



Aalto University
School of Business

Capital Budgeting (22E12000)

Gameplaying Sustainability Aspects in Capital Budgeting

March 14, 2024

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Gameplaying in Capital Budgeting

Content

What is gameplaying in capital budgeting?

Why people play games?

What are the basic requirements for gameplaying?

What can be consequences of gameplaying?

What are the main types of games played?

How to avoid gameplaying?

Gameplaying in capital budgeting: What and why? (here focus on ulterior gameplaying, Lumijärvi 1990, 1991 approach)

Ulterior behaviours adopted by individuals in attempting to achieve a desired goal in the capital budgeting process

Managers play games in order to get their capital investments approved

Managers try to reach organizational position and power (Bower, 1970)

Gameplaying in capital budgeting:

Basic requirements & consequences

Basic requirements

- all the capital investments are not approved by the proposer himself (more than one hierarchical level)
- Information asymmetry exists between proposers and approvers

Consequences

- Enhanced potential for non-optimal capital investment decisions

What are the main types of games played in capital budgeting?

Selling games

Manipulation of
profitability
calculations

Manipulation of
post-completion
audit reports

Bypassing
procedures

External
gameplaying

Selling games



Investment proposer emphasizes certain arguments to get a decision-maker committed

- Economic
- Strategic
- Non-economic
- Production technology



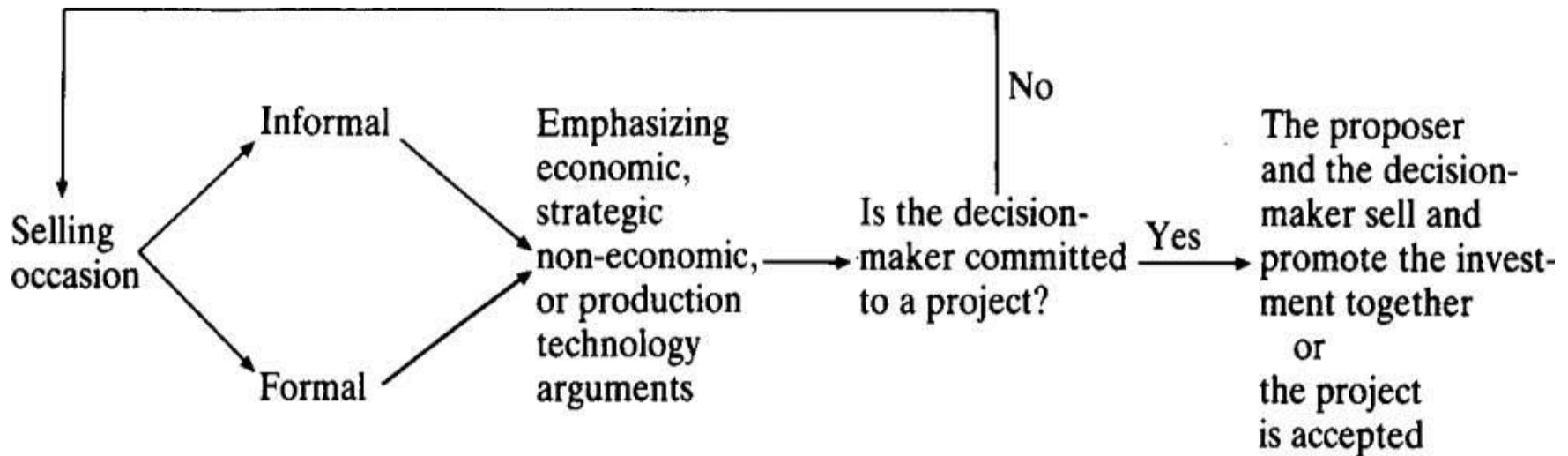
Focusing and filtering in formal and informal occasions

E.g., a proposer emphasizes the benefits of an investment, but do not present its risks



Investments are typically informally approved before their acceptance is considered at a formal meeting

Selling process (Lumijärvi, 1991)



Characteristics that were dominantly prevalent with different selling arguments (Lumijärvi, 1991)

	Econ.	Strat.	Non-econ	Prod Techn.
Unit's poor profitability	X			
Unit's good profitability		X		X
Investment represents new technology in the firm				X
Investment represents standard techn. in the firm	X	X		
Investment is very large		X		
Investment is small	X			
Investment's real reasons are not economic factors			X	

Manipulation of profitability calculations & PCA reports

Manipulation of profitability calculations

- Intentional playing with the figures
- Overoptimism in cash-in estimates
- Underestimation of cash-out estimates

Post-completion auditing reports

- Playing with the figures
- False statements
- “Forgetting to say” on purpose
- Can be reduced by letting an outside party to conduct PCA or to check reports

Bypassing procedures



Use of operating funds

Cost overruns covered in cost budgets
Motive: no investment appraisals needed



Splitting investments

Small investments
Motive: lower level of approval required



Presenting the initial outlay lower than it is

Motive: lower level of approval required



Using surplus funds for unapproved investments

Small investments
Motive: no investment appraisals needed

External gameplaying

Competitor focused

E.g., leaking information about the investment before its approval

- To "force" competitors to stop their investment preparations (competitors were planning a similar investment; market would only support the output of one investment)

How to avoid gameplaying?

Pre-decision controls

Independent reviewers
of appraisals

Post-completion
auditing

- Lumijärvi (1990): *"PCA is the only factor that was found to reduce gameplaying during the appraisal phase."*

Sanctions?

The role of Internal
auditing function?

Conclusions

Many forms of gaming used in firms

Manipulation & by-passing procedures harmful

Also using misleading, opportunistic selling arguments harmful

External gaming can be even beneficial

PCA suggested as the number one tool to reduce harmful gaming



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Sustainability Aspects in Capital Budgeting

Sustainability

Sustainability is made up of three pillars: economic, social and environment

These principles are also informally used as profit, people and planet

Sustainability is a holistic approach recognizing that all these must be considered together to find lasting prosperity

Here we focus on environmental and social aspects in firms

Coercive legislation/regulation (e.g., emissions to air & water)

Voluntary (e.g., ISO 14000 for environment, ISO 26000 for social responsibility, Global Reporting Initiative guidelines, Greenhouse gas protocols), Mandatory (CSRD)

Technological advances & growing sustainability awareness 'changing the game'

How sustainability factors are incorporated in capital investment appraisals

- Efforts to include sustainability-related impacts in quantitative investment appraisal promotes visibility and helps to internalise externalities in corporate decision-making
- Nevertheless, quantifying & monetizing costs and benefits can be very challenging
- In practice, a lot of sustainability related information remains non-financial and qualitative; i.e., it will be evaluated outside the investment calculations
- Lifecycle analysis, cost-benefit analysis and full social and environmental cost accounting suggested as tools
- Often sustainability investments are mandatory (compliance with the regulations – “licence to operate”)

Items included in capital investment appraisal due to company policy/standard procedures (Australian large companies; Vesty et al, 2015)

MANAGEMENT POLICY DETERMINED ITEM	YES	NO	Under consideration
OH&S compliance	85%	8%	6%
Employee health and wellbeing	77%	13%	10%
Impact on brand/reputation	63%	17%	20%
Energy and water consumption	61%	31%	8%
Environmental fines, penalties, insurance	60%	27%	13%
Clean-up and remediation costs	58%	35%	7%
Supply chain impacts	55%	33%	12%
Cost of purchasing offsets	44%	44%	11%
Contingency amount to reflect uncertain sustainability impacts	43%	43%	12%
Organisational waste levels	40%	48%	12%
Environmental revenues and credits	32%	58%	11%
Sustainability-related tax payments to government	25%	63%	12%

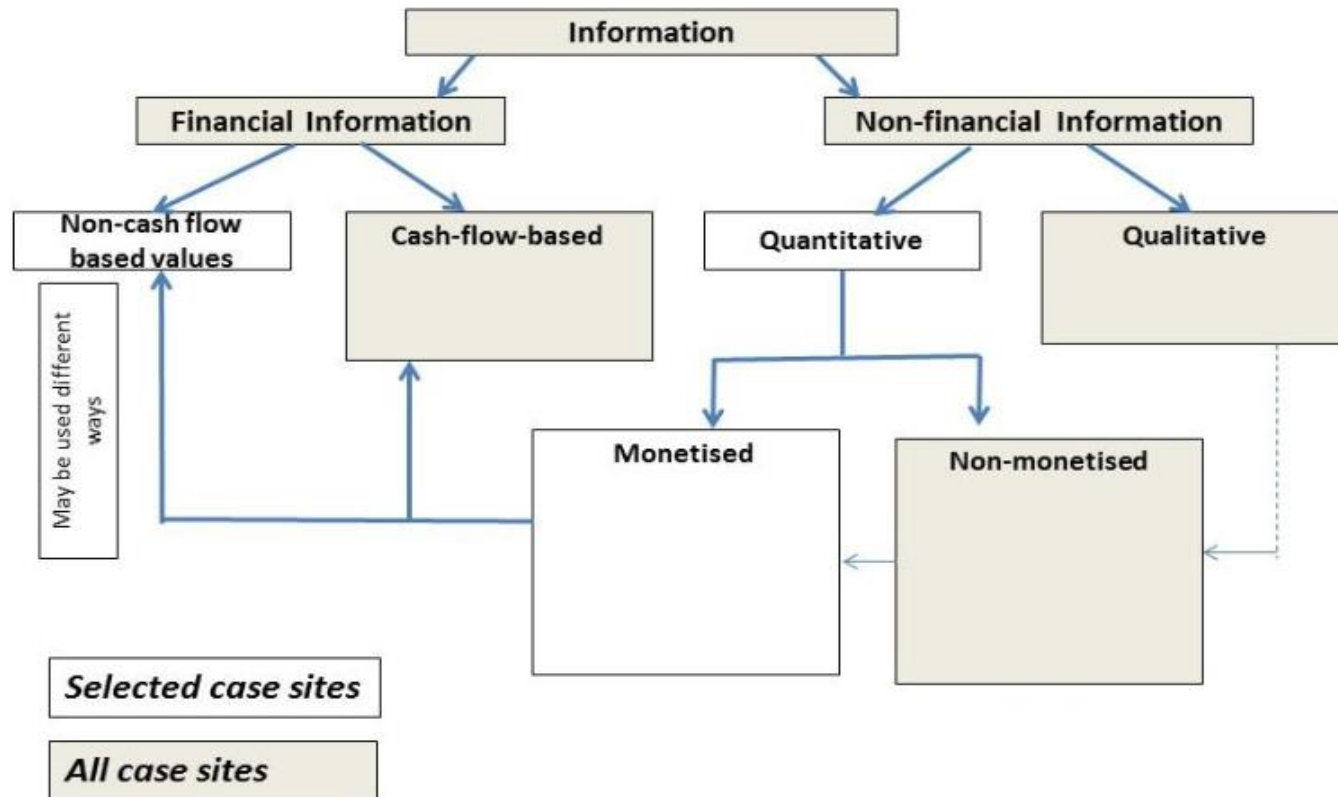
Incorporation of sustainability aspects in Capital Budgeting; Large Finnish manufacturing companies (Koskinen, 2023)

	Company A	Company B	Company C	Company D	Company E	Company F	Company G
Sustainability issues regularly included in decision making	Yes Always considered, but sometimes they do not play a role	Yes Always involved.	Yes Always involved, but smaller projects do not have all the aspects	Yes Always involved.	Yes Emphasis decreases on the lower levels of decision-making	No Considered only if the project is directly related to the sustainability issues	Yes Always considered, but sometimes they do not play a role
Environmental sustainability included in the assessment	Yes	Yes	Yes	Yes	Yes	Only if the project is directly related to sustainability issues	Yes
Social sustainability included in the assessment	Yes, but mainly OH&S related issues	Yes	Yes	Yes	Yes	Mostly indirectly	Yes, but mainly OH&S related issues
Analyzing sustainability information	Emphasis on qualitative assessment, checklist to assess the sustainability criteria	Emphasis on qualitative assessment, distinct sustainability criteria to be assessed	Most issues to be assessed in financial assessment, but also checklist to assess sustainability aspects	Emphasis on qualitative assessment, checklist to assess the different aspects of sustainability	Emphasis on qualitative assessment, sustainability part of distinct evaluation matrix	Emphasis on qualitative assessment, qualitative aspects covered in business case	Emphasis on qualitative assessment, qualitative aspects covered in business case
Monetizing sustainability issues	Only clearly quantitative and easily countable issues monetized	Only clearly quantitative and easily countable issues monetized	All issues are aimed to be monetized	Only clearly quantitative and easily countable issues monetized	Only clearly quantitative and easily countable issues monetized	Only clearly quantitative and easily countable issues monetized	Only clearly quantitative and easily countable issues monetized
Accepting lower NPV or longer pay-back period in case of sustainability benefits	Yes, in small cases	Yes, often the sustainability benefits have more weight	Yes, in small cases	Yes, the qualitative aspects have more value	Yes	Yes, but depending on the scale and competing projects	Yes
Most important sustainability factors to be included in the capital budgeting assessment	Energy efficiency, water consumption, CO2, waste issues, effective use of raw materials, OH&S, training	Energy use, CO2, OH&S, occupational well-being, energy choices (e.g. for the car fleet used in the maintenance services)	Energy efficiency, water consumption, energy choices, emissions, OH&S, occupational well-being, supply chain responsibility	Energy efficiency, water consumption, energy choices, recycling, packaging choices, OH&S, supply chain responsibility	Energy efficiency, water consumption, CO2, waste issues, packaging choices, OH&S, occupational well-being, supply chain responsibility	Energy efficiency, energy and material choices, lifetime expectancy, OH&S, training, supply chain responsibility	Energy efficiency, water consumption, CO2, waste issues, lifetime expectancy, OH&S, occupational well-being, supply chain responsibility

Motives for sustainability in Capital Budgeting; Large Finnish manufacturing companies (Koskinen, 2023)

	Company A	Company B	Company C	Company D
Most important motives	Corporate strategy, financial impacts, legislative requirements, better financing opportunities	Corporate strategy, legislative requirements & future regulation, attracting stakeholders, meeting societal expectations, competitive advantage	Corporate strategy, financial impacts, better financing opportunities, enhancing recruiting, competitive advantage	Corporate strategy, financial impacts, legislative requirements, meeting societal expectations, attracting investors, enhancing recruiting
Less important motives	Following competitors	Following competitors, preventing negative reputational damage	Following competitors, preventing negative reputational damage	Following competitors
	Company E	Company F	Company G	
Most important motives	Corporate strategy, meeting societal expectations, attracting clients, better financing opportunities, enhancing recruiting, competitive advantage	Corporate strategy, legislative requirements, financial impacts, getting financing, attracting investors, meeting societal expectations	Financial impacts, corporate strategy, legislative requirements & future regulation, getting financing, competitive advantage, meeting societal expectations	
Less important motives	Following competitors, preventing negative reputational damage	Following competitors, preventing negative reputational damage	Following competitors	

Information types in capital investment decision-making (Vesty et al, 2015)



Impediments affecting collection of sustainability-related data

(Australian large companies; Vesty et al., 2015)

Impediments	Mean*	SD
Difficulty in measurement of sustainability-related impacts	3.36	0.950
Cost of external expertise	3.30	1.057
Lack of availability of data	3.30	0.922
Cost of collecting data	3.26	0.923
Regulatory uncertainty	3.25	0.799
Lack of internal expertise	3.24	0.922
Complexity of internal processes and systems	3.19	0.856
Difficulty in assigning sustainability costs to individual investment projects	3.08	0.967
Difficulty evaluating stakeholder impacts	3.00	0.752
Lack of readily acceptable accounting software/technologies	2.87	1.030
Access to external expertise	2.76	0.942

*range 1 to 5 where 5 = always

Examples of sustainability-related information used in capital investment appraisals

(Six Australian firms in different industries, Vesty et al., 2015)

Case site	Examples of information
Water Corporation	Energy and utility use Discharges to the environment Land clearing Heritage/social/community impacts
Mondelēz	Utility use Changes to packaging impacts Supply-chain effects Noise levels Waste levels Occupational health and safety effects
Yancoal	Offset programs and expenditure (such as biodiversity offsets) Social-related items in local communities Carbon emissions Energy and utility impacts Occupational health and safety issues Land rehabilitation Reputation impacts
bankmecu	Impacts of loans on environment Biodiversity loss from loans use Energy and utility use Reputation impacts
Anglicare	Community and social welfare benefits (such as out-of-home housing for children and disadvantaged youth) Crisis housing

Importance and treatment of sustainability impacts

(In large Australian firms; Vesty et al., 2013)

Figure 9: We accept projects below financial hurdles where there are significant sustainability impacts

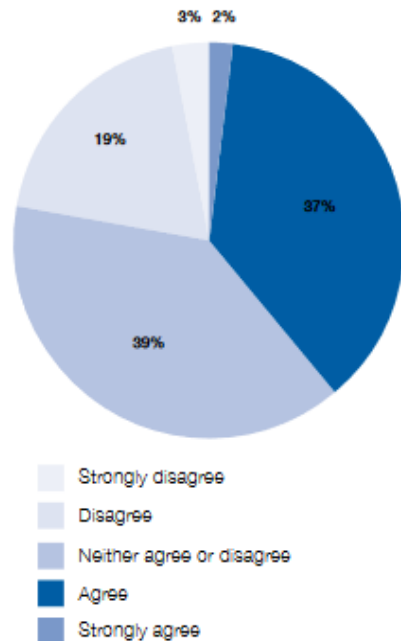
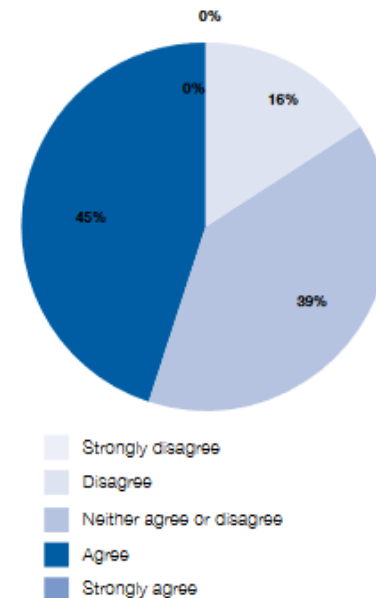


Figure 10: Some sustainability related costs/benefits are treated as a corporate wide cost/benefit and not allocated to individual appraisal projects



Case: Energy Efficiency Investment (Rasmussen, 2020)



REGULATORY - PRESS RELEASE - 7 DEC 2011, 8:30 CET

Billerud carries out environmental and energy improvements in Skärblacka

The Board of Billerud AB has decided to proceed with an environmental and energy investment at Skärblacka mill outside Norrköping. The goal is to strengthen the mill for the future by improving environmental performance and energy efficiency as well as enabling future expansion. The investment is expected to amount to SEK 900 million.

The investment includes upgrading the recovery boiler and its flue gas cleaning system with the best available technology. In addition a new evaporation unit will be build to improve energy efficiency at the mill. This will lead to a substantial reduction in consumption of fossil oil and external biofuels. Billerud has applied to the Land and Environment Court in Växjö for permission to implement these changes and received approval on 29 November 2011. The entire project is scheduled for completion at the end of 2013.

The investment is expected to amount to SEK 900 million, broken down as follows: approximately 15% in 2011, approximately 50% in 2012 and approximately 35% in 2013. With this investment in Skärblacka, the Billerud Group's total investments in property, plant and equipment for 2012 are estimated to amount to approximately SEK 800 million. Depreciation amounts to approximately SEK 600 million per year.

Skärblacka's Managing Director, Tor Lundqvist, comments: "I see Billerud's major investment in modernisation of the mill in Skärblacka as a good sign for the future. Environmental improvements are made continually at the mill and reduced energy costs will strengthen our competitiveness. Our responsibility now is to manage this in the best possible manner."

Case: Energy Efficiency Investment (Rasmussen, 2020)

- Energy efficiency investment that was motivated and justified by diverse rationales: productivity, strategic, energy, and sustainability
- Complying with environmental legislation (licence to operate)
 - Necessary for the survival of the Mill
- Reduction of energy use → energy cost savings
- Pulp and Paper Industry is a really heavy energy user
- Reduction in emissions (carbon footprint; climate change)
- Also, non-energy benefits
- In the Case company all the investments are subject to the same investment process
- The investment project was classified as strategic (large)

Investment procedures for large and smaller investments

Table 3. Identified investment procedures.

	Procedures	Level	Activity in Investment Process
Investment classification A†	Maintain, strategic, enhance.	Group	Investment application
Investment classification B	Strategic, market, mandatory, capacity, quality, rationalization, building, environment, replacement. Multiple classifications possible.	Mill	Investment application
Financial evaluation A	Primarily Net Present Value (NPV), Internal Rate of Return (IRR), Modified IRR (MIRR), payback (PB), occasionally Life Cycle Cost (LCC). Firm-specific discount rate.	Group	Pilot studies, pre-project, investment application
Financial evaluation B	Often limited to PB. Occasionally LCC.	Mill	Pilot studies, pre-project, investment application
Investment committee review	Committee reviewing larger investment proposals before authorization by group management. Structure for revision of proposals before being sent for authorization.	Group	Evaluation and decision
Investment proposal review	Finance, technology, process, environment, management. Who and when stated in the manual.	Mill	Evaluation and decision
Authorization by group management	Group management accepts or dismisses investment proposals, based on investment committee review.	Group	Evaluation and decision
Ranking/investment prioritization A	Prioritization of larger investments administered by mill manager.	Mill	Evaluation and decision
Ranking/investment prioritization B	Investments within the mill's investment budget, administered by maintenance manager. Based on ranking from division managers.	Mill	Evaluation and decision
Authorization limits	Division/mill/investment committee and group management/executive board.	Group, mill	Evaluation and decision
Investment manual	Application (motive, time frame and plan, financial details), authorization route.	Group, mill	Pre-project, evaluation and decision
Environmental analysis	Mandatory supplement to the investment manual, concerning external environment. Limits on emissions, noise, etc.	Mill	Pre-project, evaluation and decision
Risk assessment	Mandatory supplement to the investment manual.	Mill	Pre-project, evaluation and decision
Work environment analysis	Supplement to investment manual. Not mandatory, but representatives from work environment and safety should be consulted for all projects. Work environmental aspects should be addressed in the appendix or proposal.	Mill	Pre-project, evaluation and decision
Energy	Energy should be acknowledged for all investments and upgrades.	Mill	Pre-project, investment application
Supplier involvement	Tenders required at the pre-project stage.	Mill	Pre-project
Documentation routines A	According to the manual and additional pre-project report, presentation to the investment committee, and occasionally executive board.	Group, mill	Pre-project, evaluation and decision
Documentation routines B	According to the manual and additional pre-project report.	Mill	Pre-project, evaluation and decision

† Procedures notated with "A" and "B" varied depending on investment size (A: Large investments, B: Smaller investments authorized within the mill's budget).

Sustainability aspect in investment application: partly monetized for inv. calculation, partly quantified or qualitative shown in appendices

Table 5. Impacts from the case investment.

Impact	Cost (C)/Revenue (R)	Comment
Reduced dust emissions	R	Main objective of the investment.
Increased energy efficiency	C	-
Increased productivity	R	-
Increased production	R	-
Increased capacity	R	-
Increased production reliability	C	One less production stop per year.
Prolonged lifetime of equipment	C	-
Reduced material costs	C	-
Reduced use of raw materials	C/R	C: Reduced costs for bark and oil, R: Possibility to sell bark.
Reduced need for maintenance	C	-
Reduced water consumption	C	Not included in the application.
Need for cooling	C	Negative impact, resulted in increased costs.
Improved work environment	n/a	Not included in the application.
Reduced need for engineering control	n/a	-
Reduced wastewater	C	-
Reduced internal and external noise	n/a	Not included in the application.
Improved temperature control	n/a	Not included in the application.
Improved air quality	n/a	Not included in the application.
Improved lighting	n/a	Not included in the application.
Waste fuel	C	-
Worker morale	n/a	Not included in the application.
Other emissions (CO ₂ , SO _x , NO _x)	n/a	No change in CO ₂ or SO _x . Difficulties retaining NO _x levels (negative).
Improved public image	R	Not included in the application.

Lessons learned about sustainability aspects in investment in practice

Sustainability considerations will be a standard procedure in firms in the future

Sustainability assessment is nowadays largely left to sustainability and risk experts

Sustainability investment related appraisals include often qualitative analysis beyond investment calculations

Relates often to getting a licence to operate

Non-regulatory investments with negative NPV can be accepted if there are major sustainability benefits

Occupational Health & Safety investments are made regardless of investment calculation decision