv) new and renovation construction processes with the high-productivity integration of off-site and on-site prefabrication and works, well-being of staff and workforce and (v) life-cycle management processes with the provision of joint full-time, smart, easy and non-harmful uses of buildings and infrastructures.

DISCUSSION

On the theoretical sphere, the design of AEC-related BM concepts along both the core business dimensions and the common good dimension serves as (i) the broader societal foundation of a communication, (ii) enhanced ways of looking at changing empirical AEC-related contexts, (iii) means of classifying and generalising BM situations, e.g., stating those common good-based, AEC-related conditions when the efforts of business managers are likely to be (un)successful and (iv) components of theories or models and thus of explanations, predictions [and prescriptions] vis-à-vis accommodating various areas of common good over time (applying Ghauri and Grønhaug, 2002).

On the practical sphere, common good may well become a key dimension of the management of AEC-related businesses. Contexts embedded within AEC sectors play significant roles in countries and societies across the globe. Thus, the design of AEC-related BM concepts with positive impacts on common good is one of the critical areas of advancement. However, all this requires that, *ex ante*, root clients (i.e. long-term owners and owner users, capital investors, developers) dedicate themselves in the spreading of common good around and include such key areas in investment and procurement strategies.

On the one hand, it is herein assumed that today the majority of owners and management in successful companies have adopted the hands-off approach to common good embedded within AEC sectors across the globe. Typically, such companies financially support common good initiatives as well as annually publish sub-reports on corporate governance, social usefulness, community engagement and alike.

On the other hand, many pioneering AEC companies have adopted the hands-on approaches to the environmental sustainability area along the common good dimension. These companies have based business ideas (e.g. Mott MacDonald 2020), offerings (e.g. Arup 2020) and processes (e.g. Skanska 2020) on the protection of natural environment. In addition, some AEC companies are also active in other areas of common good, such as United Nations Global Compact and good corporate citizenship (e.g. WSP 2019) and social enterprise and resilient communities (e.g. Bechtel 2020).

CONCLUSION

Overall, no research tradition or group has triggered a coherent flow of AEC-related BM concepts in any of the OECD countries. The temporal pattern is emerging. The content pattern is fragmented (Huovinen, 2019). Nevertheless, 73 AEC-related BM concepts published between 1990 and 2019 jointly address the issue-based dimensions, such as domestic business, international business, business ideation, competitive strategies, business processes, project phases and resourcing, competitiveness development, organising and framing, networking, digitalisation, financing, capital investing and risk taking.

The focus of this paper is on the advancement of designing AEC-related BM concepts along the common good dimension. In the future, the 73-concept platform readily offers a multitude of possibilities for concept designers to combine common good with the core business dimensions. Naturally, many other avenues will emerge and/or become dominant and call for the design of novel common good-based, AEC-related BM concepts. These avenues may include artificial intelligence, machine learning

and digitalisation as well as business networking (along the line of Bennett 2000) and the balancing of stakeholder's interests.

Indeed, ARCOM-related experts, business managers and other actors inside and outside the UK are hereby invited to join the advancement of common good-based BM knowledge, concepts and practices during the current COVID-19 era and beyond.

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