



This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.

 **creative commons**
C O M M O N S D E E D

Attribution-NonCommercial-NoDerivs 2.5

You are free:

- to copy, distribute, display, and perform the work

Under the following conditions:

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

SUSTAINABLE PROCUREMENT THROUGH A CONSTRUCTION PROJECT: A VIGNETTE

Tas Yong KOH^{1*}, Steve ROWLINSON¹, Martin M. TUULI², and Anita M.M. LIU¹

¹ Department of Real Estate and Construction, University of Hong Kong

² Department of Civil and Building Engineering, Loughborough University, UK

*Corresponding author: tasykoh@hku.hk

INTRODUCTION

Since the 1990s, there was an increased awareness of the interactions between organisations, environment, and society that attracted the attention of both academics and practitioners (cf. Cousins *et al.*, 2004). Within this context, the importance of the roles of organisations' activities and interactions, in particular, the role of procurement function has come to the fore. This phenomenon has brought about the increased recognition on the need of sustainable procurement whereby a triple bottom line approach – economic, environmental, and social sustainability – is preferred. The trend highlights the need for procurement activities of both service receiver (e.g. the client) and supplier (e.g. the contractor) to be implemented in the way that address economic, environmental, and social issues while maintaining the viability of the organisations' performance (cf. Walker *et al.*, 2008).

In line with the above trend, the Hong Kong Special Administrative Region (HKSAR) government has embraced the trend of sustainable development. In the procurement of construction projects, the HKSAR government has adopted sustainable and community engagement / development approach. Four sustainability dimensions have been emphasised when procuring and administering construction projects. These dimensions revolve around the economic, environmental, social, and resource utilisation themes. These themes are embedded in all aspects of the procurement and project activities. The rationale is one of achieving sustainable development of construction projects in Hong Kong through balancing the economic, social, and environmental concerns of all the stakeholders in the project. In this paper, we present a vignette of a public housing construction project to illustrate the government's sustainability drive with regards to the principles of sustainable procurement within the domain of recognised practices. We first briefly review the basic tenets of sustainable procurement as outlined in the recently published British Standard 8903 (2010). We then move on to present the vignette proper. This is followed by a discussion and concluding remarks.

SUSTAINABLE PROCUREMENT – THE BASIC IDEAS

Definitions

The concept of sustainable procurement may be taken as a natural extension of the concept of sustainable development. Sustainable development may be defined as *an enduring, balanced approach to economic activity, environmental responsibility and social progress* (BS 8900, 2006). This definition highlights the triple bottom line nature of sustainability drive. An organisation is an entity designed to coordinate the

activities of its constituents to achieve the objectives desired by its stakeholders. Its procurement activities are important part in achieving these objectives. Procurement hence becomes an arena by which the sustainable approach is manifested. In the conception of sustainable development, sustainable procurement can be taken to mean *only purchasing goods (and services) that are really needed, and buying items or services whose production, use and disposal both minimise negative impacts and encourage positive outcomes for the environment, economy and society* (BS 8903, 2006, p. 1). The essence is for organisations to fulfil their needs for goods and services to achieve not only the value for money on a whole life cycle of the procured facility but also to generate benefits to society and the economy. In addition, the procurement activities should also minimise the damage to the environment.

Procurement Activities

Procurement activities within an organisation are guided by sustainable procurement principles. Sustainable procurement is based on fairness, openness, and non-discrimination. It is also an ethical approach whereby organisation should act in an ethical and responsible manner, and look beyond pure economic gain. In addition, the organisation should be mindful of its procurement effects on the quality of life of its stakeholders, the environment and society. These principles must percolate the procurement activities of the organisation.

Within the sustainable conception propounded by the British Standard, sustainable procurement can be accomplished through a three-prong approach. Three inter-related elements are proposed. These are the “fundamentals,” “procurement process,” and “enablers.” The fundamentals consist of the organisation’s policy in general, and sustainable procurement policy (and the associated strategy) in particular. Because policy dictates an overarching principles and the purpose of an organisation, it constitutes the foundations of the organisation’s sustainable activities. In this regard, the policy provides a strategic context for the organisation’s procurement activities. To be effective, organisation needs to ensure that its policy and strategy fully permeate all levels of the organisation.

Policy and strategy deployment are effected through procurement processes. The Standard has identified seven main processes. These processes are the identification of the organisation’s business need, the definition of sourcing strategy, the identification of suppliers and tender, the evaluation of these suppliers, the implementation of the contracts, the management of the performance of suppliers, and the review of the entire process chain to draw lessons learnt for continual improvement. It can be seen that the proposed scheme is closely aligned to the plan-do-check-act framework.

Sustainable procurement starts with understanding and identification of the business needs and the desired outcomes of the organisation. To achieve maximum impact, it is crucial to involve procurement in the earliest possible stages – inception and design stages. The activities involved in this stage include resourcing, stakeholder mapping, identification of business requirement and risk assessment. Once the business needs have been identified, sourcing strategy can be formulated. The main task here is to formulate the procurement strategy with reference to the

market's trends and dynamics. It is important at this stage to appreciate the potential social and environmental concerns with regards to the production / construction of the project. The activities involved in this stage are the assessment of available procurement options, risk and opportunity analysis, and deciding between procurement techniques.

With the sourcing strategy decided, potential suppliers / contractors can be invited for tender. Very often, pre-qualification of suppliers is necessary. In this respect, in addition to the suppliers' technical competencies, assessment involving sustainability objectives are required. These objectives include the suppliers' waste management, material recycled content, human resource management, local community engagement plans, etc. Tender evaluation can then be conducted with the established objectives. The suppliers may be invited for interviews and their operations may also be audited to gauge their commitment. The contract can then be let and implemented. To make business sense, the agreed sustainable targets should be incorporated into the contract. By linking the sustainable and other improvement targets within a cohesive contractual scheme, the contract administration and the related review process have the potential to positively sustain the focus and momentum of sustainability. In this respect, in terms of performance monitoring, it is important for the organisation to periodically audit the supplier throughout the duration of the contract. Finally, because continual improvement is vital for a progressive procurement approach, there is a need for reviews and feedback so that lessons learnt can be captured, shared, and acted upon.

What are vital for all the preceding policy deployment and processes implementation, however, are a set of enablers. The Standard categorises the enablers into leadership and governance, people, risk and opportunity assessment, engagement, and measurement. These enablers are embodied in the routines / practices, competencies, and capabilities of the purchasing organisation to be utilised on on-going basis to implement the procurement activities.

While leadership of the organisation provides strategic vision for sustainable outcomes to guide the staffs' sustainability objectives, governance structure is vital in ensuring accountability in procurement activities. Closely related to these issues are the people's (i.e. the staffs) buy-in, commitment, and competence. People, in particular, the staffs' competence is perhaps the most critical enabler as they are the operators of all procurement activities.

In line with good management practice, risk and opportunity assessment are essential for sustainable procurement. Apart from having processes and controls that are embedded within the organisation's practices to identify and manage risk, good risk management enables the control of risks across not only the organisation's business aspects but also the dynamics of the supply chain. To achieve this, the buyer organisations need to engage in on-going communication with the stakeholders in the entire spectrum of the supply chain. Finally, measurement systems need to be put in place so that progress towards achieving desirable outcomes can be monitored.

Having laid the sustainable procurement framework, we present next a vignette to illustrate the points covered in the preceding discussions.

PROJECT ILLUSTRATION OF SUSTAINABLE PROCUREMENT

Project Description

The project constituted the construction of a public rental housing estate and other related facilities. The main construction works involved three 41-storey residential blocks. These blocks are approximately 117 metres tall. Together, the three blocks consisted of over 2300 rented flats. Other facilities are incorporated in the project. These include a neighbourhood elderly centre, a bus terminus that is situated next to the estate, a two-storey lift tower with an attached footbridge that links the focal estate to the adjacent residential areas and commercial centre, and a double-deck walkway that connect the estate to other estate. Other auxiliary structures were also constructed. These comprise of drainage and external works, slope improvement works, retaining walls, permanent protection structure to the existing gas offtake station, and road works within the estate.

The client had formulated and implemented a few sustainable policies and criteria for the project. In terms of economic sustainability, the economic dimension involves achieving cost effectiveness for the project. This is important as public funds were utilised for the construction, and all aspects of the development (including construction, and operation and maintenance) have impact on the budget. For social sustainability, it is the client's belief that public housing and its development and construction should promote social stability, and foster social cohesion. During construction stage, the client required that the contractor to carry out the construction works in the way that kept the impacts to the surrounding residents to a minimum. For internal stakeholders – the main and sub-contractors' personnel – the client encouraged, especially on the part of the main contractor, the practice of sound human resource management. For environmental sustainability, this concerns the maintenance of the environment where the project is located. Two strategies were implemented - better construction methods and the use of more environmentally friendly materials for the project. The main idea is to manage the materials properly and to reduce the consumption of resources. These initiatives were implemented within the project operations.

For the client, sustainable procurement commenced at the tender stage. Because the project was let under the modified guaranteed maximum price (MGMP) arrangement, tenderers were required to submit design proposals for the design-and-build GMP packages. To evaluate the tenders, interviews were conducted with the contractor's team. The sustainable criteria were assessed in addition to technical criteria. The sustainable criteria included the contractor's resources and expertise; relevant project experience; safety, health, environment, and resources management. Decision was made based on the best value offered (instead of lowest bids) in terms of the benefits of buildability, compliance to specifications, future maintainability, and cost effectiveness.

We organise the following discussions in terms of the three sustainability dimensions.

Economic Dimension

For the project, the main thrust in economic dimension has to do with the client's implementation of the MGMP procurement initiative. In addition to the works let on

traditional design-bid-build approach, six GMP packages were contracted. These packages were the specialist external works, the enclosure to drainage reserve, the plumbing and drainage installation, the fire services and related water pump installation, electrical installation, the superstructure of the residential blocks other than the main structural frame. Because these packages involved design-and-build elements, they allowed the main and sub-contractors' design leverage and buildability scope.

This procurement approach is essentially a risk-reduced model as the main contractor assumed the design, (design) development, and the construction of the works, and that the main contractor also committed to a price ceiling of his design proposals (Rowlinson *et al.*, 2010). The approach also enabled the client to reduce claims and offered the contractor an incentive to provide value-added services by assimilating the contractor's expertise in the design and construction methods to enhance buildability (Chan *et al.*, 2007). In this respect, the contractor was rewarded for his improvement efforts and creativity on both the design and construction operations. This line of incentive included shared saving among the client, the main and sub-contractors. Three inter-related mechanisms were put in place – the gain share and pain share arrangement, the project dispute resolution system, and the promotion of a collaborative work environment. The last two mechanisms are social in nature and hence are discussed in "Social Dimension" sub-section.

In the gain share and pain share arrangement, the client and main contractor shared equally the cost saving of GMP packages. The contractor, however, was only entitled to 15% of his portion of the saving. The remaining 85% was to shared among the contractor and the GMP subcontractors. The sub-contractor's portion was prorated on the basis of the contribution to net savings by both parties. This arrangement had motivated both the main and sub-contractors.

Social Dimension

The social dimension can be examined in two aspects – with internal stakeholders and external stakeholders / community.

The project dispute resolution system was implemented as a means to resolve disputes that might arise. Steps in resolving disputes in amicable manner were laid down. An adjudication committee was set up in the project. The committee was represented by the main stakeholders in the project – the client, the main contractor, the sub-contractors, and the quantity surveyor. In this arrangement, the parties in disputes attempted to settle their differences in good faith in the first instance through the committee. The matter was referred to the senior management of the parties in the event that the first attempt failed. In addition to this arrangement, an independent dispute resolution advisor was appointed to facilitate the process.

To promote a collaborative working environment, as with most government projects, non-binding partnering was used in the project. In general, it was observed that better communication and understanding were reached among the main contractor and the client personnel. In addition, because of the increased interactions among the two teams for the design development of those MGMP packages through informal "workshops" convened by the project architect, the cooperation among the teams were improved. The frequent contacts of personnel from the two sides had improved their relationships. While the achievement of

better relationships might not be envisioned in the design of the procurement method, it had nevertheless facilitated positive internal stakeholder management and satisfaction. It was observed that the positive relationships had somehow been translated into “feel good” factor which engendered a comparatively more enjoyable working environment for the project participants. On the social dimension, this improved working relationship had led to lesser job stress among the project participants (cf. Leung *et al.*, 2010).

At the workers level, a worker wage protection scheme was implemented. The scheme aimed to address the workers’ concerns on the protection of their wages if the main or sub-contractors default in paying wages. An on-demand bond was instituted in the contract for this protection. The bond was intended to be used to secure wage payment for the affected workers in the event of their company’s default. In relation to this scheme, active wage monitoring had been effected at the project level. A labour relations officer (LRO) was employed to check, verify, and monitor workers’ wage records submitted by the main and sub-contractors. The LRO also responded and acted upon workers’ complaints on site. On the administration of the wage scheme, both the main and sub-contractors were required to operate under the wages declaration system. On-time wage payment was stressed in that sub-contractors were required to pay their workers on time before applying to the main contractor for their monthly payment in relation to their works done. A sophisticated computerised system of which the main contractor was responsible to maintain was set up to track and monitor the payment scheme. This arrangement had provided added assurance to workers on their wage protection.

There were other initiatives instituted by the client and the main contractor that had social character, however. These initiatives were mainly onsite welfare provisions for the workers and project staffs, and the human resource development for the main contractor’s project management team. On the part of the workers, a health promotion programme was administered that included basic health check and health counselling for workers with health conditions. Cash prizes were awarded to high performing / safe workers, and a series of heat stress preventive interventions – mobile mist generating machines, installation of thermometers, strict observance of summer working periods, etc. - had been set up throughout the site.

On the part of the main contractor site team, management initiatives had been planned to address the team’s aspirations on personal development and enrichment. The team members were encouraged to attend various personal development courses (e.g. management and leadership courses). However, perhaps in its recognition on the need to improve the site team’s project identity, cohesion, and hence group performance – motivators with social nature – the main contractor through its project senior management personnel (the project manager and site agent) had taken great length to promote a familial working atmosphere among the site team. The main contractor had put in place coaching programme, recognition, and active search and encouragement for the site staffs to try new things in commensuration of their capabilities. A well-articulated promotional scheme in terms of both financial and positional rewards was administered in the project in relation to these initiatives.

The proactiveness of client in engaging in the social dimension of sustainable procurement had been manifested more saliently in the management of external

stakeholders / community. The client believed and recognised that the principal stakeholders were those who were affected by their development and construction operations. This recognition had contributed to the formulation of the client's vision in social sustainability. The client had embraced community engagement into their project planning and development processes. For the project, a series of activities that was intended to instil a greater sense of belonging and involvement of the community with the project were rolled out. A mural painting competition was organised in the community around the project site. The winning design was incorporated as a permanent mural feature for the new housing estate. Another activity was the action seedling that was implemented to promote community participation. In this activity, the local residents and the nearby school children participated in the planting of seedling and nursing those plants for the estate under construction. These activities had increased the community ownership and decreased resistance (in terms of the number of complaints) to the project.

In what appeared to be a response to the client's aspiration of a socially sustainable procurement, the main contractor had introduced the notion of corporate social responsibility (CSR) in their project operations. While the initiatives of workforce welfare and staffs development as mentioned earlier were for internal stakeholders, externally with the community, the main contractor had provided some services to the community in the surrounding areas. The contractor had volunteered house improvement / repair services to the elderly residents in the nearby housing estates. Two teams of repair personnel had been dispatched to help repair the malfunctioned services within the flats of these elderly residents (e.g. changing light bulbs, repairing leaking plumbing, adjusting misaligned door set). In addition, to further engage the surrounding residents, the contractor had willingly furnished construction related information to the residents whenever extended working hours were anticipated. Because the residents were kept informed of the contractor's activities, lesser complaints were experienced in the project. In fact, these two initiatives, with those other community engagements, had somehow brought about positive impression from the residents to the project.

Environmental Dimension

A few environmental initiatives had been implemented in the project. These initiatives can be divided into two types – in-process initiatives and products used as forming part of the final building.

The in-process initiatives include the use of hard paved site areas, and a series of site environmental controls (e.g. waste water controls) to reduce dust and noise generated by the construction activities. The recycling concept was also invoked in the project. The on-site excavated materials were reused as backfilling materials for the retaining structures built underneath the residential blocks, and some of the plastic wastes generated from the project and elsewhere were reused in the adjacent park. In addition, extensive use of prefabricated building elements was called for in the project. Although not without its teething problem with the prefab elements (e.g. leaking facades with initial installation), the construction method not only reduced site dust generation but also increased construction speed.

The latter type of initiative involved the incorporation of environmental friendly products into the final buildings. These included the use of timber door the material

of which was sourced from a sustainable forest, and the use of LED lightings in the public areas of the estate.

DISCUSSION

Through the vignette, we have illustrated some aspects of the implementation of sustainable procurement as suggested in the British Standard 8903 (2010). Although far from perfect implementation of the criteria envisioned in the Standard, the vignette has nevertheless demonstrated some possible ways in sustainable procurement in local context. Firstly, the evidence highlights the inter-related and intertwined nature of the sustainable elements of fundamentals, processes, and enablers. Fundamentals outline the higher level organisational thrust to guide sustainable procurement processes. However, it is the enablers, to be more specific the quality of those enablers that bring about the successful implementation of those processes. The client in the project had formulated the sustainable targets, communicated them to the contractor in tender interviews, and carried them through in the course of the construction stage. What is more important, however, is the inclusion of those requirements in contractual documents and monitor the achievement of those targets on an on-going basis. This move, as highlighted in the Standard, had put forward a business case and provide commercial basis of the sustainable activities. In this regard, it is the holistic integration of the three elements that can potentially bring about positive outcomes.

In terms of policy deployment and operational monitoring, the client had demonstrated a considerable level of leadership. However, as noted earlier, the quality of enablers – the people in this instance in the main contractor – had greatly influenced the level of success of the entire sustainable scheme. Two inter-related issues were at play. The first has to do with the acculturation of the contractor towards sustainable agenda by the client's machinery. The selection of the contractor from the premier league pool, the tender interviews, the incorporation of sustainable targets into contractual documents, the partnering approach, and the constant nudge and monitoring of performance of sustainability activities on the part of the contractor had all aimed at aligning the contractor's effort in the way that is consistent with the client's strategic sustainable intentions. To some extent, the acculturation processes can be seen as the client's efforts to shape and constitute the model of sustainable procurement that it desired (cf. Bresnen, 2009).

The second point has to do with the main contractor's strategic intention in aligning his active participation with the client's requirements. In this regards, similar to the client, the contractor achieved his objectives as well. If the client had the objective to be seen as the market leader and a progressive public client in terms of sustainable movement at large, the contractor, by actively engaging with the client mooted and his own sustainable initiatives (the contractor's seemingly self-organised CSR activities referred), had similarly achieved his objective – one of supporting his competitive strategy as one of the pioneer contractors in local market to embrace sustainable agenda and CSR. In this respect, if companies are able to coalesce the notions of operating in a sustainable manner and the new CSR conception, i.e. conceptualising the companies' core business (e.g. construction operations) as aligning to social wellbeing with the use of their skills, resources, and management

capability to bring about social progress (Porter and Kramer, 2011), the companies may as well have greater leverage on this competitive aspect. The project had provided an avenue for the contractor in the vignette to demonstrate this advantage!

However, it goes beyond mere reputation as a competitive asset. By engaging with the sustainable processes experienced in the project, with the virtue of learning by doing, the contractor had developed a set of capabilities pertaining to sustainability contracting. This is an invaluable competitive asset in that it goes into forming the contractor's operational capabilities for future application. This is a first-mover advantage for the contractor because these organisational capabilities are firm-specific sets of skills, processes, and routines developed within the contractor's operations that can be used to solve the problems through (re)configuring its resources with the experience gained from the project (cf. Wu *et al.*, 2010).

These above situations have highlighted the need of mutual dependency (cf. Cox, 2004) (especially) when a novel initiative is put on trial – like the sustainable procurement. It can be discerned from the vignette that the efforts expended from both the client and the contractor to push sustainability initiatives into fruition and mutual supports from both parties were powerful commercial motives conducive for the alignment of mutual interests. This is particularly so if viewed in such a way that the contractor was keen to maintain his position within the premier league and hence potentially securing future works from the client, and the client was, in turn, keen to make its new sustainable trial a success. This phenomenon notwithstanding, the mutual dependency between the buyer and supplier has lent support to the Standard's exhortation that sustainable procurement has to make commercial case and that the key to success lies with both sides' (i.e. the buyer / client and the supplier / contractor) willingness to bring about change and their ability to work together.

CONCLUDING REMARKS

In this commentary, we have discussed the requirements in terms of sustainable procurement as laid down in the British Standard 8903 (2010). We have also illustrated the implementation of such procurement with a vignette of a rented housing construction project. While the evidence has indicated that some progress has been made in terms of the project's client leadership and farsightedness, and the contractor's inclusion of his sustainable procurement involvement as a strategic matter, this understanding has not gained wide spread acceptance. In other words, the sustainability agenda, despite gaining increased awareness, has not been institutionalised in the local construction industry.

To the extent that businesses seek to conform with social norms (e.g. strong societal expectations on sustainability), and regulatory institutions (e.g. environmental regulations) (Phua, 2006; Scott, 1987), the current state of affairs does not provide a credible impetus for both buyer and supplier to engage fully in sustainable procurement. In this respect, while the vignette has demonstrated some sustainable endeavours, it also goes to show that the movement is at its infancy stage in the Hong Kong construction industry. The sustainable targets in the project, the accomplishment of which is a commendable gesture, remained easily achievable targets with some efforts (as evidenced in the description). In addition, there

appeared to be little efforts in the reduction of construction process carbon foot print. While the client did engage in, to some extent, forward commitment procurement in the project, the assessment of a comprehensive social return on investment was not on the agenda.

As such, there remains a tremendous amount of works to be done. Educational and communicational programmes need to be put place to increase the society's knowledge of sustainability. Capacity building on the part of both the buyer and supplier on sustainable procurement and contracting is also essential. All these efforts are aimed at, in the broadest sense, institutionalising the sustainability awareness within the society.

REFERENCES

- BRESNEN, M. 2009. Living the dream? Understanding partnering as emergent practice. *Construction Management and Economics*, **27**(10), pp. 923-933.
- BRITISH STANDARD. 2006. *BS 8900 Guidance for managing sustainable development*. British Standard Institute.
- BRITISH STANDARD. 2010. *BS 8903 Principles and framework for procuring sustainably – guide*. British Standard Institute.
- CHAN, D.W.M., CHAN, A.P.C., LAM, P.T.I., LAM, E.W.M., & WONG, J.M.W. 2007. Evaluating guaranteed maximum price and target cost contracting strategies in Hong Kong construction industry. *Journal of Financial Management of Property and Construction*, **12**(3), pp. 139-149.
- COUSINS, P.D., LAMMING, R.C., & BOWEN, F. 2004. The role of risk in environment-related supplier initiatives. *International Journal of Operations and Production Management*, **24**(6), pp. 554-565.
- COX, A. 2004. The art of the possible: relationship management in power regimes and supply chain. *Supply Chain Management: An International Journal*, **9**(5), pp. 346-356.
- LEUNG, M.Y., CHAN, Y.S., & YUEN, K.W. 2010. Impacts of stressors and stress on the injury incidents of construction workers in Hong Kong. *Journal of Construction Engineering and Management*, **136**(10), pp. 1093-1103.
- PHUA, F.T.T. 2006. When is partnering likely to happen? An empirical examination of the role of institutional norms. *Construction Management and Economics*, **24**(6), pp. 615-624.
- PORTER, M.E. & KRAMER, M.R. 2011. Creating shared value. *Harvard Business Review*, **89**(1/2), pp. 62-77.
- ROWLINSON, S., KOH, T.Y., & TUULI, M.M. 2010. Stakeholder management in the Hong Kong construction industry. In: CHINYIO, E. & OLOMOLAIYE, P., eds. *Construction stakeholder management*. Chichester, UK: Wiley-Blackwell, pp. 216-239.
- SCOTT, W.R. 1987. The adolescence of institutional theory. *Administrative Science Quarterly*, **32**(4), pp. 493-511.
- WALKER, H.L., DI SISTO, L., & MCBAIN, D. 2008. Drivers and barriers to environmental supply chain management practices: lessons from public and private sectors. *Journal of Purchasing and Supply Management*, **14**(1), pp. 69-85.
- WU, S.J.-H., MELNYK, S.A., & FLYNN, B.B. 2010. Operational capabilities: the secret ingredient. *Decision Sciences*, **41**(4), pp. 721-754.