

# *Product Portfolio Management Strategic Targets and KPIs over Life-Cycle: A Case Study in Telecommunications Business*

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Product portfolio management (PPM) should define, which products to develop, sell, deliver, maintain, and remove based on company's strategic targets. Aligning the product portfolio with business strategy is, however, seen challenging. Hence, an approach for PPM target setting over life-cycle is needed. A single-case study was conducted to examine the relationship between product portfolio management and business strategy to propose a practical approach for defining product portfolio management strategic targets and key performance indicators over life-cycle. The main results include proposing PPM target setting to cover horizontally all product life-cycle phases and vertically the product structure, including both commercial and technical aspects. PPM strategic targets and key performance indicators over life-cycle through four success factors are proposed. In addition, a new tool for product portfolio analysis is introduced. The study contributes to the previous studies on aligning product portfolio management with business strategy by providing a practical example.

*Key Words:* product portfolio management, performance management, strategic management, product life-cycle management

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## **Introduction**

Business strategy aims to create a fit between different organisational activities. However, the difference between strategic endeavour and actual performance is often originated due to communication disconnection between strategy creation and its execution (Porter 1996). A magnificent

strategy does not matter, if it cannot be further transformed into required operational activities and related performance targets. The fit can only be achieved, if the strategy is successfully translated into objectives and measures that can be distinctly communicated for organization's members. Progress should be measured, since otherwise it cannot be managed or improved (Kaplan and Norton 2008).

Sustainable economic prosperity is attempted to be achieved by offering more choices for customers (ElMaraghy et al. 2013). Consequently, product portfolio of a company can be considered as one of the most important factors while seeking competitiveness and business success (Tolonen 2016). In general, product portfolio is considered as a collection of products, which is constructed in a way that fits the organisation and its objectives (Haines 2014). The products can consist of hardware (HW), software (SW), services or documentation items (Kropsu-Vehkaperä and Haapasalo 2011). The product portfolio should reflect the strategy of the company, and it should be managed adequately to achieve the strategic business targets via the products (Cooper, Edgett, and Kleinschmidt 2001; Haines 2014). Product portfolio management (PPM) should define, which products are being developed, sold, delivered, maintained, and removed based on the strategic targets. However, the current focus in product portfolio management is mostly on new product development, and it does not adequately cover the entire product life-cycle. The situation can be seen to lead to slow product portfolio renewal, which may further cause product portfolio explosion and cannibalisation between the products (Tolonen, Shahmarichatghieh et al. 2015).

Previous studies emphasise the connection between business strategy and portfolio management (e.g. Cooper, Edgett, and Kleinschmidt 1997; Meskendahl 2010; Müller, Martinsuo, and Blomquist 2008). Responsibility over portfolio level decision-making should cover the whole organisation, and information from single product level to portfolio level should be communicated. Individual opinions should not guide the decisions, but decisions should be based on business strategy (Müller, Martinsuo, and Blomquist 2008). Aligning the product portfolio with business strategy, finding the balance for the portfolio, and achieving business targets are, however, experienced challenging (Cooper, Edgett, and Kleinschmidt 2001). It appears that the role of product portfolio management as a strategic decision-making process is not widely understood in companies. Consequently, business strategies have not been connected successfully with PPM strategic targets and their monitoring. Thus, a holistic approach for target setting, covering the entire product life-cycle and

both new and existing products is required (Tolonen, Kropsu-Vehkapera, and Haapasalo 2014). This study examines the relationship between product portfolio management and business strategy. The study is conducted by analysing the existing literature and relevant practices in a company that is a market leader in its industry. Also, a case-specific approach is proposed to create a connection between business strategy and PPM strategic targets and key performance indicators.

This said, the following research question can be set for the study:

RQ *How should product portfolio management strategic targets and key performance indicators be defined?*

## Literature Review

### PRODUCT PORTFOLIO MANAGEMENT

Existing literature emphasises the role of portfolio management and its connection to company business strategy (e.g. Cooper, Edgett, and Kleinschmidt 1997; 1999, 2001; Haines 2014; Müller, Martinsuo, and Blomquist 2008; Meskendahl 2010; Padovani and Carvalho 2016). Also, the significant role of products and product portfolio, and the need for innovations to offer customers more value and options to choose from have been addressed and evidently identified (e.g. O'Reilly and Tushman 2004; El-Maraghy et al. 2013; Tolonen 2016). Still, challenges to align the product portfolio with the business strategy and to create sustainable performance for the product portfolio are being confronted (e.g. Cooper, Edgett, and Kleinschmidt 2001; Tolonen, Kropsu-Vehkapera, and Haapasalo 2014; Tolonen, Harkonen, and Haapasalo 2014; Tolonen, Shahmarichatghieh et al. 2015, Tolonen, Harkonen et al. 2015) Also, problems causing distinction between the strategic targets and reaching those targets has been identified, mainly due to not utilising performance measurements well enough to improve operations (e.g. Porter 1996; Kaplan and Norton 2008).

Companies utilising product portfolio management are seen to have a better chance to improve their business performance (Cooper, Edgett, and Kleinschmidt 1999; Padovani and Carvalho 2016). Portfolio management is seen to improve the competitive position of the business by defining how strategic business objectives are going to be achieved. Portfolio management allows to create a common basis for evaluating products. Then, it is possible to make strategically right decisions and aim for common targets (Cooper, Edgett, and Kleinschmidt 2001). Financial targets guide many companies, when making the most money out of prod-

uct portfolio is under focus. Indeed, product portfolio management is considered as a necessary process in gaining success with the products (Cooper, Edgett, and Kleinschmidt 2001; Tolonen, Kropsu-Vehkapera, and Haapasalo 2014; Haines 2014). To gain success, a product portfolio should be actively developed and renewed to exploit opportunities for new business and additional turnover (Tolonen, Harkonen, and Haapasalo 2014).

Haines (2014) emphasises how PPM should be an ongoing decision-making method to achieve strategic, market, financial and operational balance. It should cover all products and all life-cycle phases in an organisation (Haines 2014). Also, Tolonen, Kropsu-Vehkapera, and Haapasalo (2014a) argue that the current product portfolio should be actively managed instead of merely focusing on the new product development phase. Further, based on Saaksvuori and Immonen (2008), regular inspection and decision-making to remove products should be conducted, since focusing only on introducing new products is not enough.

The decision-making should not base only on financial methods, but also strategic methods are needed. Strategic approaches are seen to help to create a more successful portfolio compared to merely focusing on financial methods (Cooper, Edgett, and Kleinschmidt 2001). Indeed, allocating the available resources for the advancement and fulfilment of strategic objectives can be considered as one of the goals for portfolio management (Kester, Hultink, and Lauche. 2009). Hence, the optimal alignment of portfolio items and only pursuing the projects that are in line with the company business strategy should be desired (Meskendahl 2010). Müller, Martinsuo, and Blomquist (2008) present similar kind of results noting that successful companies in portfolio management prioritise and select the projects in line with business strategy. As Tolonen, Harkonen et al. (2015) propose, the role of PPM as a strategic decision-making process should be defining the products to be developed, marketed, sold, delivered, maintained and removed, based on company's short- and long-term strategic targets. This would allow the role of other business processes to be more purely operational, as they could focus on how to perform needed activities for the products (Tolonen, Harkonen et al. 2015).

#### ALIGNING PRODUCT PORTFOLIO MANAGEMENT WITH BUSINESS STRATEGY

Business strategy aims to create a consistency between the different organisational activities, and thus to combine different activities together.

Strategic fit in all activities is crucial in creating and maintaining the competitive advantage. This consistency across the activities allows communicating the strategy to individuals. Top management should define company's strategic position and create this consistency between activities (Porter 1996). The strategy should be able to answer, what are the strategic customers, markets and technologies, and what is the value proposition that allows the differentiation from competitors. The strategy should also describe the key processes for creating the competitive advantage, the needed human capabilities, and the overall capability of an organisation to implement the strategy (Kaplan and Norton 2008).

In general, based on several studies (e.g. Cooper, Edgett, and Kleinschmidt 1997; 1999; 2001; Tolonen, Shahmarichatghieh et al. 2015), strategic fit, value maximisation and portfolio balance are the key performance focus areas in product portfolio management. Strategic fit ensures the consequence and alignment of the products in the product portfolio based on company's strategic targets (Tolonen, Shahmarichatghieh et al. 2015). Further, the portfolio resource spending differentiation should reflect company's strategic priorities (Cooper, Edgett, and Kleinschmidt 1999). Strategic fit can also be considered as the degree to which the portfolio content reflects the business strategy (Meskendahl 2010). Value maximisation aims the portfolio to include profitable high-value and high-return items with commercial potential (Cooper, Edgett, and Kleinschmidt 1999). Further, portfolio balance seeks to form a portfolio for different capabilities. The portfolio items should consist of both long- and short-term projects, and some of them should have high-risk and some low-risk attributes. The items should be based on different technologies and cover different types of markets (Cooper, Edgett, and Kleinschmidt 1999).

Even though the role of portfolio management and its relation to business strategy is being emphasised, several challenges related to the connection between the business strategy and PPM can be identified in the existing literature. First, complexity of product portfolios itself is considered as a challenge. Wide variety of products in product portfolios is found as a challenge in several studies (e.g. Tolonen, Kropsu-Vehkaperä, and Haapasalo 2014; ElMaraghy et al. 2013; Kropsu-Vehkaperä and Haapasalo. 2011). Also, different operational functions, such as sales, product development and production, may not have a common understanding over the complex product portfolio. To overcome the challenge, a company's product portfolio should be productised vertically into commer-

cial and technical portfolios based on the product structure (Harkonen, Tolonen, and Haapasalo 2017; 2018; Tolonen, Harkonen, and Haapasalo 2014). The motivation is that the more complex company's products are, the more likely it is that the ownerships between the commercial and technical items are not clear. Commercial side of the structure is better known by marketing and sales, describing how customers perceive the company's offering. Technical side is more familiar to product development, manufacturing, purchasing and logistics, allowing gaining understanding about product specific items, and common items between different products and product families.

The actual linking of the product portfolio to strategy, balancing the portfolio and thus trying to achieve set business objectives are often seen challenging at the portfolio level (Cooper, Edgett, and Kleinschmidt 2001). Considering the PPM process, the challenges start from the disconnection between company strategy and PPM strategic targets and their monitoring. Some generic key challenges faced by companies include insufficient understanding of PPM as a concept, and lack of portfolio level business thinking. PPM is mostly seen to cover new product development phase only, where product development activities should be prioritised and executed. Inadequate portfolio level clean-up activities, non-planned product life-cycles and slow product portfolio renewal have led into product portfolio explosion. More products are introduced than are removed, and that has led into cannibalisation between the products weakening their profitability. If visibility over the product portfolio is missing, such a situation may not be confronted (Tolonen, Kropsu-Vehkaperä, and Haapasalo 2014; Tolonen, Harkonen, and Haapasalo 2014).

Different studies (e.g. Müller, Martinsuo, and Blomquist 2008; Cooper, Edgett, and Kleinschmidt 1997; Meskendahl 2010) emphasise the alignment of business strategy and portfolio management, but no specific tools to adequately achieve this connection are presented yet. As stated by Tolonen, Kropsu-Vehkaperä, and Haapasalo (2014), creation of PPM strategic targets and performance measures based on company strategy is one identified precondition for successful PPM process. Performance management framework is proposed as a solution to successfully connect company's strategic targets and portfolio performance focus areas of strategic fit, value maximisation and portfolio balance (Tolonen, Shahmarichatghieh et al. 2015). The framework covers the PPM strategic targets and key performance indicators (KPIs) for the entire product life-

cycle. As a first step, the business strategy objectives should be first created based on relevant mission statement components. For example, David (2010) lists nine components for mission statement: customers, products, markets, technology, concern for survival, philosophy, self-concept, concern for public image and concern for employees. Next, key portfolio performance focus area targets and KPIs for each mission statement component should be defined. The intention is that PPM strategic targets and KPIs cover all three performance focus areas of strategic fit, value maximisation, and portfolio balance.

Further, criteria for different product life-cycle phases should be defined. Therefore, the idea of horizontal product portfolios covering the whole life-cycle should be concerned. Continuous renewal of the product portfolio based on strategic PPM decisions requires a flow of products through different life-cycle phases, when products should also be produced horizontally based on their life-cycle phases. Four horizontal portfolios of NPD, Maintain, Warranty and Archive are proposed, in which the focus of activities is based on requirements from life-cycle phase and business itself. Finally, PPM performance management should be connected to other business processes' strategic targets and KPIs in a specific company-wide performance dashboard (Tolonen, Shahmarichatghieh et al. 2015). Portfolio management practices influence how the portfolio performance is measured (Müller, Martinsuo, and Blomquist 2008). Strategy should be translated into objectives and measures that can be clearly communicated for the organisation. If progress is not measured, it cannot be managed or improved. Therefore, critical success factors and metrics need to be identified. (Kaplan and Norton 2008). Overall, product portfolio performance management should be based on awareness about the products that meet the agreed PPM criteria (Tolonen 2016).

### **Research Process and Case Company Description**

The study was conducted as a single-case study (Yin 2013). Case study research design enables collecting detailed data in real-life context. Generalisability of the conclusions is, however, limited to the boundaries of the case. The research process is presented in table 1. Existing literature was first reviewed to reveal the characteristics of connection between product portfolio management and business strategy. The review provided an overview for both current challenges and utilised methodologies in strategic management of a product portfolio. The review was utilised to create a questionnaire for the company interviews. To recognise chal-

TABLE 1 Research Process

<i>Literature review</i>	Product portfolio management Aligning product portfolio management with business strategy
<i>Current state analysis</i>	Interviews Discussions Company materials
<i>Construction</i>	PPM strategic targets and KPIs Product portfolio analysis tool
<i>Discussion</i>	

lenges in current practices, the company analysis was focused on key aspects influencing the connection between the business strategy and PPM. The aspects included business strategy creation process, product portfolio objectives, and their communication within the organisation. The current PPM practices and utilised performance targets and measurements were addressed. Data for the current state analysis was gathered by the means of semi-structured interviews (Merton, Fiske, and Kendall 1990) and discussions with the case company's CEO, COO and CFO, and by utilising the case company's internal materials. At the beginning of the first session, a short introduction to PPM was given to ensure understanding the context. All the sessions were recorded and later transcribed for a reliable analysis of gathered data. Based on the company analysis and literature review, an approach for defining PPM strategic targets and KPIs was constructed, and a product portfolio analysis tool was introduced.

With a turnover of around 3 million euros, the case company is a market leader in a specific segment within a fast-growing industry, which enabled a good opportunity for the company selection. The company offers customer-tailored high-tech business-to-business solutions based on wireless technologies. Solutions consist of various hardware, software, and service components. Strategic management of product portfolio and related performance management are very relevant considerations for the company due to assorted content of the product portfolio.

## Results

### CURRENT PPM TARGETS AND KPIs

PPM as a strategic decision-making process was not in use, as PPM strategic targets based on the business strategy objectives had not been



defined. Also, the idea of PPM was not fully understood. The strategic product roadmap depicted, what kind of products were going to be introduced in the future based on proposals from the operational level, but the product portfolio was not being analysed in a systematic manner to form objectives for the future. The most important market segments, customers, and products could be named, but they were not systematically analysed to create specific targets for the PPM.

Currently, the product portfolio performance was being evaluated utilising the sales volumes, turnovers, and sales margins for individual products. As such they are very convenient factors for value maximisation targets and KPIs, but currently their use focused mostly on evaluating individual product performance. Since strategic fit and other qualities required for successful product portfolio performance management had not been specified, product portfolio performance covering the identified focus areas of strategic fit, value maximisation, and portfolio balance could not be sufficiently evaluated.

As specific targets for PPM had not been set, aligning the resource spending with strategic targets formed a challenge. The company has a very customer-oriented approach, and the focus of product innovation seemed to be mostly on enhancing current products and creating new products based on the old ones according to internal and external inputs. Totally new products were only being developed, if a specific need was identified in the customer interface. The prioritisation between different ideas and R&D activities was merely based on pure intuition.

#### DEFINING PPM STRATEGIC TARGETS AND KPIs IN GENERAL

PPM strategic targets and KPIs should be based on strategic objectives described in a company vision, mission statement, and values, since they are the highest guidelines for the business strategy. In the end, the products should be understood as tools to fulfil the business needs, to create competitive advantage, and to generate economic value for the company. Different aspects for the product portfolio are to be considered for enabling consistency and overall capability to implement the strategy. The concept is illustrated in table 2.

Strategic fit describes the degree, to which the core capabilities and competences in each presented mission statement aspect reflect the business strategy objectives in PPM. Therefore, the strategic fit target setting is to define, the most important drivers in each aspect to enable the overall capability to fulfil the business strategy objectives via the PPM process.

TABLE 2 Connection between Mission Statement Aspects and PPM Focus Areas

	Strategic fit	Value maximisation	Portfolio balance
Market segments	What are the core	How the core ca-	How the core ca-
Customers	capabilities and	pabilities and com-	pabilities and com-
Products	competences in each	petences in each	petences in each
Technology	aspect that create	aspect should be	aspect should be
Economic success	the overall capability	utilised to maximise	considered to gain
Compet. advantage	for the successful	the value of the	the balance in the
Values	strategy execution	product portfolio?	product portfolio?
Public image	with the company		
Employees	products?		

The resource spending is then to reflect these strategic priorities in all product-related activities. Strategic fit is to be ensured by targeting how the resources are to be allocated for different R&D activities and for different products based on the strategic objectives. Further, a specific KPIs to evaluate the actual resource spending should be set.

Value maximisation drives the product portfolio to include profitable and high-value items. The maximised value can be regarded as a commercial success potential, profitability and generic value for the business. Hence, the value maximisation target setting is to consider, how the core capabilities and competences in each aspect are to be used to maximise the product portfolio value. Based on the current state analysis, turnovers, sales volumes and sales margins were targeted and measured for the sellable products. As soon as PPM strategic priorities have been defined, the value maximisation could be better targeted in different aspects to minimise the portfolio costs and to maximise the portfolio value. For example, the product portfolio profitability should also be considered in market segment and customer dimensions.

Portfolio balance illustrates, how the product portfolio should be formed for different capabilities. It is then to be considered, how the core capabilities and competences in each aspect are seen to affect the product portfolio balance, and how the product portfolio should be seen from different viewpoints to allocate the resources accordingly for proper strategy execution. The current state analysis identified a lack of targets and evaluation for portfolio balance. Therefore, portfolio balance target setting could for example aim for balance between horizontal and vertical product portfolios. Especially the size of these portfolios should be paid attention to, since exposure for product portfolio explosion was identified due to lack of life-cycle planning. Further, product portfolio renewal

could be targeted to back up a long-term competitiveness and sustainability. Accordingly, adequate KPIs for each target to evaluate progress are to be defined.

**DEFINING PPM STRATEGIC TARGETS AND KPIs  
FOR DIFFERENT PRODUCT LIFE-CYCLE PHASES**

The different product life-cycle phases are of different nature and thus require different management focus in terms of product portfolio. PPM strategic targets and KPIs should hence be detailed for each life-cycle based portfolio. The targets and KPIs for both the PPM activities for each portfolio and the transfers from one life-cycle portfolio to another are to be set. NPD portfolio management should focus on renewing the product portfolio for the future by delivering new products according to set targets. Therefore, focus should be on ensuring a long-term economic sustainability with totally new products based on new technologies and new platforms, and with new products based on existing products. Maintain portfolio management should focus on running the PPM process based on the set targets focusing on the strategic products and replacing and ramping down the existing products by new products or more profitable products. Based on the resources allocated for enhancements, the existing products are to be improved and maintained by cost reductions and other minor fixes not visible to the customer.

As soon as a product has been ramped-down due to replacing products, unprofitability or non-strategic fit, it should be taken further to the Warranty product portfolio. The PPM strategic focus on the Warranty portfolio should be to support the removed products based on the set targets and contracts made with customers. A specific end-of-life (EOL) process for the product ramp-down notification was utilised in the analysed company, where possible substitutive products and remaining time for orders and deliveries were communicated to the customers. In the future, the duration of care and support services for the ramped-down products should be defined and communicated accordingly to the customers in EOL notifications. The customer-specific contracts should be considered as special cases. Consequently, no new orders or deliveries for the removed products are to be processed, but the removed products are to be supported according to the defined requirements for spare parts, technical support, service and minor fixes to care the products until their set final removal. Archive is the final life-cycle phase for the products. The products are no more to be cared or supported, but only the product data

is to be stored based on industry-specific legal requirements. As soon as the legal requirements have been fulfilled, the data is to be removed, and the products have then reached their end-of-life.

Since the general target for the product portfolio, based on the horizontal life-cycle phases, is a continuous renewal of the product portfolio and a steady flow of products from NPD to Archive phase, the criteria for Maintain as well as for Warranty should be defined in the PPM strategic targets. As new products are being introduced, the older products must be taken onwards along their life-cycle to avoid the product portfolio explosion and product cannibalisation. Therefore, during the product development, the Maintain portfolio is to be reviewed to define, which of the existing products at the Maintain are possibly replaced and taken further to the Warranty phase. The criteria for Maintain are to be based on new strategic products, and in some cases new supportive products. As the focus of Maintain is to ensure that the existing unprofitable and non-strategic products are removed, the criteria for Warranty are to be based on new replacing products, or non-strategic fit and unprofitability in relation to the set targets and KPIs. For the Archive phase, the criteria are the end-of-support time, or expired contracts made with customers.

#### PPM STRATEGIC TARGETS AND KPIs

Success factors to be considered in the product portfolio performance management include strategic fit, value maximisation, portfolio balance, and portfolio renewal. The PPM strategic targets are to be set to describe, the required outcomes of PPM activities for each success factor to achieve the best product portfolio performance in relation to the business strategy. Further, the progress in relation to the set targets is to be measured, and KPI for each target is to be defined. Table 3 presents formed suggestions for possible PPM strategic targets and KPIs.

The strategic fit targets and related KPIs are suggested to ensure the resource spending reflects the strategic objectives. *Strategic task prioritisation* describes, how the resources should be targeted and measured for different types of R&D activities. Further, *product portfolio focus* illustrates how the outcome of the resource spending should be seen and thus targeted and measured in the share of the sales generated by the products, for which the resources were used.

The value maximisation targets and KPIs are proposed to maximise the performance of individual items in the product portfolio, and thus maximising the product portfolio value. *Sales item chart* depicts, how the

TABLE 3 PPM Strategic Targets and KPIs

Success factor	Target	KPI
Strategic fit	<i>Strategic activities prioritisation</i>	R&D resources spent for:
	R&D resources allocated based on the strategic objectives for:	(1) Category 1 projects
	(1) Totally new products	(2) Category 2 projects
	(2) New products based on existing products	(3) Category 3 projects
	(3) Enhancements for existing strategic products	(4) Category 4 projects
(4) Enhancements for other existing products		
<i>Product portfolio focus:</i>	$x \text{ €}$	$\frac{\text{Strategic products sales}}{\text{Total sales}} \times 100$
The outcome of resource spending for the strategic products reflected in the share of strategic products sales out of total sales		
Value maximisation	<i>Sales item chart:</i>	(1) $x \text{ €}$ Actual sales vol. for Sales item $x$
	Sales item $x$ objectives met in	(2) $x \text{ €}$ Actual sales rev. for Sales item $x$
	(1) Sales volume	(3) $x \text{ €}$ Actual sales margin percentage for Sales item $x$
	(2) Sales revenue	
(3) Sales margin percentage		
<i>Product portfolio profitability matrix:</i>	$x \%$	Actual sales margin percentage in each market segment for each customer
Sales item $x$ achieves profitability in all market segments and for all customers		
<i>Freeloaders:</i>	o	Actual number of non-sold products
Product portfolio performance ensured with the minimum amount of non-sold products		

Continued on the next page

sales volumes, sales revenues and sales margins should be targeted and measured for all sales items. To deepen the product profitability analysis and target setting, *product portfolio profitability matrix* tool is introduced in figure 1, which can further be used to gain a comprehensive visual view on how the different products succeed in the different market segments and for different customers in relation to the desired targets. The labels and spots inside the cells in the matrix are coloured based on the current status of each examined relation. In labels, the green colour stands

TABLE 3 *Continued from the previous page*

Success factor		Target	KPI
Portfolio balance	<i>Vertical form of the product portfolio:</i> Reducing the product portfolio costs and maximising the commonality by reducing the total number of different components in the products	$-x\%$	Actual percentage decrease in number of components
	<i>Horizontal form of the product portfolio:</i> Reducing the size of product portfolio by removing non-strategic and unprofitable products	$x$	Number of ramped-down non-strategic and unprofitable products
Portfolio renewal	<i>Product portfolio renewal rate:</i> Ensuring long-term competitiveness with the annual renewal for the product portfolio	$x\%$	Total number of ramped-up and ramped-down products in versus to total number of products

for strategic, yellow for supportive, and red for non-strategic fit. The spots within cells represent the profitability in each relation, where green stands for profitable, yellow for zero-profitable, and red for unprofitable status. For example, strategic product A is profitable when sold to customer B or in market segment C, but zero-profitable when sold to rest of the customers and market segments. Or, customer A is unprofitable in market segment A but profitable in market segment C. The third value maximisation target, *freeloaders*, proposes ensuring the product portfolio performance by minimising the amount of non-sold products.

The portfolio balance targets and KPIs are used to gain balance for example in product portfolio size in horizontal and vertical dimensions. *Vertical form of the product portfolio* could for example be balanced by targeting to reduce the product portfolio costs and to maximise the commonality between the different products by reducing the number of different components in the products.

In general, the needs for balancing the product portfolio in vertical dimension can be simply identified by analysing the number of items at each product structure level. *Horizontal form of the product portfolio* could also be targeted for better balance. For example, the Maintain sub-portfolio could be targeted to be streamlined and diminished in size by

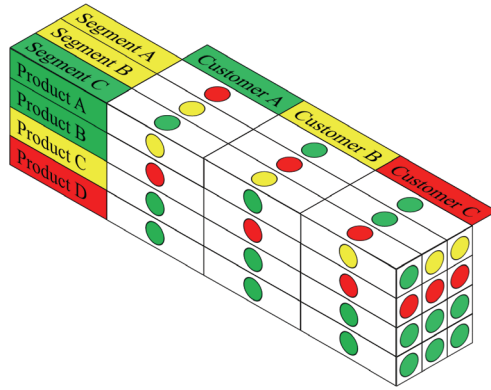


FIGURE 1  
Product Portfolio Profitability Matrix

removing the non-strategic and unprofitable products. The portfolio renewal targets and KPIs are set to ensure product portfolio renewal. The long-term competitiveness could be targeted by aiming for annual renewal of the product portfolio with a specific *product portfolio renewal rate*, and thus ensuring the flow of products from one life-cycle phase to another. Since an exposure for product portfolio explosion was identified in the analysed company, targeting for sufficient product portfolio renewal is suggested to ensure the flow of products, and thus avoid the explosion.

### Discussion

This study examined the relationship between product portfolio management and business strategy through existing literature and current state analysis of one case company. The analysed company being a market leader in a specific segment within fast-growing industry, with a product portfolio covering sellable items from single components to services, provided a good opportunity to investigate the relationship of PPM and business strategy.

The PPM target setting should cover all the product life-cycle phases and the commercial and technical sides of the product portfolio. The strategic fit target setting is to describe the degree, to which extent the core capabilities and competencies in each mission statement aspect reflect the business strategy objectives in PPM. The value maximisation target setting is to evaluate, how the identified core capabilities and competencies are to be utilised to maximise the value of the product portfolio. Further, the portfolio balance target setting is to consider, how the core capabilities

and competences are to be considered to gain balance in the product portfolio. The PPM strategic targets and KPIs are further to be specified for the different product life-cycle phases due to their varying requirements. The horizontal life-cycle-based portfolios are proposed to be used based on previous studies; NPD covering product planning and introduction, Maintain covering active sales and deliveries, Warranty covering after-sales, and Archive covering product data storing based on legal requirements. The resource alignment, strategic focus, and criteria for the next product life-cycle phase are then to be defined based on the PPM strategic targets and requirements from each life-cycle phase. In general, the focus should be on renewing the product portfolio by creating a steady flow of products through the different life-cycle phases fostering the products aligned with the PPM criteria.

The PPM strategic targets and KPIs are to be defined in a way that supports the PPM decision-making and allows taking appropriate actions for the product portfolio performance improvements. Success factors to be considered in the definition are strategic fit, value maximisation, portfolio balance, and portfolio renewal. The product portfolio performance management is then to be conducted using the defined PPM strategic targets and KPIs. The products meeting the defined PPM criteria are to be identified, and they are then to be tended as strategic tools creating competitive advantage and economic value for the company.

#### SCIENTIFIC CONTRIBUTION

The scientific contribution of this study involves extending the coverage of product portfolio management and business strategy by applying the previous discoveries in a specific practical context, hence providing support for Cooper, Edgett, and Kleinschmidt (1997) and Tolonen, Shahmarichatghieh et al. (2015). Due to the newness of the utilised holistic PPM approach, the number of previous studies implementing it into practice is currently limited. This study contributes by describing a practical case for implementing PPM targets and KPIs over life-cycle. The identified challenges justify the importance and existence of the concept, even if more feedback about the concept in practice is still needed. In addition to the above, this study provides new by introducing a product portfolio analysis tool, product portfolio profitability matrix, to provide a visual view how different products succeed in different markets and customer segments in relation to the desired strategic targets. Thus, this study extends the range of product portfolio management analysis



tools (Cooper, Edgett, and Kleinschmidt 1997; 1999; 2001) available for decision-making.

#### MANAGERIAL IMPLICATIONS

The managerial contribution of this study involves offering an approach to define PPM strategic targets and KPIs based on the business strategy objectives. The PPM strategic targets and KPIs definition are described in general, and also for the different product life-cycle phases. Some examples for strategic targets and related KPIs are proposed. This study offers a considerable solution for identified problems in current practices, for companies who can relate to the topic.

PPM targets and KPIs should be derived from company strategy, which should be seen in company's product portfolio and resource spending reflecting the strategy. Financial targets and KPIs solely are not enough for product portfolio management. To ensure long-term success and proper resource allocation, PPM targets and KPIs should cover portfolio's strategic fit and balance as well. Products should be analysed as a portfolio to ensure optimal product offering and to prevent product cannibalism. Analysis and decisions should not only focus on new products. The existing products and their continuation should be evaluated as well. Sometimes, tough decisions to discontinue products need to be made to enable future success.

A certain level of commitment for change is however a necessity as the solution requires top management's attention and contribution. Product portfolio management as a strategic decision-making process should be implemented to evaluate the portfolio on a regular basis. Also, the concept of productisation in horizontal and vertical dimensions is recommended to be defined and implemented before defining of PPM strategic targets and KPIs. Overall, this study contributes for further improvements; for how the entire product portfolio can be managed to support the strategy execution, to maximise the economic value from products, and to balance the product portfolio for long-term sustainability and for different capabilities. It is the product portfolio that is the most valuable business asset of a company.

#### LIMITATIONS

Limitations of this study include analysing the practices of a single company and basing the construction on those findings aside the literature. Hence, some further validation of the findings might prove valuable.

Also, the study was qualitative by nature setting some limitations to conclusions that can be drawn based on the study. Aside addressing the limitations, the future studies could analyse how challenging it would be to manage the strategic entity based on all the metrics, as the proportion of influence from different stakeholders may vary. This as in the described product portfolio performance management model, the PPM strategic targets and KPIs were proposed to be connected to other strategic targets and KPIs used in a company. Also, it would be interesting to analyse how the performance of different functions and business processes affect the product portfolio performance management.

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