WHAT VALUE DOES A MARINE CONTRACTOR CREATE FOR ITS STAKEHOLDERS?
Nowadays, society faces major challenges such as climate change, energy transition (from fossil to renewable), material resource scarcity, water scarcity (and surplus) and ecosystem decline. These challenges have profound impact on the way businesses need to operate in future; they determine conditions for doing business but also create opportunities (e.g., KPMG, 2012). In this context, it is increasingly important for companies to think about their impact on society and environment, and the value they create for their stakeholders.

Companies have always created stakeholder value through their business. First of all, companies provide products and services which satisfy the needs of society. Through the corporate value (cash flow and profit) they create, healthy companies generate the main condition for growth and business continuity: investment – in equipment as well as in innovation and human resources. Furthermore, companies pay taxes and they create jobs and wealth via their expenditures. By doing so, they have played a significant role in helping society to reach the next level in its development.

This might suggest that companies only contribute positively to society. This comes however often at a price. While doing business, companies extract natural resources from the earth and may have other negative impacts on society and the environment (e.g. emissions and damages to the environment). As a result, the actual contribution of businesses to society is increasingly under debate.

Traditionally, there is a strong focus on a company’s corporate value creation, in particular its profit. However, companies have many other impacts, which are not reflected in their profits. These are known as externalities. A positive externality is one in which the company produces a benefit for which it is not compensated (e.g. sponsorship of a local community, or training of staff). A negative externality is one in which the company produces a social or environmental cost for which it does not pay (e.g. damages to the environment). The process of including externalities in considerations of corporate value creation is called internalisation.

In the present article, KPMG’s True Value methodology is used to illustrate internalising a marine contractor’s externalities for assessing the value it creates for its stakeholders. This is established by applying the True Value methodology to two projects in which Van Oord has been recently involved: Gemini Offshore Wind Farm (The Netherlands) and Moin Container Terminal (Costa Rica). Although it is the first time that the True Value methodology has been applied to marine projects, Van Oord was not the first company that used this approach; it had already been applied by, for instance, Volvo, NS (the Dutch principal passenger railway operator) and LafargeHolcim (a Swiss manufacturer of cement, aggregates and concrete).

Nevertheless, valuable insights have been obtained that can be used for understanding, managing and demonstrating the value a marine contractor creates for its stakeholders.

Introduction
What is ’stakeholder value’?
Nowadays, society faces major challenges such as climate change, energy transition (from fossil to renewable), material resource scarcity, water scarcity (and surplus) and ecosystem decline. These challenges have profound impact on the way businesses need to operate in future; they determine conditions for doing business but also create opportunities (e.g., KPMG, 2012). In this context, it is increasingly important for companies to think about their impact on society and environment, and the value they create for their stakeholders.

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Drivers of Internalisation

• Laws and regulations. Through government regulations, the effects of negative externalities such as carbon emissions are increasingly important for companies. The Dutch Ministry of Infrastructure and Water Management, for instance, includes (reduction of) carbon emissions in its requests for tenders.
• Conditions set by financial institutions. Export credit agencies, for instance, insist on paying systematic attention to externalities including human rights associated with labour and land governance. The OECD Guidelines for Multinational Enterprises (OECD, 2011) are often used as framework for Corporate Social Responsibility (CSR) due diligence when contractors apply for export credit insurance.
• Vertical (chain) integration. Marine contractors, particularly the larger ones, are taking up more task in the value chain (“vertical integration”) which means that they increasingly take responsibility for the design phase. This implies having more influence on (potential) externalities during the executing stage of projects which makes it easier to internalise them in project management.
• Seeking for competitive advantage. Contractors are discovering that by increasing their positive externalities and decreasing the negative externalities they can distinguish themselves from competitors.
• Public awareness and stakeholder pressure. The public awareness and understanding of externalities is growing since more information becomes available and, due to digital connectivity, spreads more widely and rapidly than ever before. This is a major stimulus for stakeholder action.
• Corporate responsibility. Last but certainly not least: a growing number of companies consider it as their corporate social responsibility to account for externalities in the way of doing business.

Externalities of marine infrastructure projects

The wider socio-economic impact of marine infrastructure projects has existed for as long as marine contracting itself. Throughout history, contractors have created benefits for society for which they have not been fully compensated (positive externalities) and have imposed costs on society for which they have not paid (negative externalities).

In the dredging industry, such externalities have not – until recently – yet been fully included (“internalised”) in considerations of corporate value creation in any systematic way. This is simply because externalities traditionally fall (largely) beyond the scope of contractors. As a result, stakeholder value creation and corporate value creation have long remained separate concepts. This is however rapidly changing due to ‘drivers of internalisation’ (see Drivers of Internalisation).

Externalities internalised

Witnessing recent publications in Terra et Aqua about the social and environmental impact of dredging (e.g., Boerema et al., 2017) and the shift towards sustainability (IADC, 2018), marine contractors are increasingly aware of their responsibility for externalities.
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There is a growing attention for dredging projects that enhance natural and socio-economic systems (IADC, 2018). Innovations, stakeholder engagement and partnering are used to enhance stakeholder value of projects. This needs to be supplemented with a systematic approach to internalise externalities that is able to

1. get insight in which externalities contribute (the most) to the stakeholder value created by marine contractors,
2. assess the impact of marine infrastructure projects, and
3. be able to capture future stakeholder (and corporate) value opportunities and risks.

The next section gives a brief review of approaches for such internalisation in order to situate the applied True Value methodology in the literature on internalisation.

Brief review of approaches for internalisation
There are several approaches through which a company’s externalities can be internalised. Ideally, from a business perspective, a company is rewarded for the wider benefits it creates and, from a social welfare perspective, pays for the costs it inflicts on its stakeholders. The most direct approach for doing so is pricing; internalising all benefits and costs in the price for a product or service so that the equilibrium price reflects all available information, including information on the ‘true’ value of externalities created. The concept of carbon pricing is an ideal example of such internalisation (see Carbon Pricing).

Since the marine construction sector has not (yet) embraced pricing for internalisation, an alternative approach is impact assessment (IA). IA is used for assessing the externalities of public policies, programmes, plans and projects. It can be

1. qualitative (just an inventory of potential impacts),
2. quantitative (an overview of amounts and sizes; often applied in environmental and social impact analyses (ESIA)), and
3. monetarised (expressed in monetary terms, based on economic values assigned to quantities ‘volumes’: \( P(\text{rice}) \times Q(\text{quantity}) \)).

A typical example of the third is natural capital accounting (NCA), by Boerema et al. (2017) referred to as ecosystem services assessment (ESA), which provides a framework to evaluate environmental externalities of existing and planned projects (IADC, 2016). The externalities include positive as well as negative externalities. IADC (2016) contains a number of applications on various types of marine infrastructure projects. The NCA/ESA-approach forms also input for the so-called environmental profit and loss account (EP&L) and the integrated profit and loss account (IP&L; e.g., LafargeHolcim, 2017), a company’s monetary valuation of its externalities, ideally including all impacts of its own business operations as well as of its supply chain.

Applying EP&L by contractors is complicated due to the fact that the exact scale and scope of the externalities largely depend on the type and size of the projects at hand. So, a more project-related focus is required to get in-depth insight in the externalities of marine contractors. NCA/ESA meets this requirement but at the same time a major

Carbon Pricing

The carbon price reflects the price that must be paid for the right to emit a certain amount of carbon dioxide (\( \text{CO}_2 \)) into the atmosphere. The rationality behind this is that \( \text{CO}_2 \) emissions (an externality) should be set at a price equal to the socio-economic value of the damage caused by the emissions (internalisation). Via the market mechanism this should result in the optimal (economically efficient) amount of \( \text{CO}_2 \) emissions. Although there are several economic-policy arguments in favour of carbon pricing (e.g., Baranzini et al., 2017), many factors complicate the translation of this economic concept into practice including the extent to which the present carbon price covers the ‘true’ social cost for carbon (SCC). With a view on social acceptance of carbon pricing, the revenues from carbon pricing should ideally also cover the cost of mitigating measures such as the installation of offshore wind farms. The World Bank, in its most recent Carbon Pricing Dashboard (World Bank, 2018), found that around 20% of global carbon emissions are currently subject to carbon pricing. However, the carbon price level is still below the SCC.
The question who is creating which externality during which stage of the project is often not addressed.

Limitation of NCA/ESA is that it is inherently limited to environmental externalities. With a view to being able to include a wider range of externalities – in addition to environmental also social and economic externalities – a wider scope of the internalisation of project impacts is required. A typical example of an approach that meets this requirement is the social cost-benefit analysis (CBA), an approach to estimate the socio-economic costs and benefits of alternatives for public investments such as infrastructure projects. A major next step of CBA-application on marine infrastructure projects was represented by the CBA for the Maaslakte 2 project (CPB, 2011a,b), the second seaward expansion of the Rotterdam port, executed by Boskalis and Van Dord in 2008-2011. Thorough discussions on CBA-application to transport infrastructure projects can be found, for instance, Priemus et al. (2008), and on application to offshore wind energy in, for instance, Snyder & Kaiser (2009).

The essence of CBA is determined by estimating externalities of an entire project, based on a holistic view on the project. So, the question who is creating which externality during which stage of the project is often not addressed. This implies that the specific contribution of the contractor is included in the overall assessment of externalities but not (yet) differentiated. An approach that can be used to make this differentiation is the so-called True Value methodology, developed by KPMG (similar methodologies are available leading to similar results). The True Value methodology continues on the project focus of NCA/ESA and CBA, and on the wider scope of internalisation of IP&L and CBA. The result is an integrated approach to determine the stakeholder value of a contractor’s activities within a project, expressed in monetary terms (the ‘true’ value, i.e. stakeholder value). With a view on the applications, the next section discusses the most relevant aspects of this True Value methodology.

True Value methodology

Introduction

Basically, the True Value methodology – here slightly adapted to make it suitable for a contractor’s typical features – consists of three steps (e.g., KPMG, 2014):

1. Assess the stakeholder value by identifying (“scoping”) and quantifying the most relevant externalities;
2. Understand potential future stakeholder value opportunities and risks by analysing exposure to the drivers of internalisation; and
3. Create stakeholder (and corporate) value by developing business cases that capture value creation opportunities and reduce risk.

Calculating the True Value

The applications (see the next section) are focussed on the first step but in the last section of this article we will also address implications associated with step 2 and 3.

Starting point: externalities are created throughout the value chain

The starting point for step 1 is the assumption that marine contractors create positive as well as negative externalities at all points in their value chain: upstream in their supply chain, through their own direct operations associated with construction activities, and downstream through the use of the infrastructure facilities they construct. An exploration of project externalities and how to manage them to protect and increase value in the construction industry supply chain has recently been started by Vazquez-Brust (2017). For the present analysis, the most relevant externalities have been identified by an expert team of Van Dord. In future applications, external experts and/or stakeholders should be included in this team to ensure sufficient ‘outside-in view’ during the scoping stage of the assessment.

Calculating the True Value

Calculating the True Value is a matter of obtaining a volume measure of the externalities (‘Q’) and then multiplying this by an associated “price” (P). The specific interpretation depends on the type of externalities attributed to the project and its supply/value chain during the scoping stage of the assessment. As Table 1 shows, these externalities are direct externalities but also up- and downstream externalities. Since the scope of the present analysis includes the entire value chain (Construction stage, including supply chain, and Operations stage), additional data about upstream and downstream volumes was required.

<table>
<thead>
<tr>
<th>Externalities</th>
<th>Valuation</th>
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<tr>
<td>Direct (Construction stage)</td>
<td>P(Price of externalities) × Q(Quantity)</td>
</tr>
<tr>
<td>Upstream (supply chain)</td>
<td>P(Price of externalities) × Upstream Q(Quantity)</td>
</tr>
<tr>
<td>Downstream (Operations stage)</td>
<td>P(Price of externalities) × Downstream Q(Quantity)</td>
</tr>
</tbody>
</table>
Marine contractors create positive as well as negative externalities at all points in their value chain.
The empirical basis of the calculations is volume data which was obtained here from the project databases of Van Oord and interviews with suppliers and clients, supplemented with information from publicly accessible sources such as websites and research reports. As noted, each externality volume is multiplied by an appropriate price. For example, CO₂ emissions are multiplied by a price which is commonly known as the social cost for carbon (SCC). The total True Value is obtained by adding up the values of all externalities.

Validation
It is important to realise that research into externalities goes back many decades. For some areas, science has advanced significantly, while in some other fields the scientific estimates are still fairly weak. Even for the most advanced areas, estimates for the ‘prices’ (P) can still differ significantly. To take the impact of such differences into account, we conducted sensitivity analyses of our calculations. It appeared, for instance, that the overall results were not dramatically affected by relatively small changes in the attribution factor (an import variable determining the amount of True Value generated during the Operations stage attributed to Van Oord). The sensitivity analyses further pinpointed the relevance of:

1. selecting a proper discount rate for calculating the present value of future externalities, and
2. the lifetime of the infrastructure facility, since the considered period of operations of Gemini Offshore Wind Farm and Moin Container Terminal highly determine the present value of the externalities created during the Operations stage.

Results of the applications

Introduction
Together with KPMG, Van Oord has undertaken two studies to better understand, manage and demonstrate the stakeholder value of its key business activities create for society, with the aim of proactively making decisions on future projects. The Gemini Offshore Wind Farm was the first project subject to the analysis (KPMG & Van Oord, 2016), followed by the Moin Container Terminal (TCM) in Costa Rica (KPMG & Van Oord, 2017).

Gemini Offshore Wind Farm
In the Netherlands, 85 kilometres north of the coast, Van Oord realised one of the largest offshore wind projects in the world: the Gemini Offshore Wind Farm. This challenging project consisted of the installation of 150 4-megawatt wind turbines, which supply a total of 600 megawatts of renewable energy to 785,000 households.

Moin Container Terminal
To maintain and strengthen Costa Rica’s competitive position, the country’s government has awarded APM Terminals a contract for a new container terminal in Moin. In close cooperation with VOBAM (a consortium formed by Van Oord and BAM International), a high-productivity container terminal is being constructed. The terminal is the largest infrastructure project in Costa Rican history and will play a key role in supporting Costa Rica’s growing agricultural export industry and manufacturing sector. The scope of work for Van Oord consists of the construction of a rock breakwater, reclamation of an area of 40 hectares, including soil improvement works, and the dredging of the access channel and turning basin. BAM International is responsible for the construction of the 650-metre quay wall, as well as the pavement, associated buildings and all utilities.
Overall results
The value bridges (see Figures 5 and 6) show the positive and negative externalities that result in the total stakeholder value of each project. Van Oord’s activities for the Gemini wind project creates a total True Value of EUR 877.2m, whereas TCM creates a total True Value of USD $929.8m.

During the construction and installation of the Gemini Wind Farm, an overall True Value of EUR 907.7 million was created. Positive economic value-add is created through the significant amount spent by Van Oord on suppliers. The estimated economic value added is EUR 929.1m, of which EUR 366.8m is created inside the Netherlands, and EUR 562.3m outside the Netherlands. Major positive impacts from the operation of the wind farm come from the avoidance of air emissions (EUR 454.4m) and avoiding fossil fuel depletion (EUR 227.8m). The most significant cost to society is caused by the subsidies from the Dutch government. A value of EUR 712.7m has been attributed to Van Oord based on expected electricity market prices for the coming 20 years.

The construction of TCM created an overall True Value of USD 190.7 million. The estimated total economic value added is USD $245.9m, of which USD $113.9m is created inside Costa Rica, and USD $124.4m outside of Costa Rica.
However, this value is reduced by USD $11m as a result of economic inefficiencies. The major positive impacts from the operations of TCM are the additional tax revenues invested in the region and the rest of Costa Rica (USD $181m and USD $9m, respectively), the direct economic impact of TCM (USD $329.2m) and improved trade connections (‘connectivity’) and reduced transport cost (USD $580.9m). Within the selected scope of externalities, the most significant cost to society is the expected loss of jobs and revenues at the existing container port, the ‘substitution effect’, which stands at USD $198.1m.

The remainder of this section highlights three examples of externalities of which some are typical for and/or receive special attention by marine contractors, namely innovation (an economic externality, but here particularly dealing with environmental externalities), health & safety (an example of social externalities) and job creation (an example of economic externalities).

**Innovation**
Several innovations were applied on the TCM project that resulted in an estimated total impact of USD $4.3m in reduced external environmental costs, primarily through using a smaller and different type of concrete armour unit (so-called Xblocks; see Figure 7). As such, less cement was used. At the same time, cement is associated with significant CO₂ emissions and other negative externalities such as water pollution.

Using salt water, instead of fresh water, for deep cement mixing led to reduced costs and had an environmental benefit (both from using less fresh water and avoiding transporting fresh water from a well 10 kilometres off-site). The environmental impact of this was somewhat limited because fresh water is relatively abundant in Costa Rica, but the benefit could be much greater at future projects where fresh water is scarce.

**Health & safety**
Health and safety incidents, which occurred during the installation, have an estimated cost to society of EUR 3.6m (Gemini) and USD $5.6m (TCM, VOBAM consortium as a whole). During the construction of TCM, a very limited number of LTI’s (Lost Time Injuries) occurred.

The increase in workers’ skills generated through training generates extra value, respectively EUR 1.7m (Gemini) and USD $0.2m (TCM). Community development projects in Costa Rica added extra value of USD $0.8m. These projects included donating an ambulance to the local hospital, setting up a food bank, donating school supplies, noise proofing a house, educating locals on vessels handling activities and larger capacity compared with the existing port, it is expected that jobs will be lost at the existing container terminal. Based on interviews, it was assumed that 50% of the economic impact of the existing port would be lost and would recover by 2025 when the port is redeveloped. The analysis estimates that USD $198.1m is substituted in economic activities, which includes the job losses.

**Job creation**
Large Van Oord projects like TCM and Gemini have a significant positive impact on employment. Due to the construction and installation of the Gemini wind farm, 437 full time jobs are created at Van Oord internally, of which about 50% are occupied by Dutch and 50% by non-Dutch nationalities. The investment by Van Oord in the supply chain creates 2,750 person years. This calculation was done based on publicly available statistical data, which indicate how much jobs are created due to spend in selected industries. Note that this is a high level estimate.

During the construction stage of TCM (until March 2017), the VOBAM consortium created approximately 2,000 direct job years (based on the number of man years). Van Oord has tried to maximise the local economic spin-off of its activities as much as possible by hiring local workers and sourcing raw materials such as rock locally. Van Oord created approximately 750 job years as a result of its total supplier spend.

Although TCM will result in additional direct economic impact as a result of the terminal handling activities and larger capacity compared with the existing port, it is expected that jobs will be lost at the existing container terminal. Based on interviews, it was assumed that 50% of the economic impact of the existing port would be lost and would recover by 2025 when the port is redeveloped. The analysis estimates that USD $198.1m is substituted in economic activities, which includes the job losses.

**Reflections and recommendation Insights obtained**
Although the size and composition of the stakeholder value always depends on the type and size of the project(s) at hand, valuable insights in the stakeholder creation of marine contractors have been obtained from the two applications. First, the overall stakeholder value

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**FIGURE 7**
Xblocks reduced external environmental costs in the TCM project.
Although innovation did not represent the biggest contribution to the overall stakeholder value of the application cases, it can be stated that innovation plays a major role in reducing (potential) negative environmental externalities.
is not only related to typical environmental externalities (e.g. ecosystem services) of working in a marine environment. Social externalities such as health and safety, and economic externalities such as job creation can also be expressed in monetary terms and have been included in the overall stakeholder value. This highlights the relevance of taking a much wider scope of stakeholder value into account. Second, the externalities of the supply chain should also be accounted for. This is particularly relevant when the procurement cost represents a significant part of the total project cost, which is typical the case for offshore wind projects. When local procurement becomes more relevant, it makes sense to account also for local job creation. Particularly in developing countries, this may represent a major contribution to local prosperity. Third, the results also give an indication of the role and significance of innovation. Although innovation did not represent the biggest contribution to the overall stakeholder value of the application cases, it can be stated that innovation plays a major role in reducing (potential) negative environmental externalities. This highlights the relatively high impact such innovation has: it might be a lever for reducing negative impact and even for creating positive impact such as restoring and strengthening local ecosystems.

**Point of attention**

A major methodological point of attention is the attribution of externalities to the contractor created during the operations stage of the infrastructure facility. The idea behind it is that externalities during this stage would have never occurred if the facility was not constructed. At the same time, the contractor is usually not the owner/operator of the facility, unless he has an equity share. There are several options to tackle this methodologically, for instance, by using

1. the portion of the contractor’s equity share to the total project’s equity, or
2. the portion of the contractor’s contract value to the total project (lifecycle) costs.

Only in the Gemini project, Van Oord had an equity share but only during the construction stage. So, for the two applications, the second option has been used. The attribution issue raised here goes however beyond the methodological aspects; it implies also the scope and interpretation of the contractor’s social responsibilities, particularly in relation to those of the owner/operator.

**Recommendation**

The present article is limited to applying step 1 of the True Value methodology to running projects. Step 2 and 3, in contrast, aim at creating stakeholder value via future projects. This implies whether and if so, to what extent marine contractors are able to proactively account for stakeholder value during the tender stage of projects. In addition to sufficient (commercial and legal) freedom of action for the contractor, this requires True Value to be used to estimate potential stakeholder value upfront the construction stage. In close cooperation with the client, construction works could then be arranged in such a way that they benefit the wealth and well-being of local communities optimally. An important attention point however is that not all externalities can be internalised (yet). This means that there is still a need for systematic stakeholder engagement by client’s and contractor’s project management, particularly in complex project environments.

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**Summary**

KPMG’s True Value methodology is used to illustrate internalising a marine contractor’s externalities for assessing the value it creates for its stakeholders. This is established by applying the True Value methodology to two projects in which Van Oord has been recently involved: Gemini Offshore Wind Farm (The Netherlands) and Moín Container Terminal (Costa Rica). Through the process, valuable insights have been obtained that can be used for understanding, managing and demonstrating the value a marine contractor creates for its stakeholders. The steps to apply True Value’s methodology and calculations within the context of two case studies are discussed as well as lessons learned.

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**Bernd Hendriksen**
As a Partner in KPMG’s Amsterdam practice, Bernd has led KPMG Sustainability in the Netherlands for the past five years. During that time, he has successfully helped in driving sustainable revenues and developing one of KPMG’s largest teams of Sustainability professionals. Together with clients, Bernd is working on integrating sustainability into business strategy / decision-making by using the KPMG True Value methodology. On behalf of KPMG, he was project manager of the True Value assessments as discussed in this article.
In close cooperation with the client, construction works could then be arranged in such a way that they benefit the wealth and well-being of local communities optimally.