Decision Support and Performance Measurement for Global Product Development

A practical guide for industry

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INDUSTRIENS FOND
FREMMER DANSK KONKURRENCEEVNE
The Danish Industry Foundation

The Global Product Development project

Globalisation is a phenomenon that all Danish firms, irrespective of their size, face. In 2012, the Danish Industry Foundation funded a guide based on empirical evidence to support Danish industry in the globalisation of their value chains. This showed that many decisions were made on an ad hoc basis and that greater support was needed. Based on this project, it was recognized that industry need better understand how to measure the effectiveness of projects when parts of the product development process is globalized, as well as support in their decisions to globalize.

The Danish Industry Foundation has funded this project on Global Product Development to create methods and tools to support Danish industry in Global Product Development led by Prof. Saeema Ahmed-Kristensen and a team of researchers at the Technical University of Denmark together with around 40 Danish firms. The project has developed tools and frameworks that can help other Danish companies in: measuring performance of globalized product development through a framework to set up Key Performance Indicators (KPI); support the decision making process, and; move to hybrid agile/planned product development models. The guide book focuses upon supporting setting up KPIs and decision making support for globalized product development, and is the first of two guide books produced based on the knowledge gained.

Mads Lebech
CEO, The Danish Industry Foundation.

The Global Product Development Project

Many Danish companies have globalised part of their development process; from detailed design, testing to production. This has created many new possibilities but also new challenges. Through our close collaboration with more than forty Danish companies, we identified a critical need for tools to support industry in Global Product Development, this includes the need for new Key Performance Indicators that identify and address issues that are specific to Global Product Development, such as culture or communication and support the decision making process.

The project focused on research and based on this research the development of pragmatic tools to support global product development in Danish industry by investigating three key research areas. The first two form this guide:

Performance Measurement
The dynamic consequences of sourcing or offshoring parts of the product development methods are made measurable by providing approaches to develop robust metrics for assessing the companies' performance as the project progresses. A framework has been proposed based on a number of interviews, observations and testing and refining the framework with case study companies.

Decision Making
The decision making theme examined a number of cases to unfold the issues supporting manufacturing firms in making decisions to outsource or offshore part of the global product development decisions and translate these to a guide to support this process.

Joint innovation models hybrid agile processes
Understanding how to bring agile methodologies into planned models to move towards. 10 cases have been investigated to understand best practice and develop models of hybrid agile approaches. These models will form part of a separate guide.

Throughout the project, engagement with industry has been a priority, and in addition to a number of publications with the research contribution, a number of initiatives were undertaken to engage industry to maximise impact of this project. This includes eight workshops held with industry in addition to over deep case studies including over 40 interviews held in Denmark, China and Malaysia to bring an insight into the challenges of global product development. The workshops were not only a place for the results to be disseminated but also best practices shared and even the new companies formed from the network, leading to new entrepreneurial efforts.

The project is supported with 6,000,000 DKK from the Danish Industry Foundation (Industriens Fond), without this the project would not be possible. To the companies that so kindly gave their precious time for cases studies, Radiometer, Danfoss, and those who attended the workshops, presented and supported thank you, especially Roy Nielsen and Christian Ernst who have attended almost all the workshops and followed the project over the years. Also, thanks to all members of the Global Product Development research and administrative team past and present for their dedication.

Prof Saeema Ahmed-Kristensen
Head of Design Products,
School of Design, Royal College of Art

Participating Companies

This guidebook is the result of the ”Practical Tools for Global Product Development Project”, which was funded by The Danish Industry Foundation and carried out at the Management Engineering department at the Technical University of Denmark. The authors would like to sincerely thank the companies that participated in the project for their contributions towards making this guidebook a reality.

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Motivation for the guidebook

The establishment of global production sites in low cost regions such as China, India and Eastern Europe has been a key force in inducing a more recent trend in Danish manufacturing companies - the global distribution of product development activities, referred to as global product development in this guidebook.

Opportunities to reduce development costs, access new competencies and expertise and gain local knowledge of global markets during the development of products are key motivations for global product development.

However, a recent study with over 40 multinational Danish manufacturing companies [Hansen and Ahmed-Kristensen 2012] found that management encounter difficulties in relation to the coordination of culturally diverse and geographically dispersed engineering teams.

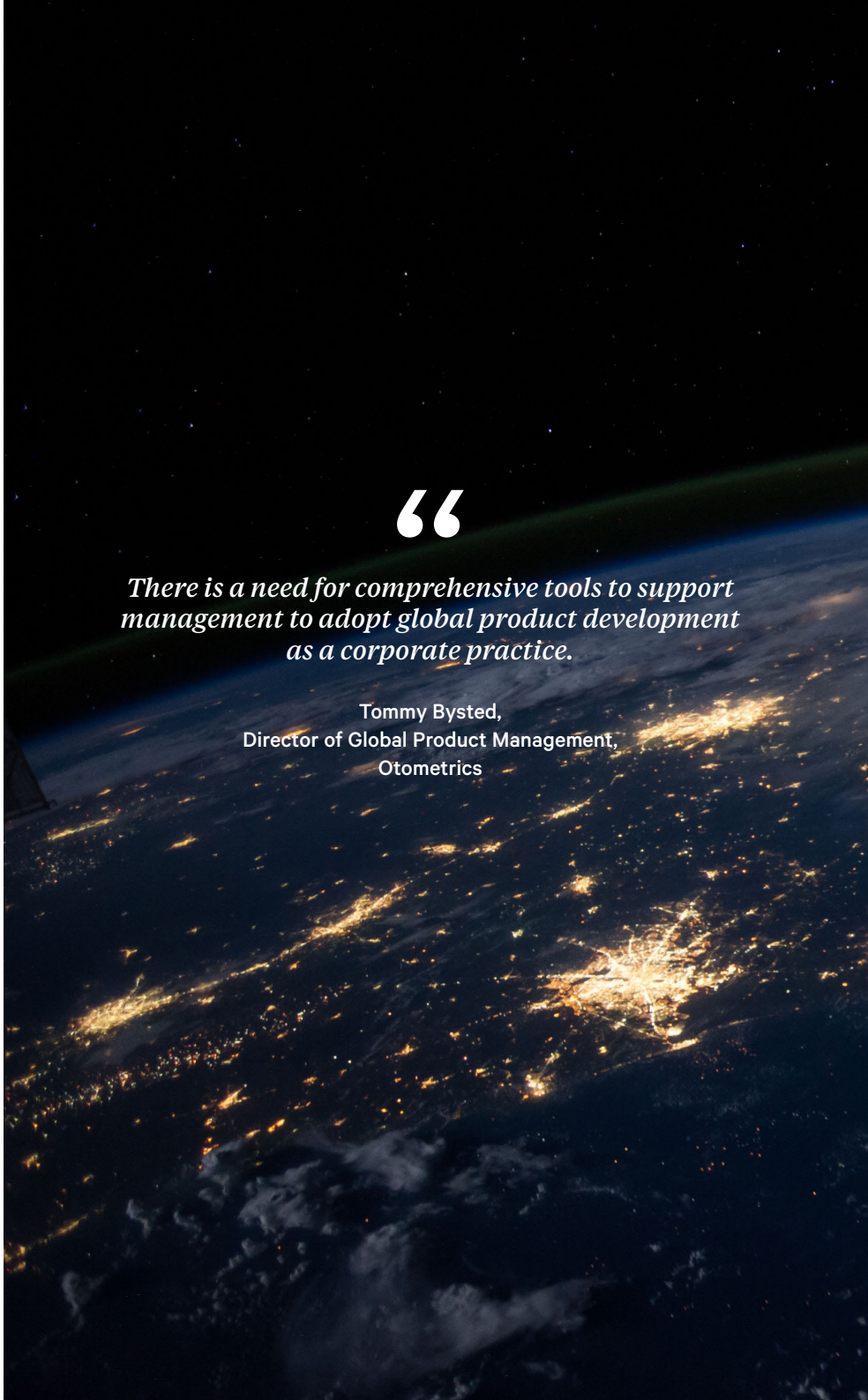
Furthermore, the lack of practical tools and methods to manage such difficulties typically resulted in a learning-by-doing approach to global product development. This can be costly later down the process and a need has been identified to support Danish companies to better prepare for global product development.

Practical Tools for Global Product Development

Building on these findings, a four-year research project was conducted that aimed to gain a deeper understanding of the impact that global product development has on Danish companies, and to develop practical tools to support:

1. The strategic decision making process
2. The measurement of operational impacts

The results from the project, which involved collaboration with over 60 multinational Danish manufacturing companies, have been compiled in this practical guidebook for industry with the purpose to strengthen the management and operationalisation of global product development.



> *There is a need for comprehensive tools to support management to adopt global product development as a corporate practice.*
>
> Tommy Bysted,
> Director of Global Product Management,
> Otometrics

Aim of the guidebook

How can we support management to overcome the difficulties and help adopt global product development as a corporate practice?

This is a central question that many western manufacturing companies are faced with today. The transition from managing engineering teams, which were previously collocated and cross-functional, to managing teams that are geographically dispersed and culturally diverse during the collaborative development of products represents a major transformation in industry.

The aim of this guidebook is to provide management with a practical toolkit that supports to overcome the many obstacles and maximise potential opportunities in the pursuit for successful global product development.

The first part of the guidebook develops understanding towards the key drivers and challenges companies face, and the current practice for managing global product development in relation to decision making procedures and performance management techniques.

The second part of the guidebook presents a ten stage approach to support management when making strategic decisions in relation to the global distribution of development activities, and translates these decisions into measurable action to support the operation of global product development.

Fundamental for the development of this guidebook is the inclusion of the knowledge and experience from over 60 multinational Danish manufacturing companies during the research project “Practical Tools for Global Product Development”. While the companies are not named in the guidebook, the case examples provided throughout are based on experiences observed in the companies that participated in the research project.

Who should use this guidebook?

This guidebook is aimed at practitioners, project and program managers and decision makers involved with the management and implementation of global product development.

Global Product Development

Global product development (GPD) is the globalisation of tasks and activities throughout the product development process, beginning with the global distribution of production centres, and more recently the distribution of high value adding stages of product development such as concept and detail design.

Unlike conventional product development, which typically consists of local, cross-functional members, GPD consists of culturally diverse and geographically dispersed engineering teams that must collaborate during the development of products.

There are two sourcing modes that companies adopt for GPD:

Outsourcing - the company hands over specific tasks and activities during product development to independent foreign providers.

Offshoring - the company expands product development to foreign countries while maintaining full ownership and control of the subsidiary.

> *We established an offshore R&D centre in India with the primary motivation to reduce development costs, but also to increase agility in operations.*
>
> **Detlef Matzen,**
> **Lead Development Engineer, Danfoss**

Cultural difference	Contrasting levels of autonomy in project team due to cultural background.
Physical proximity	Difficulties coordinating engineering teams across multiple time zones
Communication difficulties	Spontaneous, face-to-face communication is reduced due to geographical dispersion of development sites.
Trust	Increased reliance on virtual collaboration makes conflict resolution challenging, which impacts the level of trust.
Documentation	Transfer of company documentation to digital platform accessible to global partners is time consuming.
Common vision	Lack of face-to-face interaction creates difficulties for developing shared understanding.
Protection of IP rights	Ideas and inventions can be compromised when shared with parties outside of the company.
Knowledge sharing	Difficulties sharing uncodified knowledge virtually.
Coordination	Global dispersion of activities creates coordination inefficiency.
Standardisation of tools and processes	Clarifying company procedures in common language accessible to global partners is challenging

Table 1: examples of key challenges encountered during GPD from several multinational Danish companies

Key challenges with global product development

Despite the potential benefits of GPD, outsourcing and offshoring tasks and activities throughout product development does not come without its challenges, and understanding these challenges is an important step for developing precautionary measures.

Table 1 illustrates examples of challenges encountered in several case companies conducted as part of the four year research project that supported the development of this guidebook.

> *The problem is that, if you're in Denmark, you can get sufficient information from the other supporting teams: production team, marketing team for example....you can get feedback first hand. But here in China, we need to get the feedback from our leader: the mechanical engineer in Denmark, which can take time."*
>
> Vincent Yang, R&D Engineer, Radiometer

Decision making

What tasks should be outsourced, and what tasks should be offshored?
Recent trends suggest that managers approach this decision in an ad-hoc manner and companies have been found to switch between the different sourcing modes as collaborations progress. Such approach can be costly and is an early indicator for GPD failure [Amaral et al., 2011].

When faced with such decisions, management must consider the key drivers and challenges that characterise the environment where GPD will take place in terms of the product, process and organisation as a whole.

Figure 1 illustrates an example of a rational decision making model. The model relies heavily on the input and analysis of information at each stage of the process. Following the stages enables for a more fluid approach to decision making. Given that GPD is a more recent trend in relation to the globalisation of production, taking a rational approach to decision making is challenging as the information input is highly reliant on the knowledge and experience of the decision maker in dealing with GPD.

However, providing examples of best practice for decision making in GPD can support to build a depository of knowledge that helps identify the different types of decisions and the information input required for the decision.

> *The decision making process is heavily reliant on the knowledge and experience of the decision makers, which can be limited in the global product development environment.*
>
> Mikkel Frank, Design Engineer, Danfoss

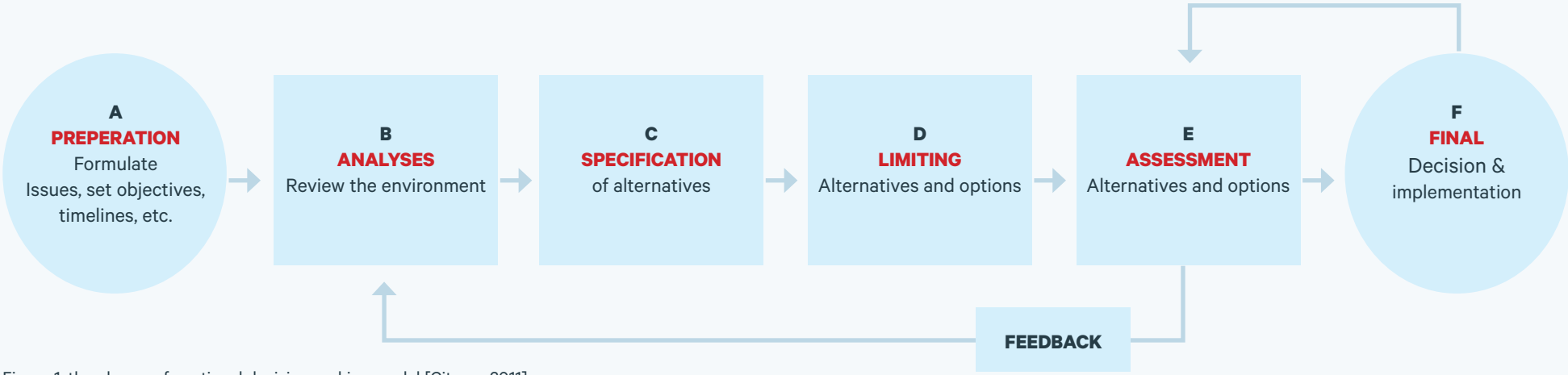


Figure 1: the phases of a rational decision-making model [Citroen 2011]

From several case studies with multinational Danish companies, Søndergaard and Ahmed-Kristensen observed over 50 decisions related to outsourcing and offshoring tasks during product development. Figure 2 and Figure 3 illustrate the types of decisions made and the methods used for making the decisions respectively.

The companies were found to follow a generic decision process during GPD, which involved the following stages: 1) Decision motivation; 2) Information input; 3) The decision; 4) Decision implementation; and 5) Decision result.

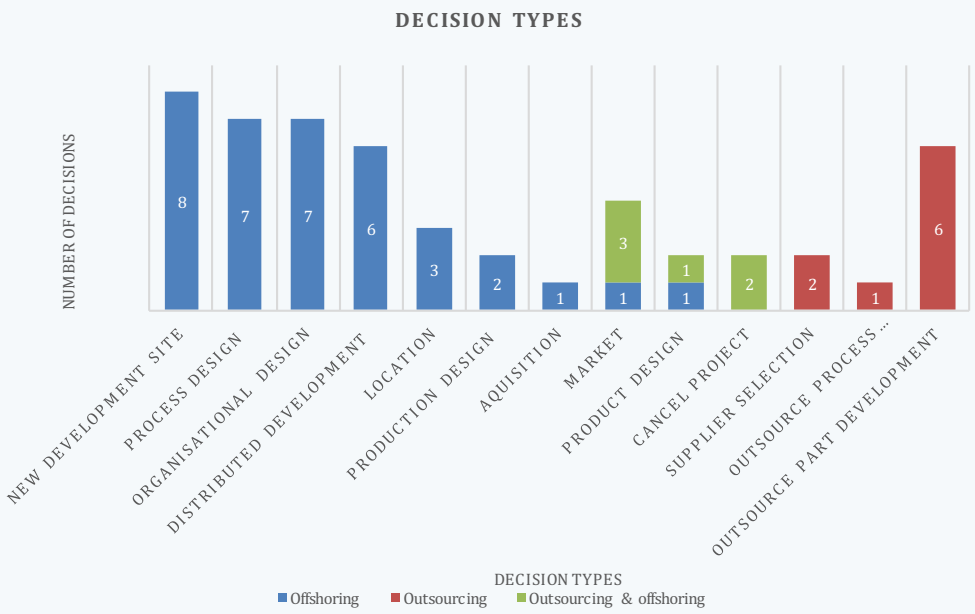


Figure 2: decision types according to offshoring and outsourcing [Søndergaard and Ahmed-Kristensen, 2016]

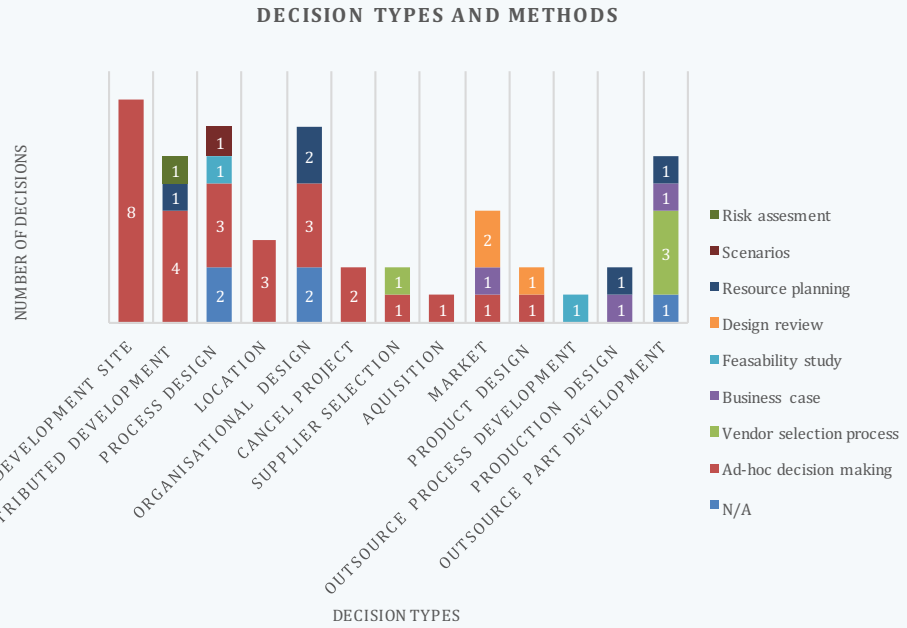


Figure 3: decision types and methods used [Søndergaard and Ahmed-Kristensen, 2016]

An example of this decision process is illustrated in Figure 4 where the company observed took the decision to establish an R&D facility in Malaysia to reduce development time and costs.

Key takeaways

Effective decision making processes rely heavily on the input and analysis of information. The applcation of appropriate methods can reduce uncertainty when making decisions in GPD. Performance indicators require developing to monitor and measure the operational impacts of the decision.

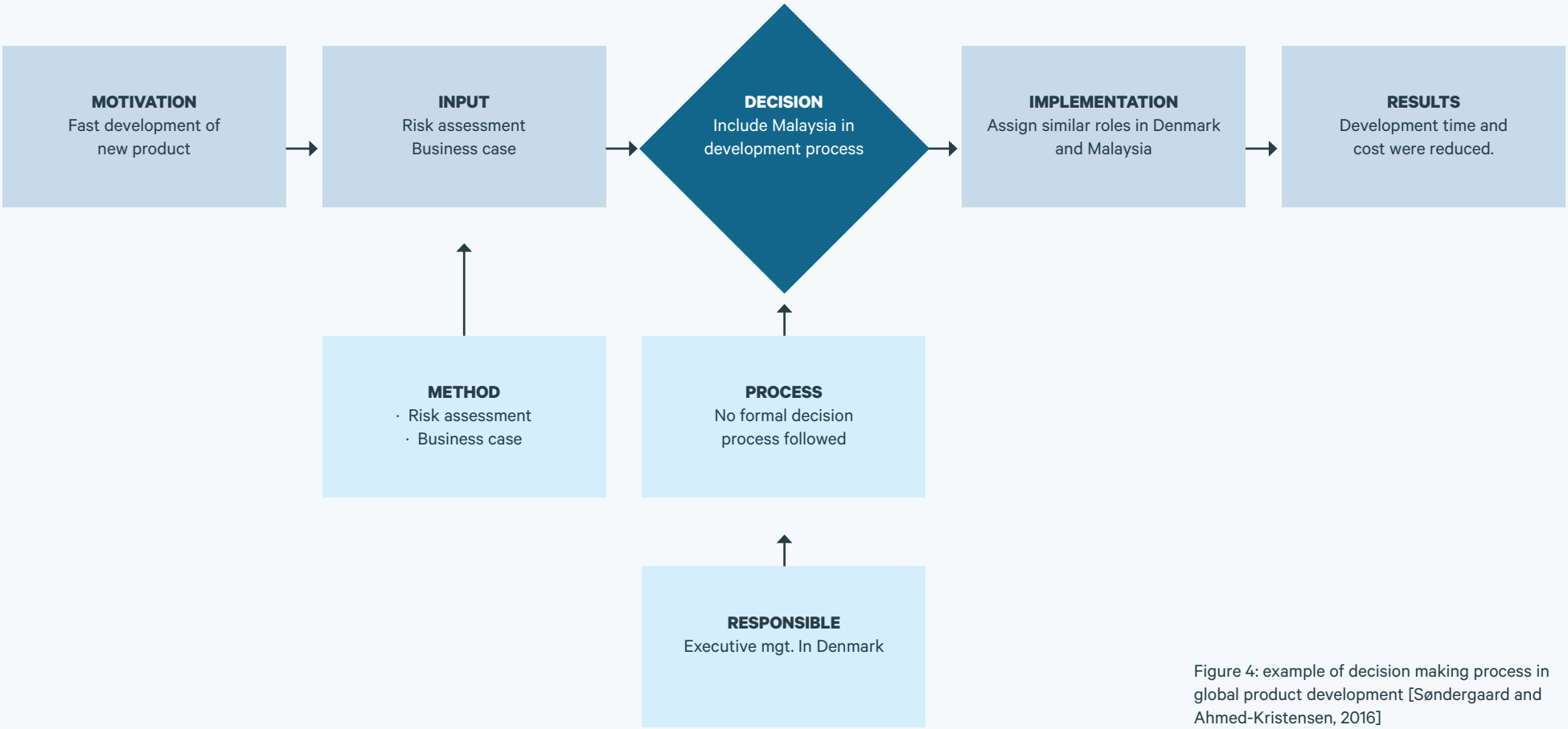


Figure 4: example of decision making process in global product development [Søndergaard and Ahmed-Kristensen, 2016]

Performance measurement

Performance measurement is a practical method to support decision making and drive the implementation of strategic objectives.

Central to performance measurement is the development and application of performance indicators, which are quantifiable metrics that help a company measure the success of critical factors.

Figure 5 illustrates two types of indicators important for successful performance measurement, namely:

- **Preventive indicators** that monitor factors influencing success and allow the avoidance of deviations (predictive).
- **Outcome indicators** that measure the output of past activity and evaluate what went right/ wrong at the end of the process (retrospective).

Objective:	**To ensure behavioural alignment within the project team**
Outcome indicator:	No. of met design specifications
Preventive indicator:	Internal design expert feedback during early development stages
Objective:	**To increase the availability of information to global partners**
Outcome indicator:	No. of delays due to documentation availability
Preventive indicator:	No. of days for release of documentation from project approval committee

Table 2: examples of outcome and preventive performance indicators used by a large Danish pharmaceutical company during GPD [Taylor and Ahmed-Kristensen 2016]

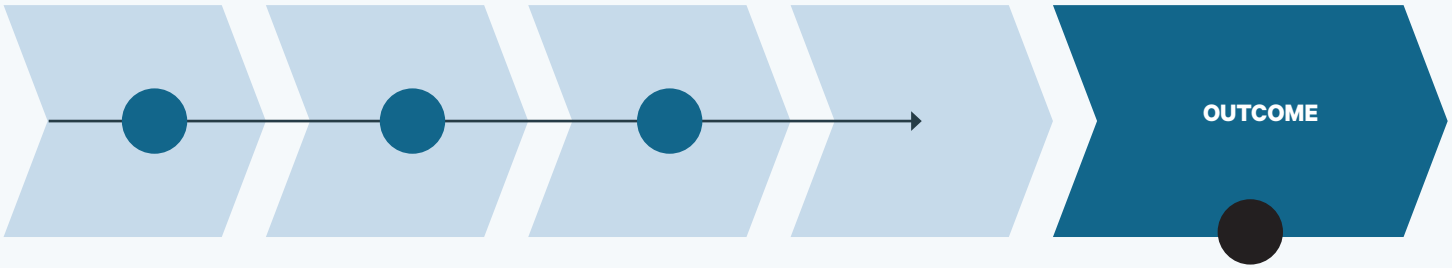


Figure 5: difference between preventive and outcome performance indicators

What are the performance indicators used for GPD?

Based on the results from over 47 multinational Danish companies, Taylor and Ahmed-Kristensen [2016] found that performance indicators commonly used for local, cross-functional product development were also used for GPD.

The most common performance indicators could be grouped according to three performance dimensions, namely: time; cost; and quality (Figure 6). Although these indicators are important, their practicality in GPD has been criticised as they are static in nature and often fail to provide the predictive insight necessary to avoid deviations along a process.

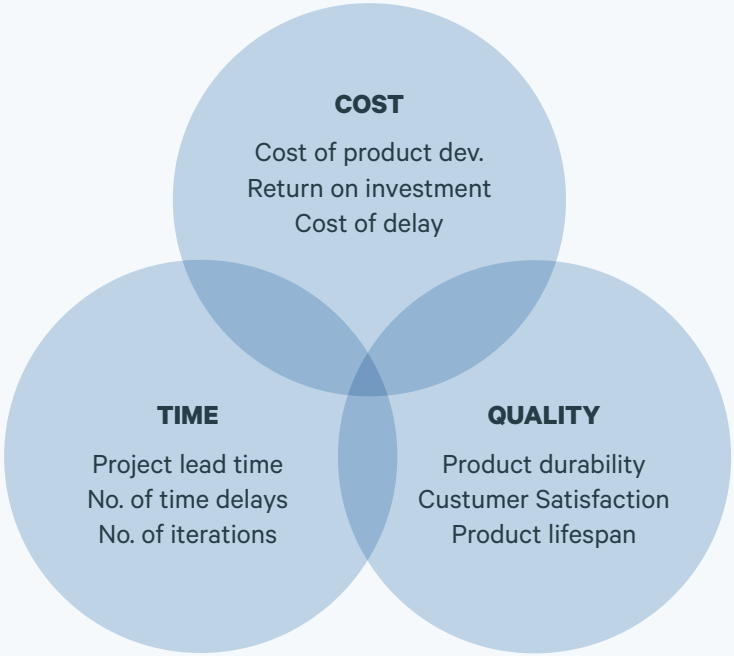


Figure 6: the most common performance indicators used in GPD categorised according to the performance dimensions time, cost and quality

For example, Figure 7 illustrates the usage of performance indicators in relation to identified risks in a large danish manufacturing company. Here, the misalignment of interests within the GPD project team was identified as a key risk that could influence project success.

However, the performance indicator ”adherence to project schedule” was only measured at the end of the concept development stage, at which point a misalignment of interests had already occured and hence, the performance indicator was insufficient to avoid the subsequent project time delays caused by the risk.

Performance indicators that fall within the three dimensions time, cost and quality often result in the development of outcome indicators. For successful performance measurement in GPD, management must change this mindset and focus on developing performance indicators that also monitor key challenges.

Key takeaways

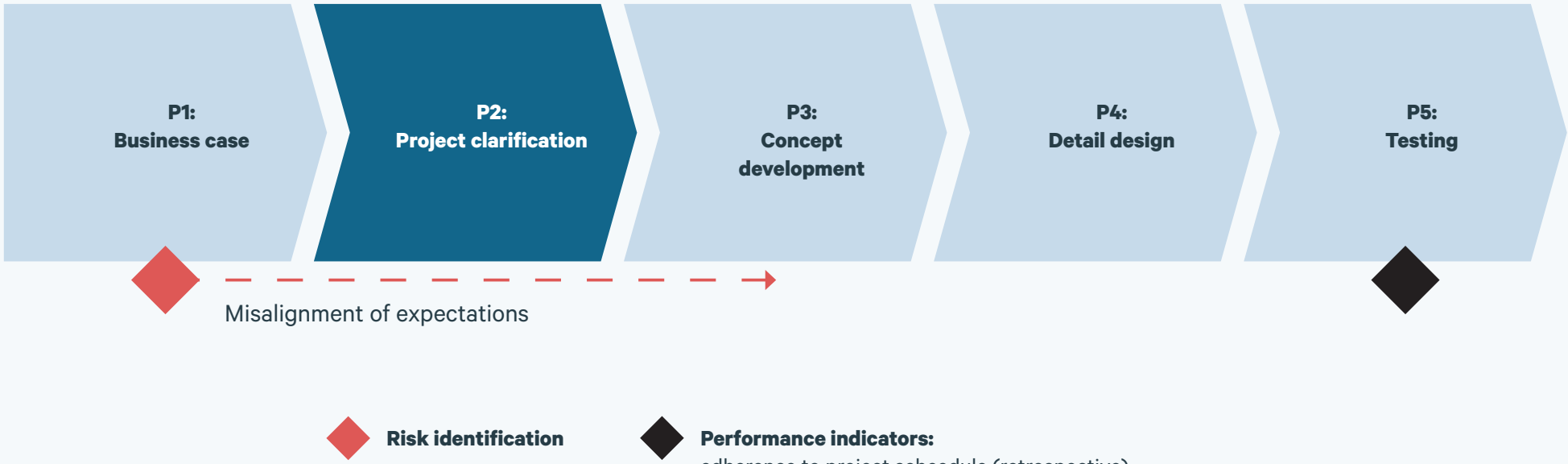
The current mindset for developing performance indicators in GPD must change to support the avoidance of key challenges.

Developing outcome indicators alone is innadequatte to avoid key challenges that influence the success of GPD.

Preventive indicators provide the predictive insight necessary to avoid deviations along the process.

> *Our focus is not on KPIs that measure an outcome e.g. missed deadlines, rather we want to focus on setting up KPIs that prevent us from missing deadlines, and hence, drive performance.*
>
> Tommy Bysted,
> Director of Global Product Management, Otometrics

Figure 7: example of performance measurement in global product development [Taylor and Ahmed-Kristensen 2016]



The strategic decision making and performance measurement process

The fundamental challenges companies face when pursuing GPD can be summarised as follows:

1. Ad-hoc decision making can be costly but difficult to avoid in an environment where information and experience is not readily available.

2. Traditional procedures for managing collocated product development are insufficient in supporting to operationalise GPD.

The strategic decision making and performance measurement process (Figure 8) is a ten stage approach designed to support management to overcome the challenges with GPD at both the strategic and operational level by incorporating experience of best practice from industry.

The process is supported with over 50 facilitation cards that provide examples of best practice from multinational Danish companies currently involved with GPD.

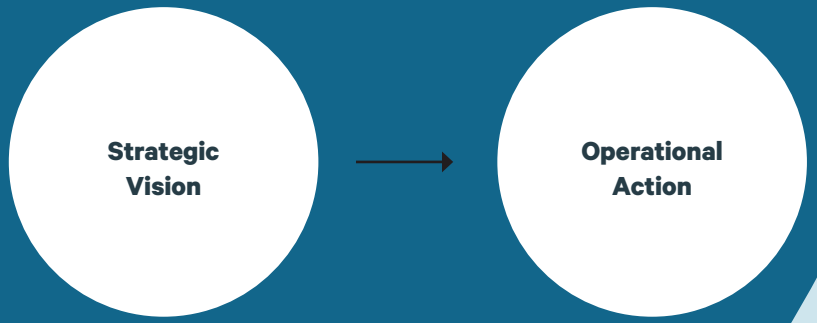
Process Aim

To support management when making decisions in relation to outsourcing and offshoring development activities, and to translate these decisions into measurable action at the operational level in GPD.

The ten stage process is implemented during a one day, faciltiated workshop at the company.

Why use this process?

- The process operates independently and does not require changes to exitsing company infrastruture.
- The process was developed in collaboration with over 60 multinational companies and includes best practice examples to support the process.
- Practical application in the business environment was fundemental to the design of the process.



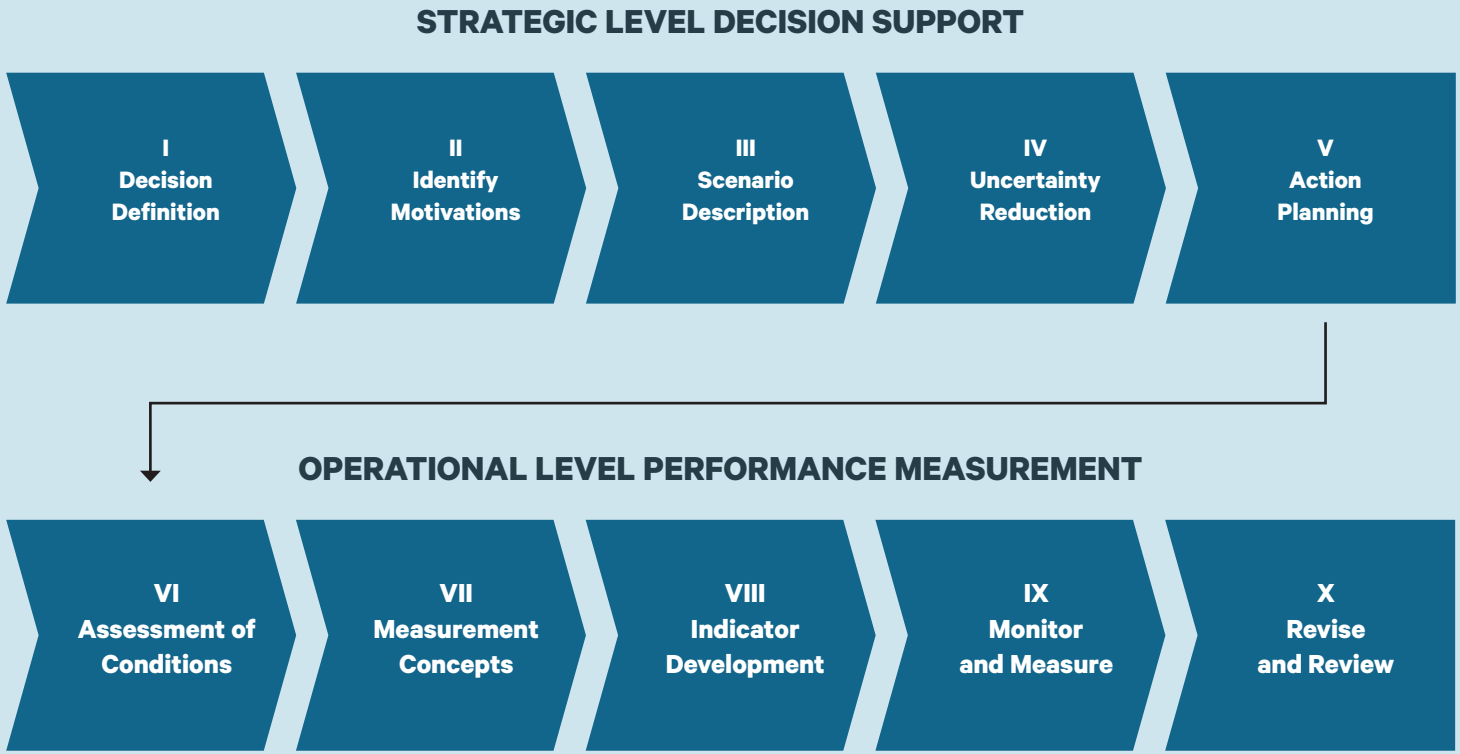


Figure 8: The strategic decision making and performance measurement process

(I) Decision Definition
Aim: Define the global product development issue that requires investigating.
Why: Supports to frame the decision process at an early stage and gain buy-in from key stakeholders to be involved in the decision process.

(II) Identify Motivations
Aim: Identify and prioritise the key motivations for the decision.
Why: Supports in identifying both direct and indirect benefits for the company and defines expected outcomes as a result of the decision.

(III) Scenario Descriptions
Aim: Outline both positve and negative scenarios as a result of the decision.
Why: Supports to identify uncertainty and prepare management for the potential consequences of the decision.

(IV): Uncertainty Reduction
Aim: Identify key challenges and methods to support decision implementation.
Why: Supports the identification of key risks that influence success towards expected outcomes and identifies methods to support different decision types.

(V): Action Planning
Aim: Document process and identify responsible for decision implementation.
Why: Supports decision process traceability and provides important information to support the development of performance indicators.

Who should participate?
Top management e.g. CEO's, departmental directors
Middle management e.g. program/ project management

(VI): Assessment of Conditions
Aim: Determine the performance measurement maturity level at the company.
Why: Determines the starting point in the following five stages and supports to modularise the process where necessary.

(VII): Measurement Concepts
Aim: Develop understanding of the purpose for performance measurement.
Why: Supports to gain buy-in and develop commitment towards using performance indicators.

(VIII): Indicator Development
Aim: Identify critical factors for the achievement of objectives.
Why: Supports to identify: project outcomes; key risk factors that influence these outcomes; and the development of action plans to drive performance.

(IX): Monitor and Measure
Aim: Develop and document preventive and outcome performance indicators.
Why: Supports the visualisation and reporting of indicators to drive implementation of actions and measure the impact of desirable outcomes.

(X): Revise and Review
Aim: To ensure indicators change as circumstances change.
Why: Supports an environment of continuous improvement and organisational learning.

Who should participate?
Middle management i.e. program management, project managers
Global product development project team

Selecting a facilitator

The ten stage process requires a facilitator to guide the management team and additional supporting staff during the one day workshop. External facilitation is recommended for initial process implementation (refer to www.globalpdtools.com for external facilitators).

Alternatively, a facilitator can be selected internally at the company. In this scenario, it is critical that the facilitator understands the fundamental purpose of each stage in the process. A structured presentation for the one day workshop and facilitation cards to support implementation can be downloaded from:

www.globalpdtools.com

Important to remember

You can't walk into a company with a predefined decision for GPD and a set of performance indicators to measure the impact of this decision. However, you can structure existing knowledge and experience at the company to support decision implementation and the development of purposeful performance indicators.

Tips

- The facilitator needs to be seen as impartial and non-threatening to other participants.
- The facilitator should act as a repository for the information produced at each of the stages in the process, both during and after the one day workshop.
- The process is designed to help structure existing knowledge and perceptions and it is essential for input to come from all participants.

Stage I · **Decision Definition**

- **AIM:**
  Define the GPD issue that requires investigating.

- **WHAT IS NEEDED:**

Decision cards

- **OUTCOME:**
  Decision identified and defined.
  Key stakeholders, initial issues and action points outlined.

- **HOW:**
  The facilitator utilises the completed decision cards to exemplify how participants should define the issue to be addressed. This can be completed with a round the table discussion, with the faciltator playing a key role to ensure all issues are included in the decision card.

Important to remember

Involving directors from R&D, production, finance, sales, etc. supports to identify key issues for the decision at an early stage from different perspectives.

DECISION

ID:	
DESCRIPTION:	*Establish an offshore R&D function in low cost region with skilled engineers.*
MOTIVATION:	*Reduce costs – free up time of Danish engineers to work on more complex tasks*
STAKEHOLDERS:	- *CEO* - *Vice presidents* - *Production facility manager* - *Project mgt. office* - *Local representative*
KEY CONSIDERATIONS:	- *Maintaining quality level* - *Coordination of distributed teams* - *Transfer of knowledge* - *Governance at global site*
ACTION POINTS:	- *Segregation of activities and resources* - *Digitalisation of procedures*

20 MIN

Stage II · **Identify Motivations**

- **AIM:**
  Identify and prioritise the key motivations for the decision.

- **WHAT IS NEEDED:**

Motivation cards

- **OUTCOME:**
  A prioritised list of key motivations driving the decision are identified.

- **HOW:**
  Participants use the company case examples on the motivation cards as inspiration to support identify additional motivations than those identified during the previous stage. List and prioritise the identified motivations according to their level of importance for the decision. Vote for the motivations considered most important for the decision and count the votes to determine the order of priority i.e. the highest count = most important.

Tips

- If necessary, use a pareto chart to support the prioritisation of motivations.
- Consider the more unexpected drivers, such as those illustrated to the right, to ensure potential opportunities are identified.

MOTIVATION

DEVELOPMENTCLOSER TO PRODUCTION

"We already had a production site and we needed closer collaboration between development and production"

Case example

Over the last ten years, Company A has moved all production activities to sites in China, while product development activities have remained in Denmark. As a result, knowledge transfer between engineers in Denmark and production staff in China has resulted in time delays during new product development projects. To improve knowledge transfer, the company set up development teams in China that are involved in new product development projects from project kick-off.

> *Including the Indian engineers during product development activities provided us with local knowledge of the Indian market; a key area targeted for increased market share by the company.*
>
> Flemming Knudsen, Sales Director,
> Novenco Marine & Offshore

MOTIVATION

RISK REDUCTION

"By doing this, we can significantly lower our risk"

"Having an external supplier for these tasks takes the risk off our table"

Case example

Company A was looking to develop a radically new product within their product portfolio. Although the rewards of developing the product were considered to be high; the risk of project failure was also high. Therefore, the company took the decision to offshore all product development activities to a low cost region in China, where they could take advantage of highly skilled engineers at a low cost and hence, reduce the financial impact on the company if the project were to fail.

Important to remember

Although cost reductions are often stated as the most common motivation for GPD, less tangible benefits such as operational flexibility, risk reduction or gaining access to new competencies provide fruitful rewards.

30 MIN

Stage III · **Scenario Descriptions**

- **AIM:**
  Outline both positve and negative scenarios as a result of the decision.

- **WHAT IS NEEDED:**

Scenario cards

- **OUTCOME:**
  Potential scenarios as a result of the decision are mapped.
  Positive and negative consequences of the decision are considered.

- **HOW:**
  Participants describe possible scenarios as a result of the decision in relation to the product, process and organisation as a whole. Use the company case examples on the scenario cards for inspiration to develop possible scenarios.

Tips

– Consider both positve and negative consequences of the decision.

SCENARIO

COLLOCATION OF GLOBAL DEVELOPMENT TEAM

"Being collocated really helped to develop a feeling of project ownership at the Polish R&D, in particular during the earlier stages of the project"

Case example

In a collaborative product development project, between an offshored R&D facility in Poland and the HQ in Denmark, Company X decided to collocate the engineers at both locations during several key milestones. The project followed a typical stage-gate model, with key elements incorporated from agile development processes, and the development team were collocated during project "sprint" meetings. This supported to align expectations within the project team and quickly overcome logistical obstacles in relation to the geographical dispersion of the engineers. Furthermore, the collocation supported in developing commitment and project ownership, in particular among the Polish engineers.

> *Forecasting scenarios helps better plan for the inevitable change management process that follows the decision to offshore development activities.*
>
> Morten Senniksen, Program manager, Cobham SATCOM

Important to remember

Early consideration towards both positive and negative consequences of the decision plays a critical role in supporting the development of strategic action plans.

SCENARIO

TASK COMPLEXITY

"There have been some difficulties as tasks that I would consider, well... simple, were not being completed on time"

"What we found was that some of the engineers here in Denmark would actually rather do the tasks themselves rather than sending it to India"

Case example

Company X established an offshore R&D facility in India with the motivation to reduce development costs. However, the company encountered difficulties with the collaboration as a number of tasks, such as the conversion of old product drawings to computer-aided design systems that were considered routine in nature, were neither completed on time nor to the desired quality by the Indian engineers. The lack of motivation of the skilled Indian engineers to work on routine tasks was considered a key contributing factor to the difficulties.

30 MIN

Stage IV · **Uncertainty Reduction**

- **AIM:**
  Identify key challenges and methods to support decision implementation.

- **WHAT IS NEEDED:**

Challenge and Method cards

- **OUTCOME:**
  Key challenges as a result of the decision identified and prioritised. Methods to overcome the challenges planned.

- **HOW:**
  Participants use the company case examples on the challenge cards as inspiration to support identify key challenges with GPD. Similar to Stage II when identifying motivations, the challenges are listed in order of the their prioirty by participants.

  Using the method cards as inspiration, the participants identify key methods to support overcome challenges identified previously. The method cards are developed based on practice for overcoming the challenges in Danish companies.

Tips

- If necessary, use a pareto chart to support the prioritisation of challenges.

CHALLENGE

DOCUMENTATION

"By working in global teams, there was a need for much more detailed documentation of everything"

"We had to transfer all our old drawings to digital format to ensure they were accessible for our global development team in India"

Will this challenge apply? How can it be addressed?

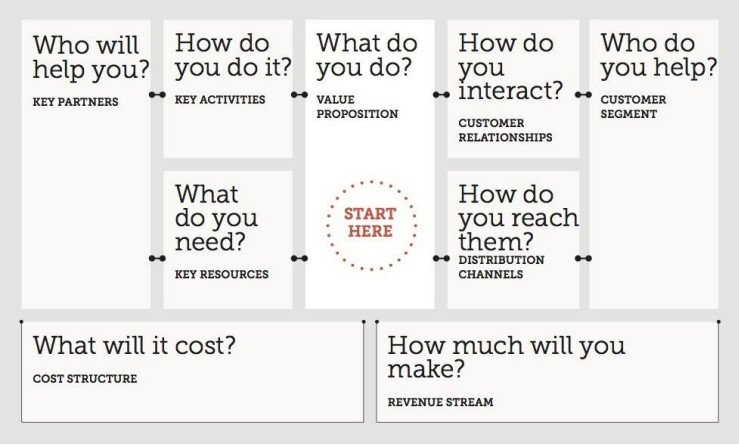
YES

NO

METHOD

Business model

"We made a business model to evaluate before making the final decision"



Source: https://www.linkedin.com/pulse/using-business-model-canvas-brainstorm-your-plan-vidhan-rana

Important to remember

Consider the most critical challenges i.e. those that are likely to have the biggest influence towards the overall objectives of GPD. Identify a key responsible for driving method implementation and maintenance.

30 MIN

Stage V · **Action Planning**

- **AIM:**
  Document process and identify responsible for decision implementation

- **WHAT IS NEEDED:**

Action cards

- **OUTCOME:**
  Actions/ projects to support decision implementation.
  Key objectives and success criteria to support indicator development.

- **HOW:**
  The facilitator supports to document main objectives, key actions, and success criteria for the decision based on the previous completed stages. The time frame, resources required and main responsible for driving the actions as a result of the decision is identified.

Action plan

Objectives	Action	Success criteria	Time frame	Resources	Responsible
What are the overall goals for the decision	*What needs to be done to achieve the goals*	*How will you identify your success*	*When do the actions need to be completed*	*What or who can help you complete the action*	*Who is responsible for driving implementation*

Tips

- Utilise the information output from the previous stages to support in completing the action plan.
- Setting success criteria is an important step to determine the development of performance indicators.

Important to remember

The accuracy of the documented input at Stage V is important in determining performance indicators, which support to drive the operationalisation of GPD activities.

30 MIN

Stage VI · **Assessment of Conditions**

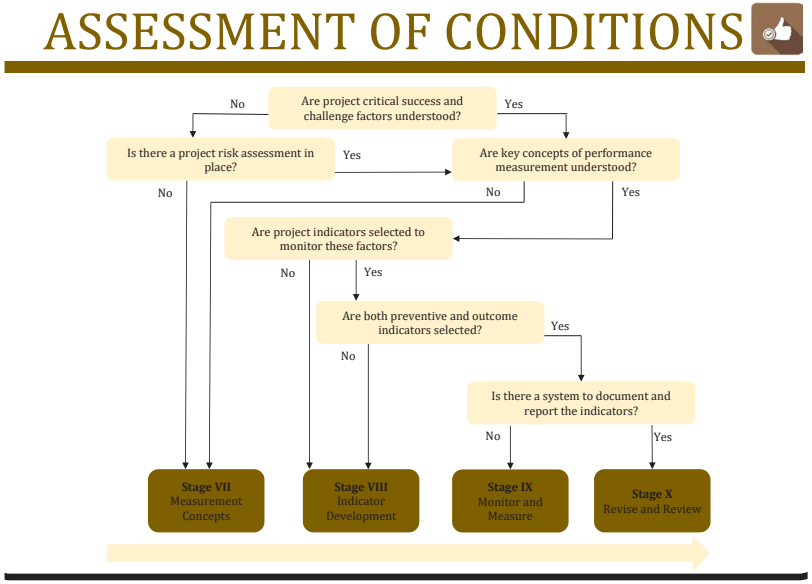
- **AIM:**
  Determine the performance measurement maturity level at the company.

- **WHAT IS NEEDED:**

  Assessment of Condition card

- **OUTCOME:**
  Understanding of performance measurement maturity in project team.
  Entry position for the following five stages identified.

- **HOW:**
  The facilitator guides participants through the assessment of conditions model illustrated to the right. For example, if the participants have a deep understanding of performance measurement concepts the facilitator moves directly to Stage VIII. Each of the stages can be held as stand alone stages, dependent on the maturity of developing performance indicators at the company.



Tips

Consider the following questions to support in assessing the performance measurement maturity at the company:

- Are our current performance indicators aligned with the strategic objectives identified in Stage V?
- Do our current performance indicators drive performance and the implementation of GPD activities?

> *We already have a deep understanding of performance indicators so the measurement concept stage can be skipped. However, the steps followed at the indicator development stage can be useful to align expectations across multiple project stakeholders.*

Jakob Spangberg,
Product Development Process Expert, Danfoss

Important to remember

The operational level performance measurement process can be modularised to support the needs of the individual company.

(VI) Assessment of Conditions
(VII) Measurement Concepts
(VIII) Indicator Development
(IX) Monitor and Measure
(X) Revise and Review

20 MIN

Stage VII · **Measurement Concepts**

- **AIM:**
  Develop understanding of the purpose for perfomance measurement.

- **WHAT IS NEEDED:**

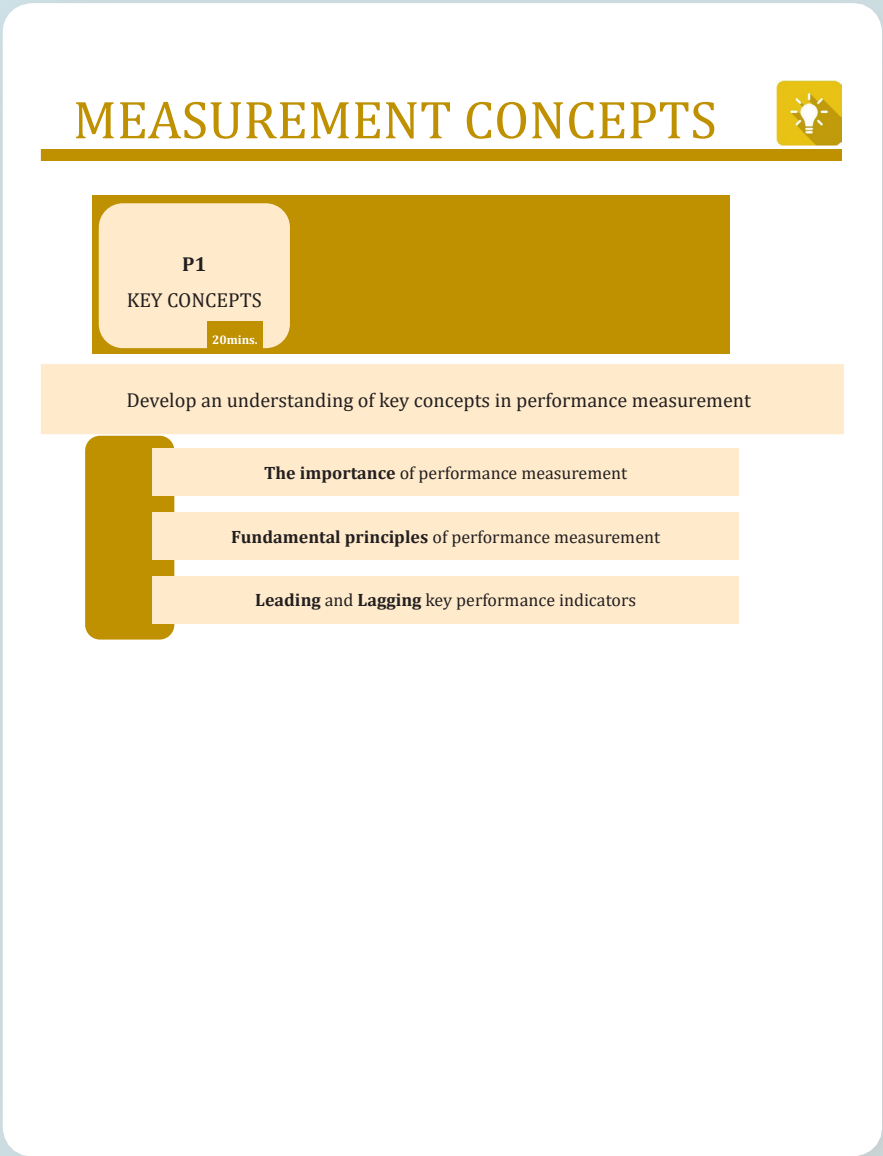
Measurement Concepts presentation

- **OUTCOME:**
  Understanding of purpose for performance measurement in project team.
  Commitment towards using indicators in project team.

- **HOW:**
  The facilator develops understanding towards key concepts of performance measurement by delivering the presentation specific for Stage VII. The presentation focuses on the importance of performance measurement, fundamental principles of performance measurement and the difference between preventive and outcome indicators.

Tips

Use the examples provided on page 31 to support develop understanding towards the difference between preventive and outcome indicators.



> *Completing the measurement concepts stage helped justify the time spent on defining indicators and provided a greater understanding of key concepts such as outcome and preventive indicators.*

Torbjørn Ærenlund, Director of Product Management, Novenco Marine & Offshore

Objective:	**To ensure behavioural alignment within the project team**
Outcome indicator:	No. of met design specifications
Preventive indicator:	Internal design expert feedback during early development stages
Objective:	**To increase the availability of information to global partners**
Outcome indicator:	No. of delays due to documentation availability
Preventive indicator:	No. of days for release of documentation from project approval committee
Objective:	**To improve the KPI Development Workshop**
Outcome indicator:	Customer satisfaction with pre-defined evaluation forms
Preventive indicator:	Customer awareness during the workshop (providing opportunity to adjust the workshop)

Important to remember

Understanding key performance measurement concepts supports to understand the purpose of measurement and hence, increases the level of commintment towards using the performance indicators developed.

20 MIN

Stage VIII · **Indicator Development**

- **AIM:**
  Identify critical factors for the achievement of objectives.

- **WHAT IS NEEDED:**

Key outcomes

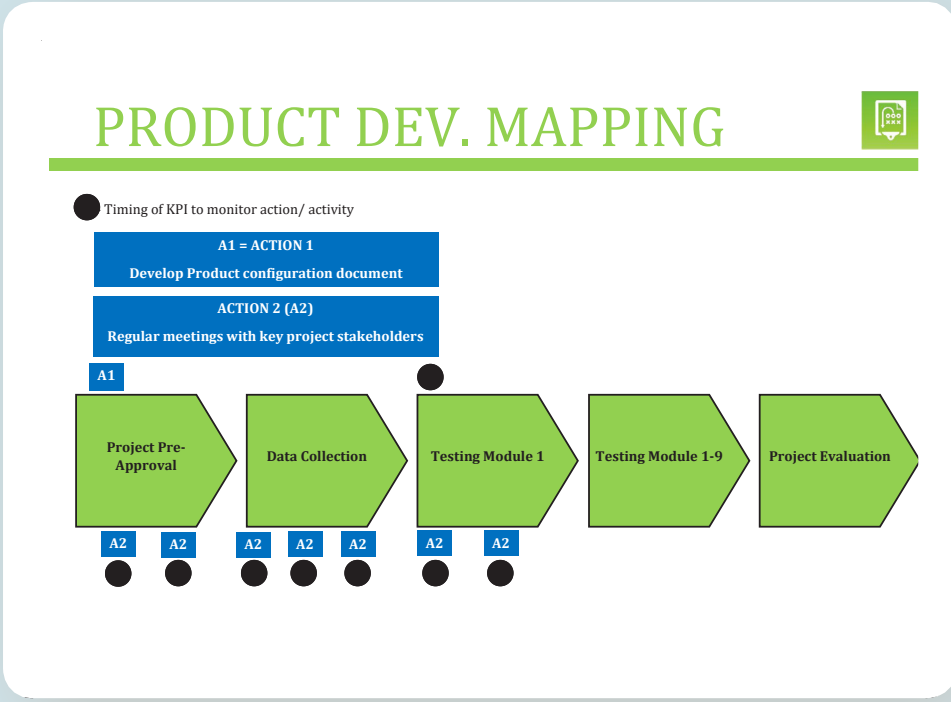
Key influences

FishBone

PD mapping cards

- **OUTCOME:**
  Cause-effect relationship between critical outcomes and key risks identified.
  Action plans to drive performance mapped to product development plan.

- **HOW:**
  Using the cause-effect Fishbone diagram, the participants identify and prioritise: critical outcomes for GPD project success (e.g. product delivered on time, at the right cost, to the desired quality); and risks that influence success towards this outcome (e.g. documentation, cultural differences, etc.). Activities to avoid the influence on success and achieve the desired outcome are planned and mapped to the product development plan at the company (page 32). Based on these activities, it will be possible to identify initial performance indicators to drive the implementation of the activities, and measure the success towards desirable outcomes.



Tips

- The project manager should take a lead role during Stage VIII to ensure key project outcomes and risks are prioritised adequately.
- Project outcomes should be derived from the strategic motivations for GPD (refer to Stage II).
- Project risks should be derived from the strategic challenges for GPD (refer to Stage IV).

> *This stage not only supported the initial development of performance indicators, but also supported to align the interests and expectations of colleagues from several different functions.*

Flemming Knudsen,
Sales Director, Novenco Marine & Offshore

Important to remember

Proactively understanding key cause-effect relationships between: (1) desirable outcomes for the GPD project; and (2) key risks that influence success towards these outcomes is an important step to support the development of necessary precautionary strategies to better manage global product development projects.

60 MIN

Stage IX · **Monitor and Measure**

- **AIM:**
  Develop and document preventive and outcome performance indicators
- **WHAT IS NEEDED:**

Indicator Template

Visualisation Board

- **OUTCOME:**
  Indicators mapped to criteria in the indicator template.
  Indicators mapped to the visualisation board for monitoring.
- **HOW:**
  The facilitator supports the project manager to complete the performance indicator template, utilising the example templates completed by previous company cases. Once completed, the developed performance indicators are recorded on the Visualisation board for simple monitoring. Examples from previous company cases provide inspiration towards how the developed performance indicators can be visualised. The visualisation board should be accessible (either digitally or physically) to all members of the GPD team. The project manager is responsible for recording key challenges encountered, proposed solutions, key achievements and next steps throughout project completion on the visualisation board.

Tips

Identifying minimum and maximum targets can support to quantify the performance indicators.

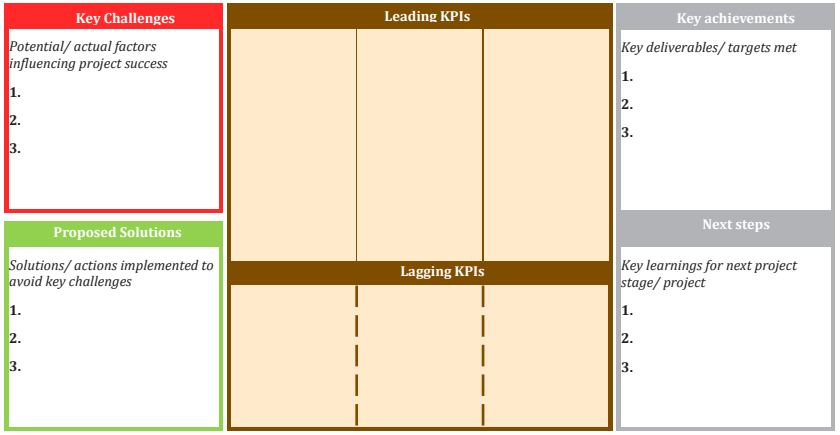
INDICATOR TEMPLATE

Key Performance Indicator:	*Name of the KPI*
Purpose	*Rational underlying the KPI*
Strategic action plan	*Strategic action plan to which the KPI relates to*
Critical influence factor	*Critical influence factor to which the KPI relates to*
Desired outcome	*Desired outcome to which the KPI relates to*
Leading/ Lagging	*Classification of the KPI according to Leading and Lagging concepts*
Responsible	*Main responsible for collecting and reporting the data*
Calculation (%of, #of, $of, ...)	*Formula for measuring the KPI*
Forcasted target (weekly/ monthly)	*Minimum target to which performance should not fall below*
Maximum target (weekly/ monthly)	*Maximum target (if necessary) to which performance should not exceed*
Measurement frequency	*Frequency performance should be recorded and reported*
Product development stage	*Stage in product development process the KPI is measured*
Data source	*Source where the raw data is to be collected*
Notes and comments:	

> *Completing the performance indicator template supported to cleraly identify the purpose for the indicator, and highlighted initial steps towards how the indicators could be operationalised.*

Morten Senniksen,
Program manager, Cobham SATCOM

Visualisation board



Important to remember

It is critical the developed performance indicators are documented and visualised in an understandable format to ensure the indicators are used as a communicative tool, both internal and external from the GPD project.

Stage X · **Revise and Review**

- **AIM:**
  To ensure indicators change as circumstances change

- **WHAT IS NEEDED:**
  Download facilitation cards from Stage VIII onwards.

- **OUTCOME:**
  Decision to revise or retain performance indicators for the project.

- **HOW:**
  As the GPD project progresses, the key factors influencing success may alter. Therefore, the facilitator should plan to revisit the strategic decision making and performance measurement process at Stage VIII to ensure the performance indicators change as circumstances change.

Tips

An important stage to plan for revising the process is at the end of key milestones in the project, where tasks and activities are altered and new deliverables are set.

> *Successful performance indicators are not static, rather they change as circumstances change.*

Tommy Bysted,
Director of Global Product Management, Otometrics

Important to remember

Understanding the key factors influencing success at the different stages of GPD is critical to ensure accurate performance indicators are established and maintained throughout.

(VI) Assessment of Conditions
(VII) Measurement Concepts
(VIII) Indicator Development
(IX) Monitor and Measure
(X) Revise and Review

Research underlying the frameworks produced in this project.

T, Taylor and S, Ahmed-Kristensen “Global product development projects: Measuring performance and monitoring the risks” in Journal of Production Planning and Control

Søndergaard, E., Ahmed-Kristensen, S. (2016). Developing a support tool for global product development. The 14th International Design Conference – DESIGN, 2016, Dubrovnik, Croatia.

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Useful Literature

Articles

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Citroen, C.L. (2011). The role of information in strategic decision making. International Journal of Information Management 31(6): 493-501.

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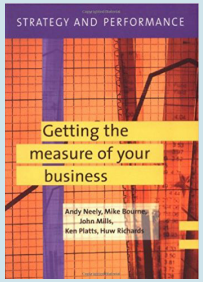

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For more information please visit our website at:
www.globalpdtools.com

This guide provides management with a practical toolkit to overcome the many obstacles and maximise potential opportunities in the pursuit for successful global product development. The guide is based on the knowledge and experience of managers from over 60 multinational Danish companies.

The Strategic Decision-Making and Performance Measurement Process supports management when making decisions in relation to outsourcing and offshoring development activities, and supports to translate these decisions into measurable action at the operational level in global product development.

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