МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ВНЗ “УКРАЇНСЬКИЙ КАТОЛИЦЬКИЙ УНІВЕРСИТЕТ”

Факультет суспільних наук
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Магістерська робота

на тему:

Стратегія вибору технології: вихід на нові ринки за допомогою власного підходу комерціалізації технологічних послуг

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SECTION I

EXECUTIVE SUMMARY

Business development practices and approaches used for the first 3 years after the business launch don’t perform well for the grown company:

- Clients engagement through the partners national network approach doesn’t help to sustain growth for the company.
- Ad-hoc practices to select technologies and markets for commecrialization didn’t end in a sustainable revenue streams from selected directions.
- Inbound/outbound clients engagement performance of marketing and sales functions for international markets (EU, UK) is still low with the new FinTech offerings.

This project goal is to create a solution that will help to unlock the FinTech solution provider and service company business development potential with the Technology commercialization Strategy approach. Such solution should engage all company functions to work effectively together with strategic goals in mind of creating high business value for clients (NPS˘>8) and sustainable business growth for the Company (Revenue and Net Value).

The Company is 4 years old in size of 80+ experts in software engineering and management with key expertise in building software for banks and fintech. The Company has just rebranded to change the old brand name directly related to chatbots development services as main offering that allowed the company to grow from the beggining, but stoped to be the key business development interest. The poor performance of national clients engagement in 2021 was the reason to rebrand and develop business in new markets.

I’am a co-founder and member of Strategy board in the company. Before exiting from operational activities in June of 2021 my responsibilites were head of delivery from the company initiation till May 2020, CFO and head of marketing before June 2021. My personal growth will be in proposing and making changes to happen in the grown Company that will work for the sustainable business develpment and growth for the next 5 years.

To work on the problem I will use Technology Commercialization Strategy related best practices from software and hitech hardware industries, methogologies and tools used to build a sustainable and effective commercialization process that will result in a competitive position for the Company’s offerings, high profits and sustainable cash flow. To propose the Strategy model, process and supportive tools I will use experience and publications from IBM, NASA, HBR, Gartner, KPMG, McKinsey, knowledge and practices shared on **LvBS courses: tools and frameworks from R&D Management course, scenario planning approach from IT Strategies course, 10 types of innovation design thinking methodology from DIGITAL DISRUPTION**, Alexander Ousterwalder books for Testing Business Ideas, IBM Innovation passport with description of corporate technology commercialization strategy FOAK approach, and other materials.

The data for master thesis work I will collect from the Company managerial and financial reports, CRM, sales and marketing materials, colleagues and co-founders’ interviews and clients’ feedbacks. No business sensitive data will be disclosed in this project, financial data is changed to imagined (not real) values, but left in the same dimensions. Some analytical tools like Competitive Analysis Matrix will be used along with financial model calculations in Google Spreadsheet with results presented in this work.

SECTION II

WHY INNOVATE?

Banking is one of the most conservative markets where customers are struggling a lot from legacy technological infrastructure and lack of innovative approaches. It has started to be disrupted by nonbanking technology organizations to prototype, test, and build fintech solutions on banking infrastructure to provide new financial and other types of products and services in the last decade.

Banks' infrastructure is usually built on legacy core banking systems which are hard to replace on one hand come with fewer profits and interest from technical experts to support on the other hand banking industry is highly competitive and demands for innovations to grow or save profits. At the same time, **there's a strong market demand to have better technology-based integrity** with banks to embed banking services and automate banking transactions into non-banking products.

Recent changes in law regulations for banking institutions have pushed banks toward technology innovations (PSD2 in the EU, Open Banking in the UK). **These changes catalyzed the market a lot along with the technology trends like blockchain, cryptocurrency, www3, IoT, etc**.

Accordingly to PSD2 regulation EU banks in 2019 had to open a set of APIs for third parties to build over their products. This pushed neobanks, BaaS, and banking API aggregators startups to grow along with other fintech initiatives.

Banks typically keep internal technical teams to retain core systems knowledge and support expertise in-house or/and use core banking licensed support leaving some space for external solution providers to bring in other innovative products for banks to stay competitive.

The FinTech market is growing, opening for business new opportunities based on technological innovations, new customer segments, and business models. This market requires not only banks but also service components for customizations, integrations, and other typical infrastructure types of services and players from other markets like retail, adtech, insurtech, and many other markets to build on new products and services.

All those recent changes with demand for innovations are giving space for a technological company to become a competitive fintech solution provider and to plan its business development with prospective horizons for 10 years based on new technologies required but being either not adopted by the market yet or still being in R&D stages of development.

2.1. Does technology commercialization matter?

In the study of technology commercialization conducted by McKinsey & Company, it was shown that there is a strong link between improved commercialization and competitive success. Allowing companies to leverage their core technologies across more markets and earn higher returns [HBR1990].

The study found a strong relationship between competitiveness and the ability to commercialize the technology. In many technology markets industry leadership clearly depends on superior commercialization skills. In these and a growing number of

industries, companies that are first to market with products based on advanced technologies command higher margins and gain share. Companies that spin out variants more rapidly and leverage their core technologies across more markets earn higher returns.

SECTION III

PERSPECTIVE FINTECH TRENDS AND TECHNOLOGIES. OPEN NEW OPPORTUNITIES

Technology trends and market disruptions are both threats to existing solutions and opportunities for the competition. Understanding such trends and the ability to use them for business development can help businesses to be in leading positions in their markets. Gartner, KPMG, Delloite, and other world TOP business consulting organizations invest in technology trends landscape research to predict the future and allow businesses to catch up with technologies important for innovations and further business development.

Understanding technology trends that can unlock innovations' potential to make a crucial impact on the industry is important for both technology solution providers and service companies' business development strategies. There are many tech market analytics methodologies presented, but using such predictions with a breakdown of time periods when technologies will become available may allow getting an essence for technology commercialization-based strategy and its planning.

3.1. Short-term Finance technology trends forecasts for 2022

There are some short-term examples from technology trends forecasts for 2022 based on CEOs, and CIOs' interviews with finance organizations:

3.1.1. TOP 6 trends by Forbes

1. Embedded finance continues to soar.

2. Web3 will become more mainstream.

3. 2022 could be the year of blockchain.

4. Cross-border e-commerce is on the rise.

5. The dawning of the “super app” is here.

6. The infusion of artificial intelligence and machine learning starts.

3.1.2. TOP 6 Trends of interest and investment in fintech by KPMG

1. A growing number of banks will offer embedded solutions (BaaS-related business)

2. There will be increased regulatory scrutiny of embedded finance offerings

3. Fintechs will focus on branding themselves as data organizations

4. ESG-focused fintechs will have a big growth trajectory

5. There will be a stronger focus on dealmaking in underdeveloped regions. (fintech investments)

6. Unicorn status will lose some of its luster in developed markets and remain key in emerging ones.

3.1.3. TOP trends by adoption stage In Use, Adopting, Exploring by Gartner

Gartner’s research methodology Technology Bullseye (Figure 3.1) and Technology Hype Cycle charts present information about technologies state, horizons to become markets available, and hype trends.

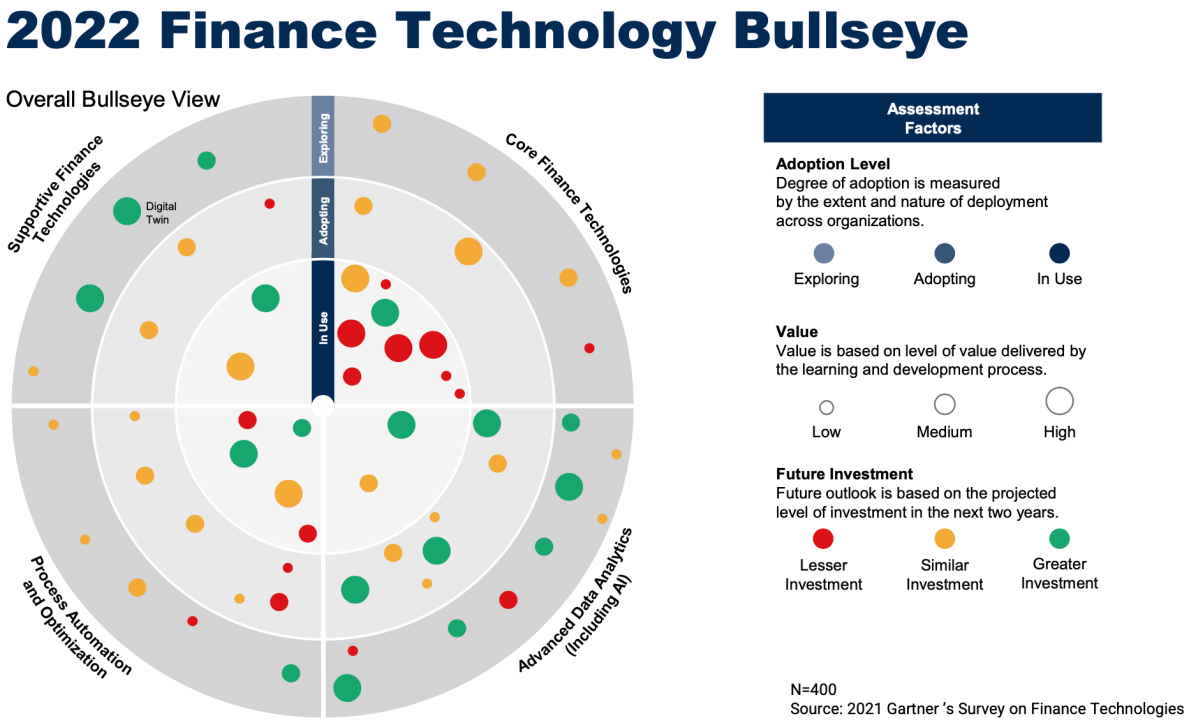


Figure 3.1: Technology Bullseye (Impact Radar) from Finance Technology Innovations for 2022

Bullseye circle breaks down technologies to the states In Use, Adopting, Exploring and allows planning for solutions or service offerings development. This methodology analysis allows seeing a middle-term perspective for technologies that businesses put stakes on today or have already started to experiment with or adoption process.

According to Gartner's research set of technologies shown in Figure 3.2 will get the same or higher level of investment to grow the efficiency of the finance market organizations. This view provides a hint that the short-term focus of the adoption is on technologies like workflow automation software, RPA, self-service data, and analytics, reporting automation, low-code development, and others.

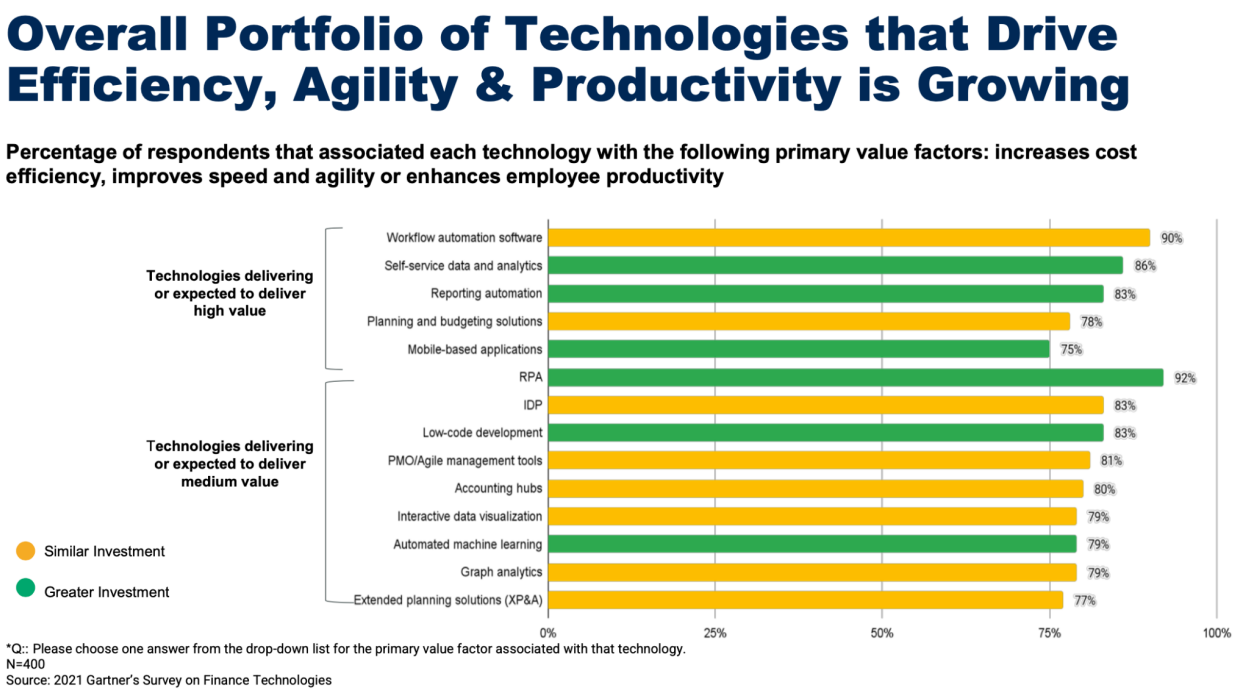


Figure 3.2: Technologies delivering or expected to deliver high and medium value in the finance sector.

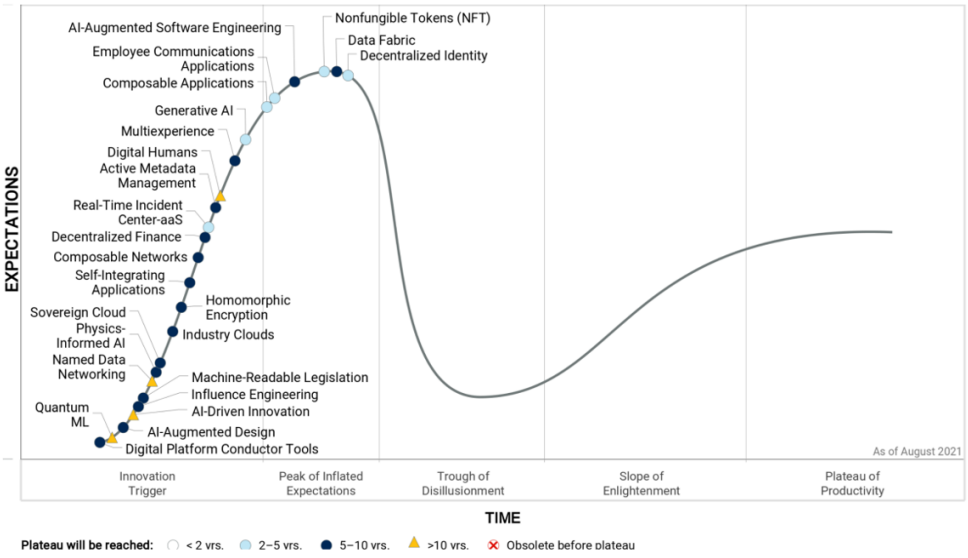
3.2. Middle and long-term technology hype trends

Based on the Financial trends above we map them to the technology landscape and identify which technologies would enable particular trends. The following exercise with analysis technologies with high interest from the market would further allow identifying the focus for R&D areas.

3.2.1. Gartner's Hype Cycle

Market interest level in technologies is identified on Gartner's Hype Cycle chart (Figure 3.3) with different expected terms to reach the top level of hype. There are technologies with hype expectations for plateau-level within 2, 2-5, 5-10, and more than

10 years term. A technology with 2 years to hype plateau will be ready for commercial use first if the market didn't get disappointed with it. Some technologies can get not be widely spread but find their very narrow niche to solve a limited set of business problems, others can provide wide business appliance and adoption, and the rest will die or go on hold because some other supportive technologies are not ready or there's no market yet.



Source: Gartner (August 2021)
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Figure 3.3 Gartner's Hype Cycle (August 2021)

Top pics in relation to the finance industry could be the following list of technologies to keep a radar on

Generative AI (2-5 yrs)

Decentralised Identity (2-5 yrs)

Decentralised Finance (>5 yrs)

Self-Integrating Apps (>5 yrs)

Digital Humans (>10 years)

Quantum ML (>10 years)

Accordingly to such projection Generative AI and Decentralised Identity with the availability from 2 to 5 years with the potential for innovations in finances. It makes them important to be explored in relation to services and solutions to be built for security, and product offerings in the nearest future.

Such trending technologies may allow breaking disrupting limits of already adopted solutions.

Here are some examples in Table 3.1. of the technologies that may unlock new opportunities and make changes in the financial market.

Table 3.1. Technology-based solutions dependency on technologies in the hype cycle

Technology in hype cycle	**Influence on financial market technologies in Use**
Generative AI	Personal Assistants incl. Chatbots Personalised Offers Predictions Fraud monitoring, Cyber security, etc. has the potential to take personalization to new heights.
Decentralized Identity	Opportunity for KYC services to extend services

	Threat at the same time for KYC with no change plan — banks may not need KYC for more information than is legally required.
Self-Integrating Apps	Is a great opportunity for solution providers and service companies to create such custom apps and infrastructure on demand. New architecture requirements related to trends will have 70% of organizations by 2024. The Could solutions will become a threat after it's widely adopted for custom integrators' services. But there are opportunities for connector marketplaces to build on this trend or provide fast connectivity for non-enterprise level players.

Such opportunities will transform into a growing business only after the adoption period which requires not only technological experiments but verified business case creation, marketing, and business development work.

The ability to commercialize technologies with the potential to get successfully adopted by businesses and unlock innovations is important for new markets opening or building a market's leader presence. That is why technology solutions providers or IT service organizations should consider the opportunity of having their own technology commercialization strategy.

SECTION IV

ABOUT THE BUSINESS

Company was founded in the autumn of 2017 as chatbots development service company under the chatbots development brand.

All company’s founders with more than 10 years of experience each in banking middleware and core banking applications, SaaS, marketing, enterprise-level IT project, and program management came together with a wide network of colleagues in a variety of national banks and enterprises with demand for different IT applications.

2018-2019 company grew fast with a few key accounts with demand for communicational platforms and conversational interface-related solutions and services.

In January 2020 company announced building a banking division to service contracts with banks and fintech. This became a mainstream business offer in 2021. Most of the customers came out of the founders' personal network.

Since the beginning of 2020 sales reps were focused on closing deals mostly with national companies, putting much effort to extend short-term contracts with existing clients but didn’t demonstrate a sustainable success in inbound/outbound sales abroad. A personal network was still enough for sustainable business growth.

2021 became a hard year for the national IT market to acquire and retain talent which made Company more focused and investing in HR and recruitment processes without big changes in customer acquisition and retention. It was also a gap year for marketing activities, but it didn’t affect successfully getting planned results.

In December 2021 Company started rebranding to stop associating its main expertise with chatbots, and build a new international fintech brand for marketing with the main focus on technology solutions development.

Today the Company team size is 83 including 65 technology experts with main expertise and focus on delivering fintech solutions. Being challenged by the fairly small size of national contracts for a grown company and lowering of profit margin after job market changes, made founders look at new strategies, markets, and customer segments to open other opportunities for sustainable business growth.

4.1. Current Organization structure and approaches to embrace the opportunities

The Company updated its organizational structure and operational processes in May 2022 shown in Figure 4.1. Recent changes were made after welcoming successfully passed probation period specialists to roles of CDO and Head of Sales, canceling CRO role, and embedding the revenue-related tasks in the CFO's list of responsibilities.

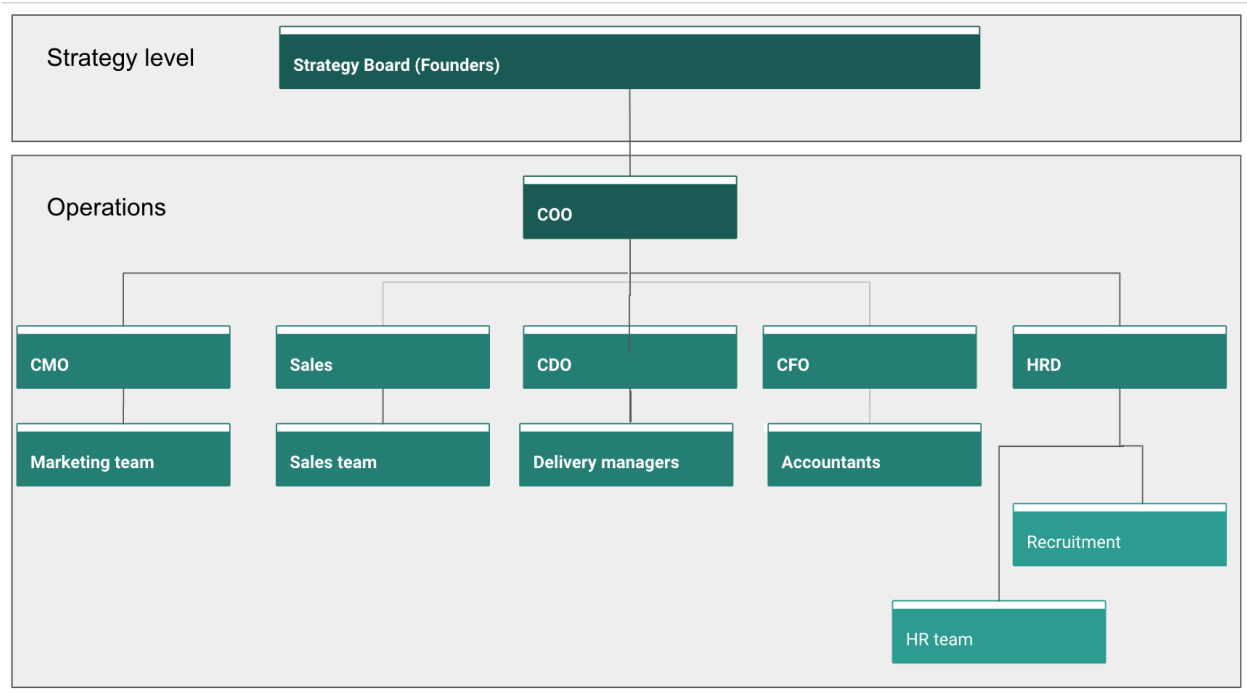


Figure 4.1 Company organizational structure in May 2022

The Organization structure should be updated in order to welcome changes that Technology commercialization Strategy deployment will bring.

Due to the nature of technology commercialization management with more focus on research, analytics, and experiments, none of the existing units in the Company has the relevant expertise to launch it as a new function. A new unit responsible for the early

stages of technology commercialization with a technology commercialization strategy adopting should be introduced into the company's organizational structure. Creating a separate unit will help to avoid overhead in management and losing focus in existing units but will allow to use of functions and expertise of each other.

Responsible roles for the new unit should be introduced into the organizational structure. Unit structure, responsibilities, metrics, KPIs, and connections with other company’s units are to be proposed in the results of this work.

4.2. Approaches to embrace opportunities

The Company already has the potential to grow with competitive advantage and expertise in creating business workflow automation software, experience in front and backend software architecture, and development for banks and fintech. Business development could focus on both external technology trends and internal changes and initiatives embracing new opportunities to grow.

4.2.1. Technology directly related trends

1. (Technology “In Use” stage) As experts in Node-RED IBM technology explore opportunities for services related to workflow automation software — the technology In Use (adopted by the finance market and receiving a high level of interest for investments).
2. (Technology “In Use” or “Adopting” stages) Monetising on market demand for integrations and digital transformation related to PSD2 and Open Banking EU/UK.
3. (Technology “Adopting” and “Exploring” stages) Learn and consider other FinTech-related technology trends opportunities within the next 2 to 5 years of adoption term like Self-Integrating Apps.

4.2.2. Approach to other business development opportunities

4. Grow the new initiative for the inbound/outbound Sales and Marketing Model development.
5. Extend Partnerships model and co-operation with VISA abroad.
6. Look at partnerships and other opportunities with large consulting providers and FinTech platforms to grow the company's business and value.
7. Spin-Out FinTech Startup for retail or/and Spin-In Self-Integrating Apps platform for FinTech to commercialize on already developed solutions, experience, and partnerships.

The ability to commercialize technologies that are becoming ready for the market (technologies in Adopting and Exploring that will make in less than 5 years to In Use stage) will require a business model and processes updates, the introduction of new recruiting requirements, and corporate culture changes.

4.3. Main challenges

1. Marketing and Sales Strategy: Company experienced poor performance in inbound/outbound customer engagement (sales pipe was mostly filled with short-term contracts). Marketing in 2021 didn’t generate inbound leads. Founders’ personal network demand became shallow to feed the sales pipe for the grown company after the first 3 years of growth.

2. Technology selection for commercialization is limited by a combination of the technical team acquired expertise and sales pipeline with short-term project expectations.

Previous ad-hoc attempts for technology commercialization didn't lead to sustainable success but could be qualified as part of the technology commercialization learning curve.

3. About half of AR is generated by 1-6 month term projects. Some of them may convert to future extended contracts. Short projects help Company to discover with customers the market opportunities, better understand customer needs, create business cases for marketing and come up with new up-sale ideas for current clients. But they also come with overhead in management, profit margin risks, and low LTV.

As a result sales and marketing were making their best efforts to satisfy the constant need to bring work for the existing team with insufficient conversion to the portfolio accounts with sustainable revenue streams.

4.4. Proposed Solutions

Change **marketing and business development** functions **to lead in offerings definitions** and customer segment selections (feasible, creating value, sustainable for business).

Focus/**identify technology expertise** and new solutions development **that could become new points for sustainable business growth**.

Improve sales role to build effective process on inbound/outbound leads relations and focus on sustainable for business perspectives customers segments.

Consider technology horizons maturity and development prioritization in relation to **portfolio management**. The company needs to extend its strategic portfolio from

TRL 9 to at least TRL 6-7. i.e. technology is climbing the hype curve to **explore market and business potential to be among the first service companies who can help customers with adapting it**.

Employ modern business methodologies and tools to structure the whole technology commercialization cycle that considers: creating required offerings based on feasible technological solutions for sustainable business customer segments, testing hypotheses to make reasonable “Go” or “Not to go” decisions making technology commercialization process to bring positive business results.

SECTION Y

HOW TO EVALUATE THE PROJECT RESULTS?

To evaluate the technology commercialization strategy success will help both quality and quantity criteria listed below

1. The company's offerings have a competitive advantage with ready solutions and business cases, and commercialization experience in the adoption phase.

2. Company demonstrates the sustainable capability to take "first to market" advantage with its experience in technologies commercialization for technologies just transferring from Adoption to In Use stage.

3. Technology commercialization strategy shares >20% of AR growth first year and grows up to 80% in 4 years.

4. R&D function is profitable.

Mentioned evaluation criteria are also to be converted and introduced as metrics and KPIs for responsible roles, units, and processes in the Company.

SECTION VI

HOW TO APPROACH THE PROBLEM?

There are a number of methodologies and innovation frameworks to identify, develop and market solutions for technology commercialization.

- **Goldsmith Technology commercialization model** to develop technological solutions, identify where existing solutions are in the development process, and identify missing steps to fix the problems.

- **Stage-Gate (Phase Gate process)**: Implementation of the transparent processes to develop technology, and validate the market and its business potential (following Goldsmith model phases and steps).

- **Testing Business Ideas** David Bland and Alex Osterwalder framework for validation process steps is described in the Strategyzer book.

- **10 types of innovation**. Assess the business of potential customers from 10 perspectives. Identify potential complex solutions or service offerings.

- **Horizon model** (current, 1-2 years from now, 2-5 years from now) for Portfolio analysis to see how the portfolio is balanced and how to make it balanced. Approximating TRL.

- Technology Maturity Levels and time to market estimation by **Gartner Hype Cycle** and **Tech Radar (Bullseye)** to distinguish mature vs hyped technologies.

● Innovation spots Identification methodology: **10 types of innovation**. Assess the business of potential customers from 10 perspectives. Identify potential complex Solutions or service offerings.

● Product management: **Competitors matrix analysis.** This tool allows to have answers to competitive analysis-related questions: Who are your competitors? Who are the customers of the competitors? What are customer needs? How can you be better than competitors to win a customer segment?

There are many different tools, methodologies, and practices that could be used for making strategic business decisions or for technology commercialization strategy deployment at the operational level. They are all not a silver bullet but require tailoring to the Company context and needs, and customization to work effectively together.

A high-level view of these methodologies with analysis and customizations is outlined in the chapter below.

SECTION VII

GOLDSMITH TECHNOLOGY COMMERCIALISATION MODEL

Goldsmith Technology commercialization model breaks down the process into three main functions Technical market, Market, and Business involves in the process of different business units in three phases (Concept, Development, and Growth). It also defines necessary steps to ensure that required functions are executed and completed with the results for each step.

Each model step is followed by explanatory descriptions and evaluation questions that can be used for checklists and guides. If needed the model steps could be easily customized in relation to technology readiness level and internal functions practices.

Each model stage includes three steps. The example below represents the **Concept phase** with Stage 1 **Investigation** and its first three steps required to accomplish this phase: Technology analysis, Market and Venture opportunities assessments.

Goldsmith Concept phase with Stage 1 Investigation and 3 first steps

	Technical Market	Market	Business
CONCEPT PHASE			
Stage 1 Investigation	Step 1 Technology Analysis	Step 2 Market Needs Assessment	Step 3 Venture Assessment

Detailed descriptions for all three steps are provided in the Example in Exhibit 2 (Exhibits section).

The model validation questions are crucial to making commercialization successful. However as mentioned above some questions could be amended due to the nature of the technology and business development process practices in a company, the criteria set to validate each step results will allow to stop not perspective for sustainable business activities at early stages focusing business resources and development efforts on most likely for success technologies to commercialize.

7.1. Development of custom Technology commercialization framework based on Goldsmith model. High-level analysis

It’s very important that Goldsmith's methodology allows assessing existing offerings and product development activities to identify gaps. Below I focus on using it to analyze the current state of the company and its main FinTech offerings after.

Analysis of the Technical market, Market, and Business functions related activities following Goldsmith technology commercialization methodology showed that some steps are not completed, sometimes missing or not relevant. The reason could be the nature of the client acquiring process and other practices to use market opportunities applied in the first 3 years of the company.

Table 7.1. The company’s current technology commercialization state by Goldsmith technology commercialization methodology

		Technical Market	Market	Business
CONCEPT PHASE	**Investigation**	**1. Technology Analysis**	**2. Market Needs Assessment**	**3. Venture Assessment**

DEVELOPMENT PHASE	Feasibility	4. Technical Feasibility	5. Market Study	6. Economic Feasibility
	Development	7. Engineering Prototype	8. Strategic Market Plan	9. Strategic Business Plan
	Introduction	10. Business Start-Up	11. Pre-Production Prototype	12. Market Validation
GROWTH PHASE	Growth	13. Production	14. Sales and Distribution	15. Business Growth
	Maturity	16. Production Support	17. Market Diversification	18. Business Maturity

In light green — actions completed

In grey — completed partly.

In white — not touched.

A result of applying the Goldsmith technology commercialization methodology to the Company's current business development model shows the particular difference and a need for the following approaches changes in order to catch up with the Goldsmith's model:

1. Marketing should become a leading function in validating key offerings for sustainable customer segments, pricing, market size, and horizons that support business growth and stay aligned with technology expertise and business development.

2. Company's business development must proactively be engaged in offerings validation to define if there's a sustainable business component for customer segments and partnership opportunities. And if an offering can generate a sustainable business stream for profit. It should become a proactive function for initiating new business streams along with the current administrative responsibilities.

3. Technology Market function completed by Goldsmith closely all steps in the model should get aligned after changes in Market and Business functions to focus on expertise and offerings development in the defined by strategic business development key-value propositions areas and come up with proposals for new opportunities if it finds any relevant.

4. Technology commercialization strategy for the Company also should consider creating a process with criteria that will allow building a portfolio that will balance efforts, priorities, and technology In-Use horizons with a perspective of more than 12 months.

The Goldsmith Technology Commercialisation Model gives an excellent direction to changes needed in the company to structure the process and criteria with ‘what to do’ methodology which can be used along with ‘how to do’ agile technics to get out results of each Technology Commercialisation phase and stay lean consuming company resources also with ‘fail fast’ validation criteria approach for each step.

7.2. Custom checklists development

Next important step after analysis is to customize evaluation criteria for steps and phases that fit in the Company context.

Investigation (Concept phase) Generic model questions checklist should be transformed into a Custom checklist that corresponds to the high technology readiness levels the company is dealing with.

Table 7.2 Investigation (Concept phase) questions checklist

Default Goldsmith model checklist	Custom checklist for the company
1. Technology Analysis Have you completed a technology database search? Have you researched related patents or copyrights? Have you researched technical journals and trade magazines? Have you discussed the topic with experts? Do you know the current state-of-the-art competitive technologies? Have you selected the technologies for the application? Have you determined the advantages of this technology? Have you determined the risks for this technology? Do the benefits of this technology or product offer significant advantages over the existing solution?	**1. Technology Analysis** Have you researched online publications? Have you researched related patents or copyrights? Have you discussed the topic with experts? Do you know the current state-of-the-art competitive technologies? Have you selected the technologies for the application? Have you determined the advantages of this technology? Have you determined the risks for this technology? Do the benefits of this technology or solution offer significant advantages over the existing solution?
2. Market Needs Assessment Have you assessed the needs of the market? Do you know the product uniqueness? Do you know the product competition? Do you know the customer requirements? Have you identified the barriers to market entry? Have you identified distribution channels? Do you know the pricing criteria?	**2. Market Needs Assessment** Have you assessed the needs of the market? Do you know the solution uniqueness? Do you know the solution competition? Do you know the customer requirements? Have you identified the barriers to market entry? Have you identified distribution channels? Do you know the pricing criteria?
3. Venture Assessment Do you have experience in launching a business enterprise? Does this venture appear to have profit potential? Are you the right person to commercialize the	**3. Venture Assessment** Does this venture appear to have profit potential? Are you the right person to commercialize the product? Is your enterprise the right one to

product? Is your enterprise the right one to commercialize the product? Have you estimated the resources (capital and service providers) required to launch your venture? Have you researched the intellectual property considerations?	commercialize the product? Have you estimated the resources (capital and service providers) required to launch your venture? Have you researched the intellectual property considerations?

in grey — partly missed validation steps

in red — missed but important to pay attention to in the commercialization flow

Feasibility (Development phase) Generic model questions checklist transformed to Custom checklist looks mostly the same.

Table 7.3 Investigation Feasibility (Development phase) checklist

Default Goldsmith model checklist	Custom checklist for the company
4. Technical Feasibility Do you have an engineering prototype of the product? Have you identified what critical materials you will need? Have you conducted final tests on the prototype? Do you have a pilot production process? Do you know how reliable the manufacturing will be?	**4. Technical Feasibility** Do you have an engineering prototype of the solution? Have you identified what critical resources (components, expertise, budgets etc.) you will need? Have you conducted final tests on the prototype? Do you have a pilot production process? Do you know how reliable the manufacturing will be? Have you defined quality standards?

5. Market Study Have you conducted a market study? Have you identified factors critical to the market environment? Have you identified the economic and industry trends? Have you quantified the market size? Have you identified the market segments? Have you identified the size, growth rate & competition of the market segment? Have you analyzed business capability for market share, competitive position, product capabilities, and resource capabilities?	**5. Market Study** Have you conducted a market study? Have you identified factors critical to the market environment? Have you identified the economic and industry trends? Have you quantified the market size? Have you identified the market segments? Have you identified the size, growth rate & competition of the market segment? Have you analyzed business capability for market share, competitive position, product capabilities, and resource capabilities?
6. Economic Feasibility Does the venture demonstrate a positive economic feasibility? Have you developed a break-even financial analysis for the venture? Does the venture offer financial returns that justify investment? Have you compared the merits of licensing to venture?	**6. Economic Feasibility** Does the venture demonstrate a positive economic feasibility? Have you developed a break-even financial analysis for the venture? Does the venture offer financial returns that justify investment? Have you compared the merits of licensing to venture?

in grey — partly missed validation steps

Development (Development phase) Generic model questions checklist transformed to Custom checklist includes important marketing and business plan formalization steps. This part seems to be very important to check if everything is defined and ready to synchronize on the organizational level next steps moving out from the exploration phase to production.

Table 7.4 Development (Development phase) checklist

Default Goldsmith model checklist	Custom checklist for the company

7. Engineering Prototype Do you have an engineering prototype of the product? Have you identified what critical materials you will need? Have you conducted final tests on the prototype? Do you have a pilot production process? Do you know how reliable the manufacturing will be?	**7. Engineering Prototype** Do you have an engineering prototype of the solution? Have you identified what critical resources (components, expertise, budgets etc.) you will need? Have you conducted final tests on the prototype? Do you have a pilot production process? Do you know how reliable the manufacturing will be? Have you reached the quality standards?
8. Strategic Market Plan Have you defined the competitive advantages of the enterprise and the product? Have you defined market objectives for the product, market image, service levels, market share, and sales levels? Have you selected target markets? Have you selected your market niche? Have you selected product features? Have you selected a price? Have you selected distribution channels? Have you obtained direct market feedback?	**8. Strategic Market Plan** Have you defined the competitive advantages of the enterprise and the solution? Have you defined market objectives for the solution, market image, service levels, market share, and sales levels? Have you selected target markets? Have you selected your market niche? Have you selected solution features? Have you selected a price? Have you selected distribution channels? Have you obtained direct market feedback?
9. Strategic Business Plan Have you developed a strategic business plan? Have you finalized the intellectual property requirements? Have you finalized the business organizational structure? Have you selected a board of directors (or advisory team)? Have you finalized agreements on any concurrent breakthrough? Have you developed a formal financial plan that includes the strategy and timing of present and future funding rounds?	**9. Strategic Business Plan** Have you developed and formalised a strategic business plan? Have you finalized the intellectual property requirements? Have you finalized the business organizational structure? Have you selected an advisory team including external senior experts? Have you finalized agreements on any concurrent breakthrough? Have you developed a formal financial plan that includes the strategy and timing of present

Have you developed a detailed business plan for product development including objectives, schedules, milestones, and allocations of the required financial and human resources?	and future funding rounds? Have you developed a detailed business plan for solution development including objectives, schedules, milestones, and allocations of the required financial and human resources?
Can you ensure that management has critical experience and expertise in technology/product/market and business development?	Can you ensure that management has critical experience and expertise in technology/product/market and business development?
Have you formed a cohesive commercialization team (design, manufacturing, marketing, management)?	Have you formed a cohesive commercialization team (design, manufacturing, marketing, management)?

in grey — partly missed validation steps

in red — missed but important to pay attention to in the commercialization flow

Introduction (Development phase) Generic model questions checklist transformed to Custom checklist is slightly different accordingly to software development production nature. Rest could be the same and added into operational management roles guidelines.

Table 7.5 Introduction (Development phase) checklist

Default Goldsmith model checklist	Custom checklist for the company
10. Business Start-Up	**10. Business Start-Up**
Have you initiated business activities?	Have you initiated business activities?
Have you established hiring criteria?	Have you established hiring criteria?
Have you hired and trained core personnel?	Have you hired and trained core personnel?
Have you executed contracts?	Have you executed contracts?
Have you arranged for the next stage of financing?	Have you arranged for the next stage of financing?
Do you convene regular board of director meetings?	Do you convene regular board of director meetings?
Have you developed a business policy and procedure manual?	Have you developed a business policy and procedure manual?
Have you established control mechanisms for cash expenditures that correspond with the business plan?	Have you established control mechanisms for cash expenditures that correspond with the business plan?

Have you established a dynamic process for strategic and tactical planning for the enterprise?	Have you established a dynamic process for strategic and tactical planning for the enterprise?
11. Pre-Production Prototype Do you have a production prototype of the product? Have you conducted pilot production? Have you selected the manufacturing process? Have you selected the manufacturing equipment? Have you conducted full scale production? Do you have a commercial-level design? Do you have quality control procedures? Have you produced sufficient quantities for market?	**11. Pre-Production Prototype** Do you have a production prototype of the solution? Have you conducted pilot production? Have you selected the production process? Have you selected the production resources? Have you conducted full scale production? Do you have a commercial-level design? Do you have quality control procedures?
12. Market Validation Have you conducted limited product sales? Have you quantified the volume, rate, and demographics of sales? Have you designed and implemented a customer survey? Have you analyzed customer feedback (price, design, function, packaging, delivery)? Have you analyzed your competitor's response? Have you incorporated marketing modifications into the market plan? Have you transmitted design modifications to technicians?	**12. Market Validation** Have you conducted limited solution sales? Have you quantified the volume, rate, and demographics of sales? Have you designed and implemented a customer survey? Have you analyzed customer feedback (price, design, function, delivery)? Have you analyzed your competitor's response? Have you incorporated marketing modifications into the market plan? Have you transmitted design modifications to technicians?

in grey — partly missed validation steps

Growth (Growth phase) Generic model questions checklist transformed to Custom checklist is slightly different accordingly to software development production nature.

Rest is the questions that could be added to operational management roles guidelines without changes.

Table 7.6 Growth (Growth phase) checklist

Default Goldsmith model checklist	Custom checklist for the company
13. Production Do you support commercial production? Do you have after market support for the product? Have you improved the production process? Do you support a warranty?	**13. Production** Do you support commercial production? Do you have after market support for the solution? Have you improved the production process? Do you support a warranty?
14. Sales and Distribution Have you established product distribution and sales? Have you identified areas for market expansion? Have you assessed customer satisfaction? Have you assessed distributor satisfaction? Have you refined product features?	**14. Sales and Distribution** Have you established solution distribution and sales? Have you identified areas for market expansion? Have you assessed customer satisfaction? Have you assessed distributor satisfaction? Have you refined solution features?
15. Business Growth Are you engaged in full-scale production? Have you arranged for full scale production financing? Have you institutionalized a corporate vision, mission, and policy? Do you have a process to monitor business trends and practices? Can you identify opportunities and threats to enterprise profits?	**15. Business Growth** Are you engaged in full-scale production? Have you arranged for full scale production financing? Have you institutionalized a corporate vision, mission, and policy? Do you have a process to monitor business trends and practices? Can you identify opportunities and threats to enterprise profits?

in grey — partly missed validation steps

Maturity (Growth phase) Generic model questions checklist transformed to Custom checklist highlights the need in portfolio horizons management practices as one of the strategic growth factors.

Table 7.7 Growth (Growth phase) checklist

Default Goldsmith model checklist	Custom checklist for the company
16. Production Support Do you support commercial production? Do you have after market support for the product? Have you improved the production process? Do you support a warranty?	**16. Production Support** Do you support commercial production? Do you have after market support for the solution? Have you improved the production process? Do you support a warranty?
17. Market Diversification Have you diversified your product line? Do you have a market environment scanning process? Do you have a technology transfer and/or deployment process? Do you make resource allocations for continual improvement? Do you make resource allocations for new product development?	**17. Market Diversification** Have you diversified your solution? Do you have a market environment scanning process? Do you make resource allocations for continual improvement? Do you make resource allocations for new solution development?
18. Business Maturity Are you optimizing the company's profit potential? Have you implemented an internal company diagnostic process? Do you provide continuing education and training opportunities? Do you explore alternate management technologies? Do you reinvest profits? Do you monitor product life cycles in the enterprise portfolio? Do you monitor opportunities and threats to enterprise profits?	**18. Business Maturity** Are you optimizing the company's profit potential? Have you implemented an internal company diagnostic process? Do you provide continuing education and training opportunities? Do you explore alternate management technologies? Do you reinvest profits? Do you monitor product life cycles in the enterprise portfolio? Do you monitor opportunities and threats to enterprise profits?

Can you identify opportunities and threats to enterprise profits? Do you conduct strategic and tactical planning for the enterprise?	Can you identify opportunities and threats to enterprise profits? Do you conduct strategic and tactical planning for the enterprise?

in grey — partly missed validation steps

in red — missed but important to pay attention to in the commercialization flow

Custom checklists were made with assumptions to the Company business model context and purpose to use checklists in guidelines accordingly to Goldshith Technology commercialization model for commercialization steps evaluation. The total number of questions in custom checklists is 114 with 37 in the Technology Market section, 38 in the Market section, and 39 in the Business section.

For the commercialization process state transparency, it must include the generation of the performance metrics and artifacts that can be used for ‘go or not to go’ decisions to continue to the next step. It should be based on the validation criteria for the commercialization model phase results assessment. Such process flow with validation criteria could be based on the methodology used for research projects — Stage-Gate and used for commercialization project management.

SECTION VIII

OFFERINGS DEVELOPMENT ANALYSIS BY GOLDSMITH MODEL

The Goldsmith Technology Commercialisation Model was also used to check the Company offerings (solutions and services value propositions) to see which steps were missing and what needs to be done to re-validate, improve or fix them.

The decision for entering EU and UK markets in 2022 was based on the opportunities opened by PSD2 and Open Banking initiatives that challenged the conservative climate of the banking community by growing FinTech startups requiring automated access and better integrity with banks and other licensed financial services.

Following the market demand Company has prepared offerings with the integrator solutions and customization services for Banks and FinTech organizations:

1. **Middleware and modules** to launch quick new products for neobanks, and FinTech startups.

2. **Connector Modules for BaaS** for neobanks, banks, and FinTech startups. BaaS companies are usually spin-outs from banks.

3. **Corebanking & Payment Processors integrating modules** for neobanks.

All offerings include licensed solutions with customization services and support.
Targeted customers: FinTech, BaaS, and neobanks from the EU and UK.

8.1. Middleware and Modules

The steps completed to create this offering were validated with customized for the Company Goldsmith Technology Commercialisation Model checklists.

The analysis results are shown in the table Goldsmith Model Analysis for Middleware and modules.

Table 8.1 Goldsmith Model Analysis for Middleware and modules

		Technical Market	Market	Business
CONCEPT PHASE	Investigation	1. Technology Analysis	2. Market Needs Assessment	3. Venture Assessment
	Feasibility	4. Technical Feasibility	5. Market Study	6. Economic Feasibility
DEVELOPMENT PHASE	Development	7. Engineering Prototype	8. Strategic Market Plan	9. Strategic Business Plan
	Introduction	10. Business Start-Up	11. Pre-Production Prototype	12. Market Validation
GROWTH PHASE	Growth	13. Production	14. Sales and Distribution	15. Business Growth
	Maturity	16. Production Support	17. Market Diversification	18. Business Maturity

In light green — actions completed

In grey — completed partly.

In white — not touched.

Accordingly to the Goldsmith Model phases with checklists was found that not all important steps were completed. Two key steps for Market and Business planning were not made separately for this offering to be also defined as a separate business solution product line, but generalized in a mix with all other offerings. This allowed not to waste time launching it, but on the other side doesn't allow Company to have a planned performance for the offering to evaluate it separately from the mix of other offerings.

Middleware and modules solutions offering checklist completeness (full checklist)

Custom checklists made for offering development steps were checked for completeness to have a general picture to quantify completeness and shown in the diagram below with 22% of actions in "Not done" and 20% "Done partly".

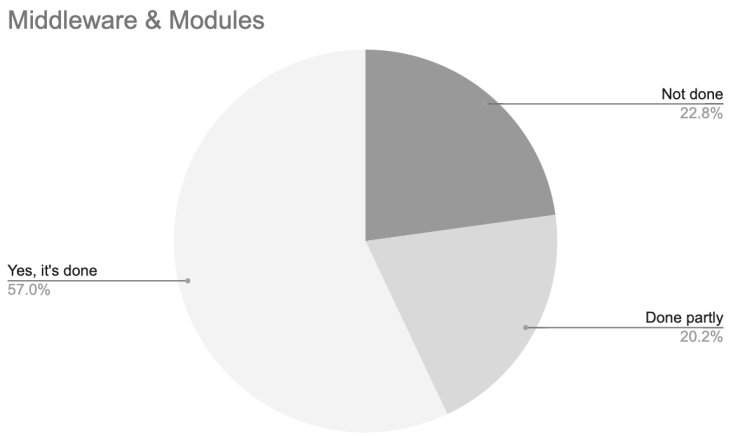


Figure 8.1 Middleware and modules solutions offering checklist completeness

Checklists approach gave the ability to find uncompleted, but critical actions needed to find the way how to improve, fix or "kill" offering.

The quality analysis showed incompleteness in a responsibility area for “Done partly” or “Not done” activities:

Not Done (checklist questions marked “N” as undone)

4% (1) — Technology Market,

30%(8) — Market,

66%(18) — Business.

Done partly (checklist questions marked “Partly” as uncomplete)

26%(6) — Technology Market,

44%(10) — Market,

30%(7) — Business.

Example of “Done partly” items from the custom checklist that could be critical for strategic or operational risk levels

Technology Market

Have you determined the risks for this technology? (Strategy risk)

Have you established control mechanisms for cash expenditures that correspond with the business plan? (Operational risk)

Market

Do you know the solution competition? (Strategy risk)

Have you defined the competitive advantages of the enterprise and the solution? (Strategy risk)

Business

Have you quantified the volume, rate, and demographics of sales? (Strategy risk)

Do you monitor opportunities and threats to enterprise profits? (Operational risk)

Strategy risk level questions show threats not to have a sustainable business for analyzed offering, Operational risk level questions show threats to business effectiveness. Prioritization to work on answers for such open items should be in accordance with the relation to the Model steps sequence. This approach will allow making offering development decisions considering the information given by all completed accordingly to the Model sequence questions before.

8.2. Core banking & Payment Processors integration solutions and Connector Modules for BaaS

Next two offerings were recently created based on hypotheses for market needs. Both are still in the development stage (preproduction) which is reflected in the model described below. These two offerings analysis showed quite similar answers to checklists as for the Middleware and modules offering. Checklists for Growth and Maturity levels were not processed further due to offerings development stage Introduction accordingly to the Goldsmith Model.

Table 8.2 Goldsmith Model Analysis for Core banking & Payment Processors integration solutions and Connector Modules for BaaS

		Technical Market	Market	Business
CONCEPT PHASE	**Investigation**	**1. Technology Analysis**	**2. Market Needs Assessment**	**3. Venture Assessment**
	Feasibility	**4. Technical Feasibility**	**5. Market Study**	**6. Economic Feasibility**
DEVELOPMENT PHASE	**Development**	**7. Engineering Prototype**	**8. Strategic Market Plan**	**9. Strategic Business Plan**

	Introduction	**10. Business Start-Up**	**11. Pre-Production Prototype**	**12. Market Validation**
GROWTH PHASE	**Growth**	**13. Production**	**14. Sales and Distribution**	**15. Business Growth**
	Maturity	**16. Production Support**	**17. Market Diversification**	**18. Business Maturity**

Custom checklists made for offering development steps were checked for completeness to have a general picture to quantify completeness and shown in the diagram below with 23% of actions in “Not done” and 23% “Done partly”.

Core banking & Payment Processors integration solutions offering checklist completeness

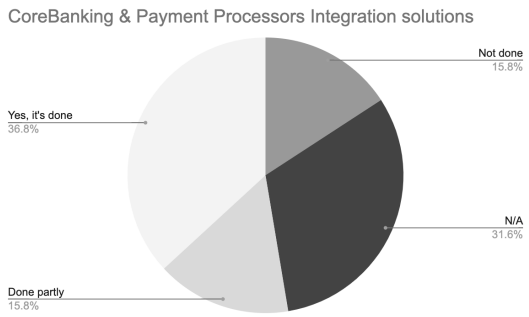
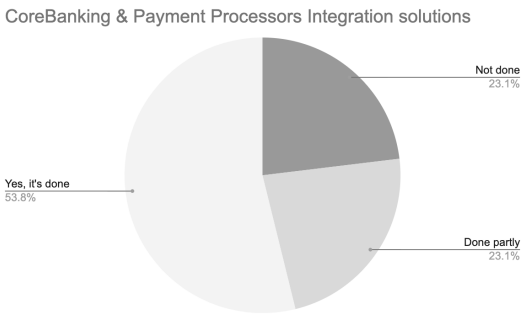
Full custom checklist	**Concept and development (current)**
	

Figure 8.2 Corebanking & Payment Processors integration solutions offering checklist

The quality analysis showed incompleteness in a responsibility area for “Done partly” or “Not done” activities:

Not Done (checklist questions marked “N” as undone)

17% (3) — Technology Market,

17%(3) — Market,

66%(12) — Business.

Done partly (checklist questions marked “Partly” as uncomplete)

33%(6) — Technology Market,

61%(11) — Market,

6%(1) — Business

Example of “Done partly” items from the custom checklist that could be critical for strategic or operational risk levels

Technology Market

Have you determined the risks for this technology? (Strategy risk)

Have you established control mechanisms for cash expenditures that correspond with the business plan? (Operational risk)

Market

Have you conducted a market study? (Strategy risk)

Have you identified the economic and industry trends? (Strategy risk)

Business

Have you quantified the volume, rate, and demographics of sales? (Strategy risk)

Checklist completeness analysis for Corebanking & Payment Processors integration solutions offering showed more strategy risk-related incompleted or avoided steps. It reflects the offering being in the Development phase in the preproduction state.

BaaS solutions offering checklist completeness

Custom checklists made for offering development steps were checked for completeness to analyze and quantify completeness. The result is shown in the diagram below with 24% of actions in “Not done” and 22% “Done partly”.

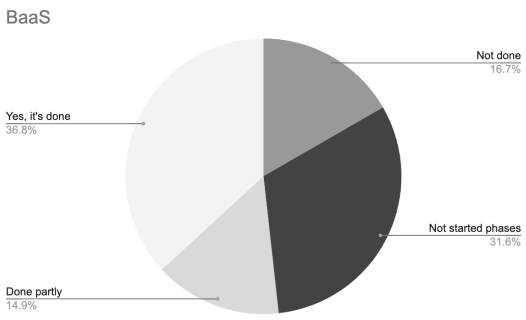
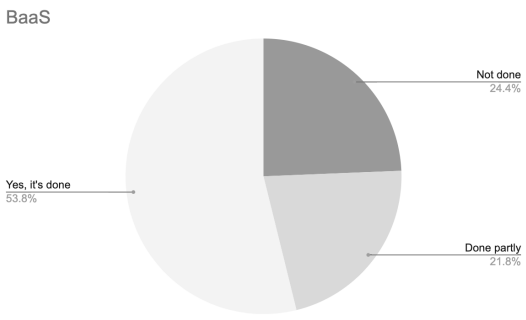
Full custom checklist	**Concept and development (current)**
	

Figure 8.3 BaaS solutions offering checklist

The quality analysis showed incompleteness in a responsibility area for “Done partly” or “Not done” activities:

Not Done (checklist questions marked “N” as undone)

21% (4) — Technology Market,

16%(3) — Market,

63%(12) — Business.

Done partly (checklist questions marked “Partly” as uncomplete)

35%(6) — Technology Market,

59%(10) — Market,

6%(1) — Business

Example of “Done partly” items from the custom checklist that could be critical for strategic or operational risk levels

Technology Market

Have you determined the risks for this technology? (Strategy risk)

Have you established control mechanisms for cash expenditures that correspond with the business plan? (Operational risk)

Have you established a dynamic process for strategic and tactical planning for the enterprise? (Strategic and Operational risk)

Market

Have you conducted a market study? (Strategy risk)

Have you identified the economic and industry trends? (Strategy risk)

Business

Have you quantified the volume, rate, and demographics of sales? (Strategy risk)

Checklist completeness analysis for BaaS solutions offering showed more strategy risk-related incompleted or avoided steps. It also reflects the offering being under development in the preproduction phase.

8.3. Offerings analysis summary

Company’s Offerings analysis showed that

- About 50% of the information needed to make strategic or operational decisions was received for the current step in the custom technology commercialization model.

- Undone actions for offerings in the preproduction stage correlate more with strategic risks due to the commercialization phase.

- For the offering in the production answers to checklists also point to operational (tactical) risks.

- The analysis result for offering in the Growth phase also showed that commercialization model deployment will require more effort from Marketing and Business functions than from Technology Market related. This correlates with the current responsibilities for these functions in the company.

Completing undone or partly done actions will allow to mitigate such risks, improve offerings or kill them in case they don't support the strategic goals. Such actions and critical decisions are required from all responsible for commercialization model functions.

The quality results for checklists completion could also be used to formalize the changes roadmap to adopt customized to the Company context Golsmith Technology Commercialisation Strategy Model.

SECTION IX

TECHNOLOGY COMMERCIALISATION PROCESS

Goldsmith Technology Commercialisation Strategy Model requires a formal description as a process to be adopted by the Company's units and general management to assess the commercialization projects' progress to make decisions, have a transparent process structure to identify problems, have performance metrics through the entire process.

The Stage-Gate Process, also known as the Phase Gate Process, is a technique used by managers to assess the viability of developing a new product/offering and improving a process or business change. It is a phased approach that is divided by different gates or decision points to analyze the business case, resources, risks, and forecast to determine the best course of action. A Phase Gate Process with the different stages of each gate considers decision-makers and stakeholders' participation or influence.

Creation of a transparent process that supports technology commercialization strategy in the company to develop technology, validate the market and its business potential (following Goldsmith model phases and steps) is the important task to adopt the Strategy, make required changes and receive results.

The commercialization process is based on the Phase Gate approach with Goldsmith model phases that could be used as gates with generalized passing criteria definition for decision making will also inherit all commercialization steps in the model needed for commercialization.

The phase gate process with Goldsmith Model phases will include Investigation, Feasibility, Development, Introduction, Growth, and Maturity phases. It is visualized in Figure 6.4.

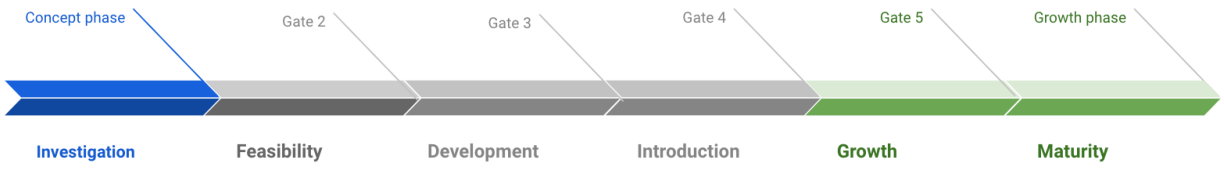


Figure 6.4 Customized Phase Gate process

The gates structure is identified by phases, and has inputs, passing criteria, and outputs.

Gate Inputs consist of the deliverables and documentation updates made through the commercialization process and required for the next phases.

Gate passing criteria are the quantitative and quality output values used to evaluate if the phase assigned actions are completed. Gate Outputs are generated on each process phase and support taking a decision whether a product is to be developed, killed, or conditionally paused.

The commercialization process phase under evaluation can result in the following outcomes:

1. Go: Conditions are completed to be pursued to the next gate (Model phase).

2. Kill: The project is not feasible and is shut down.

3. Hold: The project is halted due to some reason, but might be continued.

4. Recycle: The project can be developed further after a few adjustments.

5. Conditional go: The project is allowed to proceed once it meets certain conditions, such as the result of a recycled offering.

At each step of the commercialization experience and knowledge received are transferred through the process to the next steps. To make the process assessment a more simple task it's important to define collective/grouped criteria (including the quantity or quality metrics) otherwise decision-makers and stakeholders will need to assess all checklist answers to 114 questions and artifacts created.

Stakeholders and decision-makers for each phase should also be appointed to define a decision-making process along with the responsibility.

Another example of the commercialization model — The jolly Model for Commercializing Technology has an approach to stakeholders mobilization as bridges between phases that satisfy stakeholders of the current phase and mobilize stakeholders for the next. IBM in Innovation Passport book that also describes internal Technology Commercialization Model also points to the stakeholders' interests importance.

Internal stakeholders in the Company involved and/or interested in the commercialization process outcomes would be founders (one of them with COO

operational role responsibility), Marketing and Sales, CFO, CDO, and Head of R&D Unit that will be responsible for the early phases of the commercialization process.

The list of phase evaluation criteria, artifacts needed to take a decision, and stakeholders responsible for decision-making are described for each process phase (gate) in the Table below.

Table 9.1 Phase Gate process evaluation criteria and decision-making stakeholders.

Phase gate	Passing criteria
Investigation	TECHNOLOGY: Is technology accessible? — YES MARKET: Can create value for the market? — YES Did we find three key values confirmed by interviews or design sessions — YES + VALUES LIST BUSINESS: Can we extract profit for business? — YES Business model canvas — YES Decisionmaker: Head of R&D
Feasibility	TECHNOLOGY: Can we create a working model and organize production? — YES Production costs estimate calculated — VALUE MARKET: Do we understand key requirements and the confirmed interest of target customers? — YES

	Market segment size — VALUE Market price expected — VALUE BUSINESS: This offer brings an extra 20% of AR next year or more? — YES Estimated AR — VALUE Decisionmaker: COO
Development	TECHNOLOGY: Is PoC done? — YES MARKET: Marketing plan created (describe plan canvas for offerings or updates of the general plan) — YES BUSINESS: Business plan created (describe plan canvas for offerings or updates of the general plan) — YES Decisionmaker: Founders board
Introduction	TECHNOLOGY: Production is ready to launch —YES MARKET: Did you create the product or full production process is ready — YES Business: product has reached first customers and received feedback — YES Decisionmaker: Founders board

Growth	TECHNOLOGY: Do we meet customer quality requirements, timelines and production costs? MARKET: Number of sales — VALUE Avg. contract size — VALUE BUSINESS: Revenue — VALUE Profit — VALUE NPS — VALUE Decisionmaker: COO
Maturity	This final process phase is reached only by Go decisions made on all previous steps

The visualization for the technology commercialization phase gate process that includes evaluation criteria and listed key artifacts is shown in the process diagram on Figure 6.5 below

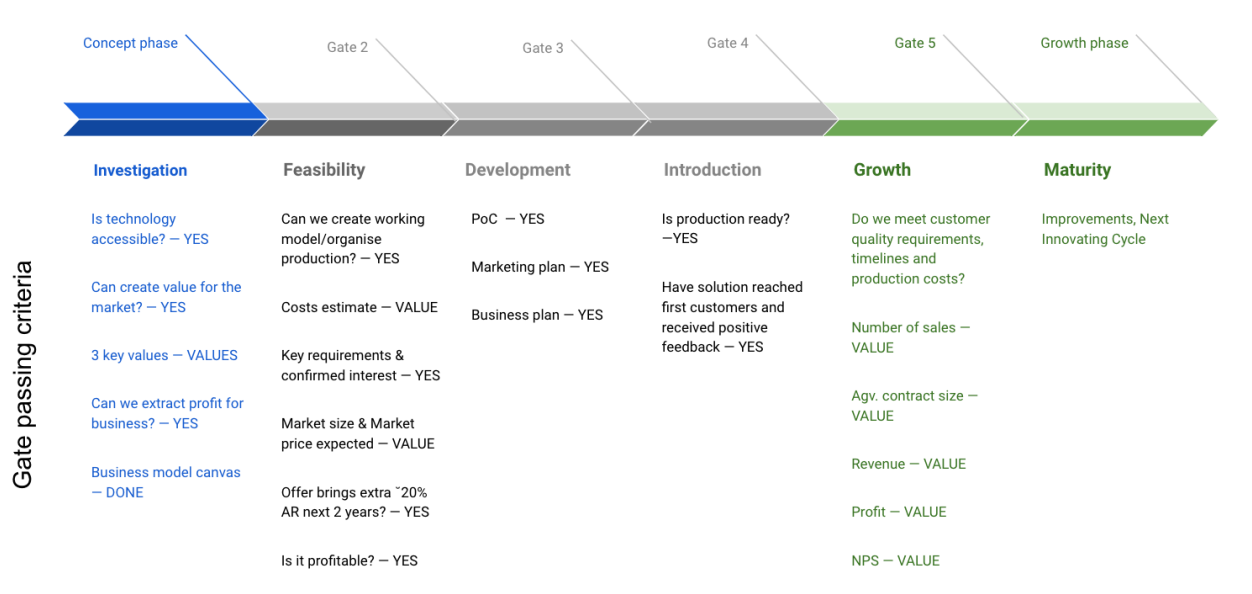


Figure 9.1 Custom technology commercialization phase gate process with evaluation criteria

The phase gate process diagram with 5 gates passing 22 evaluation criteria adds transparency and simplicity to implementation of the complicated Goldsmith Commercialization Model with 18 steps and 114 checklist questions.

Such a process description tool gives the opportunity to control and evaluate several projects for technology commercialization and a helicopter view of the Technology Commercialisation Strategy performance.

SECTION X

COMMERCIALISATION MODEL STEPS VALIDATION

On the operational side business has for each commercialization model step a detailed set of actions with checklists to take important decisions. The uncertainty for some checklist items is to be clarified before the model step is completed. It requires some analytical and research approach that helps to turn a hypothesis into knowledge to give answers needed to proceed or stop a particular commercialization process.

For hypothesis, validation could be used a variety of frameworks that allow testing ideas, defining innovation directions needed with targeted client segments, or analyzing offerings potential in a competition environment.

- **10 types of innovation**. Assess the business of potential customers from 10 perspectives. Identify potential complex solutions or service offerings.

- **Testing Business Ideas** David Bland and Alex Osterwalder framework for validation process steps is described in the book by Stargazer.

- Product management: **Competitors matrix analysis.** This type of analysis helps to identify who are your competitors? Who are the customers of the competitors? What are customer needs? How can you be better than competitors to win a customer segment?

10.1. 10 types of innovation

The design thinking methodology **10 types of innovation** provides an intuitive tool that allows defining key directions for innovations that will support clients' business growth. It follows the idea that many companies usually fail to innovate deciding to focus all efforts on one type of innovation. Selecting several most relevant innovation directions with discipline in executing gives more success probability in market competition.

10 types of innovation framework break innovations into three categories: configuration, offering, and experience. The most internally focused innovations on the framework scale are on the left. Moving toward the experience on the right, the innovation types become increasingly relevant to end-users expectations. The framework follows the idea that the decision to innovate in different categories brings more success in the innovation process.

Figure 10.1. 10 types of innovation framework innovations scale

This methodology is to be used in the entire phase of the model by the Market function (step 2). It allows having a broad discussion about innovations and solutions that might support it with involvement in workshop key stakeholders from the client side. The same practice can help to improve a solution or a product at the Maturity stage to use collected knowledge and experience for the next offering improvement cycle.

10.2. Business ideas validation

Testing Business Ideas is a framework for validation of business ideas with 44 ready-to-use experiment types included. It also provides the process and methodology with an explanation of how to set up and run experiments. It's a resource save and also follows lean best practices to run a sequence of experiments on a growing probability scale to fail fast with invalid ideas.

The business ideas validation generalized process is shown in the figure below

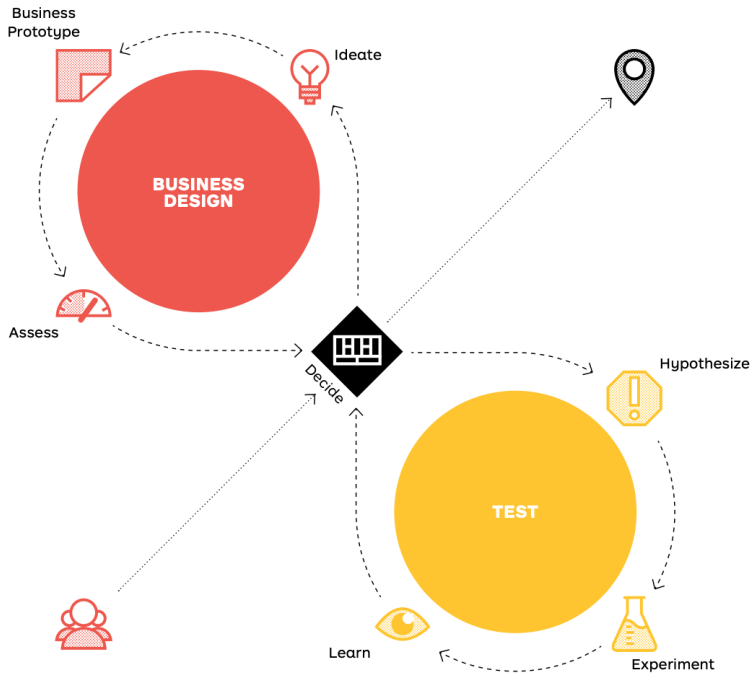


Figure 10.2 The business ideas validation generalized process

To test a product, solution, or a complex offering it brakes the idea down into hypotheses test flow. Framework hypotheses cover three types of risk to mitigate. First, is the desirability to confirm or deny that customers are interested. Second, feasibility — the ability to deliver solutions. Third, viability — matters for a business to focus on.

This breakdown fits well into the Goldsmith model structure Technology Market as feasibility, Market as desirability, Business as viability.

This gives an intuitive way to navigate among experiment types to select them for different steps.

10.3. Selected experiment types and tools

Experiment types from templates provided could also be selected in relevance to the particular type of hypothesis, customer type, and expected experiment accuracy. Custom checklists considerations allowed us to assume which experiments could be used for B2B software solution development by default and are shown in the table below.

Table 10.1 Experiments from Tests Business Ideas methodology mapped to Goldsmith Stages.

Model stage	**Experiments**
Stage 1 Investigation	1. Discussion forums (viability) we do not solve an important problem? we do not solve the main problem? we do not benefit the customer? How do users try to resolve the limitations of your service? 2. Boomerang (desirability) is the experiment type to find unsolved problems in the market with the help of an existing solution % of completed tasks and feedback

	3. 10 types of innovation
Stage 2 Feasibility	Interview with a B2B client or an interested specialist (desirability, viability). Helps to get a ranking of important tasks, problems, and benefits. Could be performed online on LinkedIn, Twitter, and specialized forums. Helps to Identify demand and price clients are willing to pay. The updated value proposition is a result.
Stage 3 Development	Clickable prototype allows for evaluating a % of completed tasks and receiving feedback (Opportunity, Desirability, Viability)
Stage 4 Introduction	1. Pre-sale (desirability, viability) helps to assess the market demand before the start of open sales. Could be performed by creating a landing of a dedicated product and buying traffic. Also helps with assumptions for expected orders by received requests. 2. Single-function MVP (opportunity, desirability, viability) Interest to buy after the attempt to use, also helps to estimate real production costs
Stage 5 Growth	1. Feedback 2. NPS 3. Interview with a B2B client
Stage 6 Maturity	10 types of innovation to rune another cycle of improvement

10.4. Competitive analysis matrix

Creating offerings requires a good understanding of the competition. The competitive analysis matrix approach gives clear output for analyzed product/solution strong and weak offering sides compared to competitors. It also provides a forecast for offering importance in a perspective for analyzed clients.

10.4.1. BaaS offering competitive analysis example

Competitive matrix analysis for the Company's BaaS offering competitive state (Figure 10.3) shows that doesn't perform well for Us (the Company) today, but it’s good in the long term for the most important Customer A and Customer C. Current offering is leaving leadership to Competitors and requires to review its performance.

The BaaS offering also points to the importance of the Customer types of A and C in the future to target with current offering in the current competition state and also shows the need to either improve the offering now to make it competitive or kill and focus resources on other if competition is lost with this one.

Competitive Matrix Template (BaaS offering)

	260	190	270											Us (long term)
How good each competitor is overall, from each customer's point of view	68	57	73										Us (near term)	
	174	208	210								Competitor 3			
	160	190	190					Competitor 2						
	160	190	190			Competitor 1								
	Customer A	Customer B	Customer C	Problems	Us (right now)	Now	Future	Now	Future	Now	Future			
	10	0	8	Problem 1	total number integrations	0	0	0	0	0	0	2	10	
	7	9	10	Problem 2	protocol updates support	6	10	5	10	5	12	3	10	
Importance of each problem to each customer	9	10	9	Problem 3	lack of resources to integrate	8	10	8	10	8	10	3	10	
				Problem 4										
				Problem 5										
Importance of customer to our strategy	10	9	8											
4830	1600	1710	1520	Competitor 1	(now)									
4830	1600	1710	1520	Competitor 2	(now)									
5292	1740	1872	1680	Competitor 3	(now)									
1777	680	513	584	Us	(near term)									
6470	2600	1710	2160	Us	(long term)									
Overall relative strengths of all competitors, given relative importance of each customer group as a function of our selected strategy														

Figure 10.3 Competitive matrix analysis for the Company's BaaS offering

Where Customer A is a new BaaS platform, Customer B is BaaS with all-important integrations, and Customer C is a BaaS platform that still needs to develop an integrations portfolio, but with an integrations portfolio in the middle of Customer A and B.

Same competitive analysis should be used to evaluate competitive state for other offerings as the part of marketing analysis made on the Goldsmith Model steps.

The competitive matrix analysis gives valuable insights for marketing to target experiments and communications to the most relevant client segments and can be used in every phase of the Goldsmith Model to keep under control market situation and competitors.

SECTION XI

PORTFOLIO MANAGEMENT

General changes in the client acquisition approach should also have a touch on the technology portfolio building strategy. To build a future portfolio Company should also consider technology market-related factors along with the client's needs and own capacity: time to market, technology maturity by TRL, and key success factors for commercialization like access to customer segment, competitors' development state, resources needed to be first in commercialization.

11.1. Time to market

Ability to be first in commercialization technologies just getting into the Adoption horizon (Gartner's Technology Bulleye) allows having premium conditions approximately for the first year which is close to a monopoly. In some existing business cases, the price for being 6 months ahead of the competitors is an additional ⅓ of total revenue during the life cycle of such product [HBR1990].

11.2. Technology maturity

Technology Readiness Levels (TRL) is the measurement to assess the maturity level of a particular technology. This measurement system includes nine technology readiness levels where TRL 1 is the lowest and TRL 9 is the highest. TRL scale is shown in Figure 11.1 with outlined commercialization phases: research, development, and deployment.

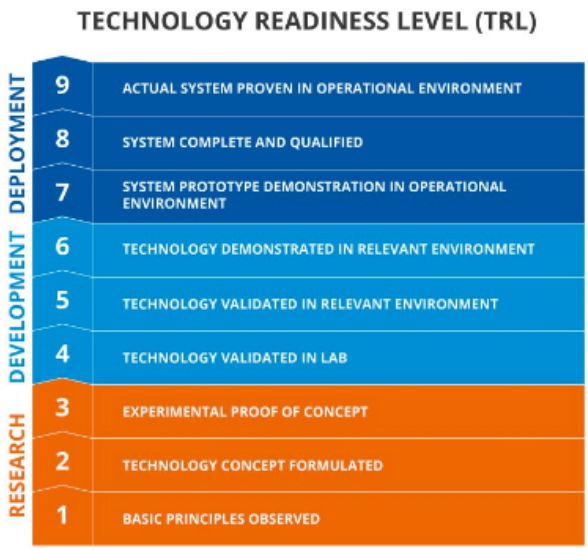


Figure 11.1 Technology Readiness Level (TRL)

Technology with TRL>5 accordingly to NASA (“Technology Readiness Level.” *NASA*, 28 October 2012) are technologies with working prototypes in a real environment. TLR>7 means ready for the introduction phase and towards a full production in the Growth phase reaching TRL=9.

To take the place of being the first to introduce new technology to the market, the company needs to broaden its strategic technologies portfolio from TRL 9 to technologies in the latest stages of commercialization, but still with the high maturity levels (TRL 6-7). i.e. technologies that are climbing the hype curve to explore the market and have business potential. This unlocks the opportunity to be among the first companies that can provide solutions and services in the adoption phase.

Considering technology horizons maturity as development prioritization in relation to portfolio management allows picking from relevant technologies list for discovery process with assumptions for time to market expectations.

11.3. The three horizons of growth

Following McKinsey idea of The three horizons of growth (Works Cited“Enduring Ideas: The three horizons of growth.” *McKinsey*, 1 December 2009), Company may also build its strategy on three horizons with different commercialization approaches and resources allocation.

Horizon one (1-3 years) represents company offerings identified as the main business that brings main profits and cash. Accordingly to McKinsey's ratio, about 70% of business resources are allocated on this horizon. These could be offerings that include most investment and proved technology “in use” with TLR 8-9.

Horizon two (2-5 years) includes new opportunities, that are likely to generate substantial profits in the nearest future but that could require time to develop solutions and business cases before they join main offerings and start to represent a sustainable revenue stream. These could be technologies in the adoption phase with TRL 7-6 and 20% of the development resources allocation.

Horizon three (5-7 years) is a pure R&D with ideas for profitable growth in the future. The technology horizon could come with TRL<6 and accordingly to McKinsey's 10% resources allocation.

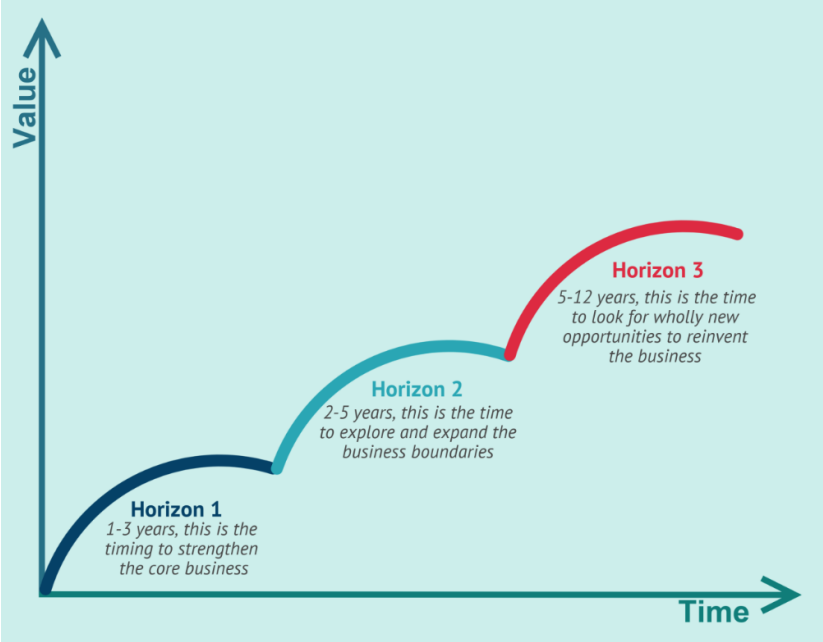


Figure 11.2 McKinsey The three horizons of growth. With credits to fourweekmba.com for the image source.

Based on McKensey 3 horizon and Gartner's Technology Bulleye adoption levels the Technology Commercialisation horizons schedule could be planned accordingly to keep the company growing its technology business. The assumption for a schedule that includes all 3 horizons is shown in the Table below to visualize how technology horizons move to a more mature level of adoption through exploration and development to become create revenue and profit stream for the Company in a 6 years cycle.

Table 11.1 Technology Commercialisation horizons schedule model based on McKensey's 3 horizons and Gartner's Bulleye Technology adoption levels

	Main offerings	Bussiness case development	Discovery
Technology maturity	*In Use*	*Adoption*	*Exploration*
McKensey horizon	**1**	**2**	**3**
2022	2022-1	2022-2	2022-3
2023	2022-1	2022-2	2022-3
2024	2022-2	2022-3	2024-3
2025	2022-2	2022-3	2024-3
2026	2022-3	2024-3	2026-3
2027	2022-3	2024-3	2026-3
2028	2024-3	2026-3	2028-3
2029	2024-3	2026-3	2028-3
2030	2026-3	2028-3	2030-3
2031	2026-3	2028-3	2030-3
2032	2028-3	2030-3	2032-3

In the table shown the model of technologies moving through McKinsey three horizon every 2 years in 6 years cycle. Technologies in the table are indexed and the index number e.g. "2022-1" describes the year and horizon of initiation in the Company (2022 year, 1st horizon). Technology initiated in 2024 as 3rd horizon technology

(Exploring stage by Gartner) will approximately become 1st horizon (technology in Use) 4-6 years after.

11.4. Capacity to commercialize

The Company should also consider its own strength factors that make its position competitive and the resources needed to create a successful business case with new technology or updated offering. One of the factors is related to technical expertise and the existing technology portfolio allows to build quickly on the successfully commercialized cases. This approach also allows to extend relations with existing clients and grow LTV.

To hypothesize which technologies are overlapping as wishable, feasible, and sustainable for business the Company could use existing technology development reports mentioned in this project before and employ technics for learning and analyzing new technology trends in relation to existing client segments' needs, industry trends, and scientific research publications.

11.5. Company culture in technology commercialization

Along with the new Model implementation that influences technology and marketing researchers' work the technology commercialization initiatives could be also launched in an informal way and become a part of the Company culture. As an example, some learning and sharing could happen at competency leads meetings, during delivery teams' involvement in discovery phases, or grow the interest in the form of a reading club or technology research lab. Research results could not only discover new technologies but also user case ideas, find new client segments and improve existing offerings.

SECTION XII

IMPLEMENTATION PROPOSAL

In the chapter above assessment and adaptation of a number of methodologies and frameworks to the Company strategy were made in order to adjust the technology commercialization model, and process to the Company context.

Outlining below approaches in implementation and plan for key changes in the Company required to have the Technology commercialization strategy deployed.

The idea of Technology commercialization strategy in the Company has never landed on the work agenda because of focusing resources for quick growth on ‘a low-hanging fruit’ opportunities. Extending strategic planning horizons with earlier stages of the technology commercialization process — product development and marketing R&D stages will give an opportunity to gain expertise and solutions built on new technology trends before their TRL hits mature levels.

The Technology Commercialisation Strategy canvas was presented and discussed with the Company COO (one ot the partners involved in operational activities). The general idea of establishing a structured commercialization process based on the phase gate approach in decision-making process was welcomed for both strategic and operational activities. This is to be decided during the next strategy session where the current strategy, internal and external environment changes, and technology market factors will be evaluated, and other strategic alternatives will be brought by partners to compare and decide on which to focus.

The upcoming Strategy Session is planned with the agenda for further steps in company development that includes formulating a vision for a longer term than a year. This will be the right place to take a strategic decision about Technology Commercialisation Strategy use for the Company, what customization for commercialization model, process, organizational changes, success factors, metrics, etc. will be needed to implement it.

12.1. Customization for commercialization model

The commercialization model customization was made on the assumptions of how it should work in the Company environment. Custom checklists (Exhibit 9.2) were made with the particularities knowledge of the current offerings and services, but could have other rounds of changes to be implemented and become part of the internal process guides. To adopt the model in the Company the Commercialization Model adoption project should be run at the TOP managerial level under the Strategy board of Founders supervision.

Some existing business processes, automated monitoring, and reporting processes will need to be changed to welcome the R&D unit with its responsibilities, resources, metrics monitoring, and KPIs calculation. Some management and cooperation practices will require changes to integrate with the new unit and make it work in synergy for the Company. This will be the responsibility of the operational board to be delivered as a result of the project dedicated to the operational level changes required.

Adopting the new commercialization model will include getting over some challenges not only related to changes in the existing business model and processes, but also in the company culture and the need to bring new knowledge and experiences into the Company.

12.2. Changes in the company structure

1st horizon technologies commercialization responsibility will stay as it's now — assigned to the current Delivery unit, marketing, and sales. The main changes required are to put efforts to improve offerings (considering competitors' analysis), build a strong presence with the improved offerings with marketing materials, and succeed in inbound/outbound client engagement.

To improve offerings custom checklist made for the Goldsmith Technology commercialization model and described in this work methodologies for testing business ideas, defining directions for innovations, and competitor analysis could be used.

The marketing and sales operations units are already in the process of building their confidence in cooperation for out/inbound leads and sales.

Another challenging question is — does the Company need to organize technology commercializing activities for technology trends from the 3rd horizon with a perspective of 5-7 years for commercialization? Will it end only in a waste of time and resources?

The Company today has no big experience in systematic technology commercialization. It will be the logical step to start with the technologies related to 2nd horizon first. This will allow to receive the first experience and start technologies and cases transfer to support the 1st horizon where the company generates profits and cash now. This will be also a quick proof that the technology commercialization strategy can be beneficial for the Company. And if it does then establish the next R&D line for 3rd horizon targeting trends with TRL<6.

2nd horizon for commercialization will be represented by the new in the company structure R&D unit with the responsibility to

1. Research and create offerings that the company will use for 2-3 years after the selected technology is started to be adopted by the client's segment,
2. commercialize the first cases of such offerings with the requirement to stay profitable in operations,
3. drive R&D part of the culture and related processes in the Company.

3rd horizon R&D activities from the beginning will be represented by a small dedicated research team of R&D unit that scouts opportunities for the 2nd horizon and develop them into project teams from the 2nd commercialization line, dedicates to 3rd horizon research approximately 30% of the time.

This approach will allow us to build on experience and confidence in R&D management and technology commercialization, and create innovating and engineering culture to contribute to sustainable business growth.

12.3. Commercialization process

The generalized custom technology commercialization process is described in the diagram below in Figure 12.1. It includes phases with key validation criteria, and artifacts needed to take a decision to pass the gate. Types of experiments and design thinking and analysis practices are also mentioned for each process phase.

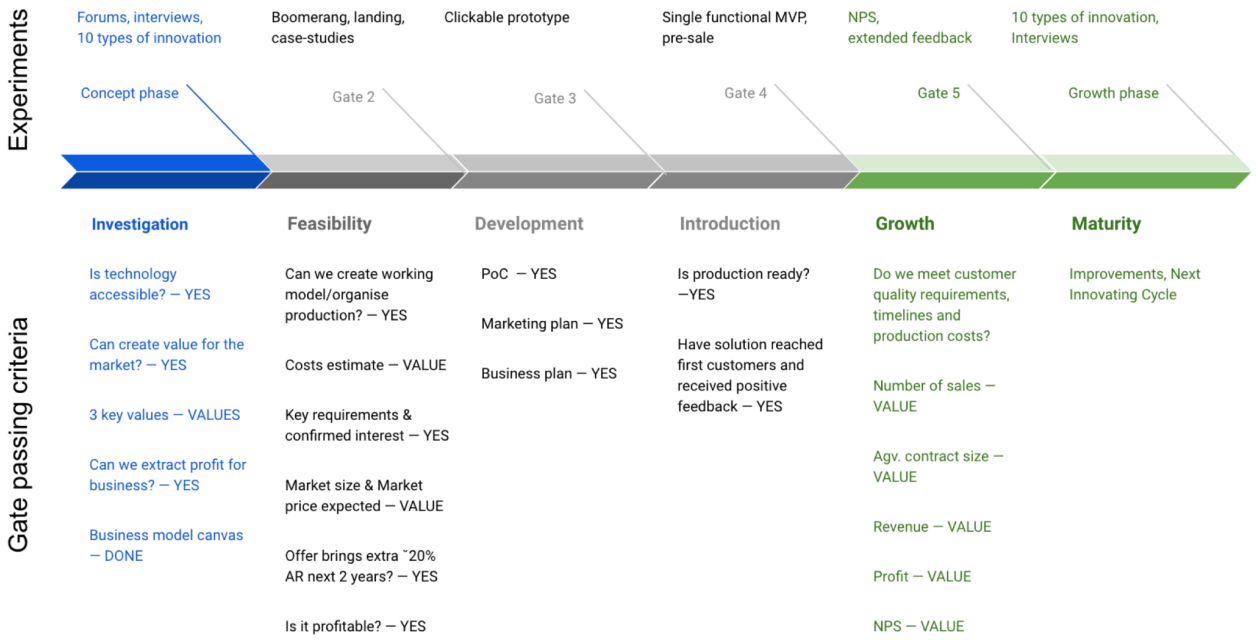


Figure 12.1 Custom technology commercialization process with gate passing criteria

Stakeholders for each phase were also described in the methodology assessment part of the work, decision-maker for each phase was also assigned.

Possible changes made by model customization during implementation will also affect assumptions for the process descriptions and gates criteria but will make it more adjusted in case such changes will be required.

12.4. Organizational structure changes

Organisational structure requires adding a separate R&D unit responsible for early phase gate process phases before **Introduction** where technology transition to production should take place before the **Growth** phase which is already under the responsibility of the Company business development. The size of the R&D unit will depend on the project need and software engineers could be allocated to R&D project

teams from the Delivery unit and vice versa. Estimation for the R&D unit size will be also presented as a model in the financial model sub-chapter below. The updated organizational structure with the R&D unit introduced is shown in Figure 12.2

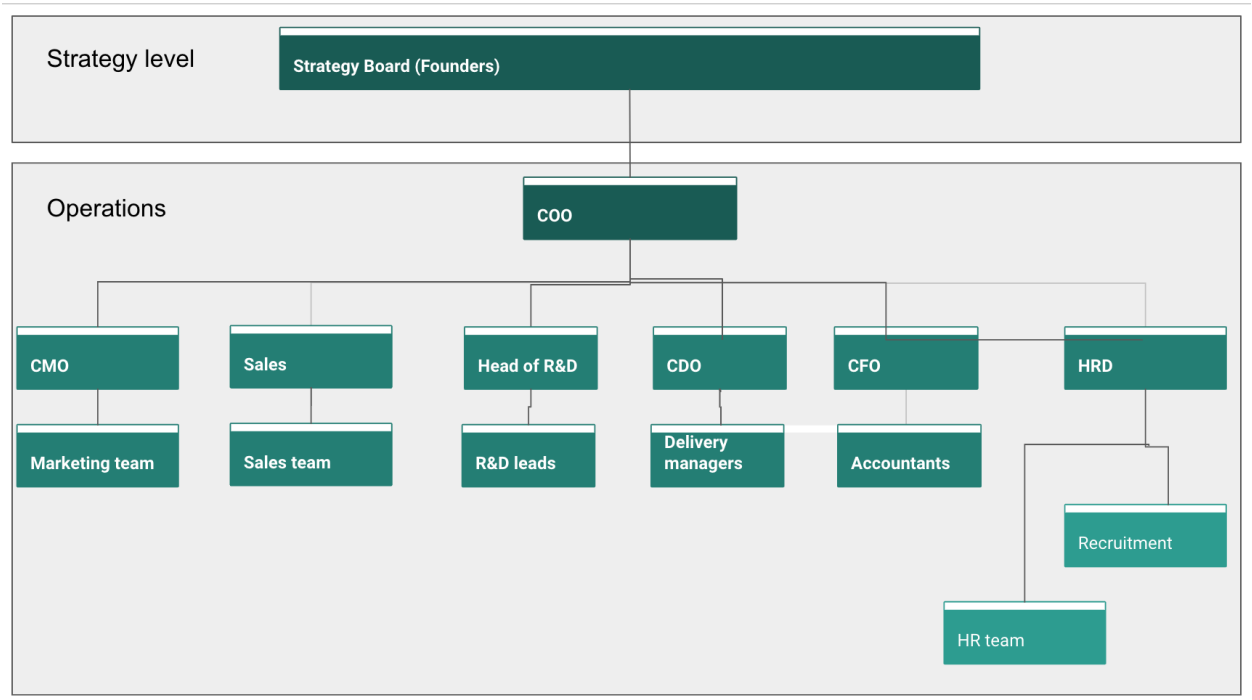


Figure 12.2 Updated organization structure for the Company that includes the R&D unit

The Head of R&D should report on the operational level to the COO

This role as responsible for R&D should also

— report on project phases progress,

— agree on projects basis on a budget for resources, services from other company units including dedicated experts allocation (marketing, recruitment and other),

be responsible for

— R&D unit management,

— new technologies/solutions research,

— delivering R&D projects results,

— first commercialization cases,

— knowledge and cases transfer to production,

— R&D unit profit.

12.5. R&D unit structure

R&D projects management has differences from projects management practices in production. It encompasses more uncertainty and requires building results with a number of technical and business experiments.

R&D leads (Research Leads) with an engineering background should have good management skills and a clear understanding of business requirements to have a critical view of experiments results and deliverables for business.

The structure of the R&D unit will be made of project teams as in production (delivery). Some projects may need expertise or additional resource from the Company's production, sales, and marketing and there should be a process that allows to allocate it for a limited time as an alternative for recruiting for the permanent allocation.

Development R&D will mostly require engineers, but Marketing R&D as one of the key activities will also require permanent experts who can manage marketing research and experiments, manage publications & traffic purchases, and MQLs management.

R&D project team members

Head of R&D

R&D leads (Research Leads)

R&D teams (Development R&D, Marketing R&D)

Cross-functional teams for projects that require temporary participation of other Company's units experts.

R&D Unit responsibilities were described in the **Changes in the company structure** chapter above.

12.6. Metrics & KPIs

Key metrics

Number of technologies/offerings in the commercialization process

Conversion rate (Technologies In / Technologies transferred to Sales & Production (Growth, Maturity)

Costs and Revenues

Other metrics

Commercialization projects progress (on which state it's in the phase gate process)

Business cases number

Number of MQLs, SQLs in CRM

KPIs

R&D Blended Profit Margin >10%

>2 main offerings/solutions a year transferred to production (1st horizon)

Each offerings/solutions must support min 20% of Company AR projection growth next 12 months

Metrics and KPIs for 3rd horizon responsible group are to be defined after 2nd horizon commercialization brings successful cases.

12.7. Changes success factors

- Endorsement by the company culture of innovations and engineering skills to grow.
- The right people are recruited to join the R&D unit (engineers, marketing, and management).
- Processes, budgets, and other resources are available, allocated, and controlled.
- New offerings and expertise are transferred and adopted by units responsible for Introduction and later commercialization phases.
- Operational level KPIs also depend on R&D unit success, goals encapsulating goals of R&D.

All company units are involved in technology commercialization strategy deployment to make necessary changes on their level fast to allow extracting business value out of changes made.

12.8. Finance Model

However R&D is usually assumed to be a cost center, development, and marketing R&D as the final stages of the technology commercialization process are able to generate not only future leads but also profits. Technologies in the adoption horizon (TRL 6-7) already have interest from innovating companies to create new products and differentiate from competitors. Such companies that invest in R&D projects or buy innovative solutions can be external R&D partners in technology commercialization with the right “first to the market”.

The financial model uses McKinsey's Three horizon ratio for the unit size required for sustainable business development. The calculation presented in the table below is

based on assumption that Technology Commercialization Strategy will give Company additional growth of 20% per year which corresponds with the KPI for Head of R&D.

Table 12.1 High level financial model for the custom Technology Commercialization Model

	Offerings and technologies			Teams size (growth factor 20%/Y)			Changes in value	
Technology maturity	*In Use*	*Adoption*	*Exploration*	*Production*	*R&D teams*	*R&D Scouts Team*		
McKensey horizon	**1**	**2**	**3**	**Delivery engineers**	**P+M R&D**	**TECH R&D**	**AR**	**Net Value**
2022	2022-1	2022-2	2022-3	60	3	0	1.0	4.0
2023	2022-1	2022-2	2022-3	78	22	11	1.4	5.0
2024	2022-2	2022-3	2024-3	94	27	13	1.7	6.0
2025	2022-2	2022-3	2024-3	113	32	16	2.0	7.3
2026	2022-3	2024-3	2026-3	136	39	19	2.4	8.7
2027	2022-3	2024-3	2026-3	163	47	23	2.9	10.4
2028	2024-3	2026-3	2028-3	196	56	28	3.4	12.5
2029	2024-3	2026-3	2028-3	235	67	34	4.1	15.0
2030	2026-3	2028-3	2030-3	282	81	40	5.0	18.1
2031	2026-3	2028-3	2030-3	338	97	48	6.0	21.6
2032	2028-3	2030-3	2032-3	406	116	58	7.1	25.9

AR (annual revenue) value for the first year isn't real, but taken as 1M.

Company Net Value for simplicity is calculated as the total for the next 3 years' AR projection.

P+M R&D stands for development and marketing R&D.

Technologies in the table are indexed and the index number e.g. “2022-1” describes the year and horizon of initiation in the Company (2022 year, 1st horizon). Technology initiated in 2024 as 3rd horizon technology (Exploring stage by Gartner) will approximately become 1st horizon (technology in Use) 4-6 years after.

The calculation also shows the number of engineering resources allocated in the Delivery and R&D unit with the assumption that the company is successful with R&D activities with technologies in the 2nd and 3rd horizons.

12.9. Gantt chart for Technology commercialization strategy validation

Scheduled plan describes steps needed to validate in the second half of the year 2022 Technology commercialization strategy model, process and managerial approaches for research projects to make it profitable function (plan for the pilot — pay for itself, Blended Profit Margin >10% on later development stages) that brings new business to the Company.

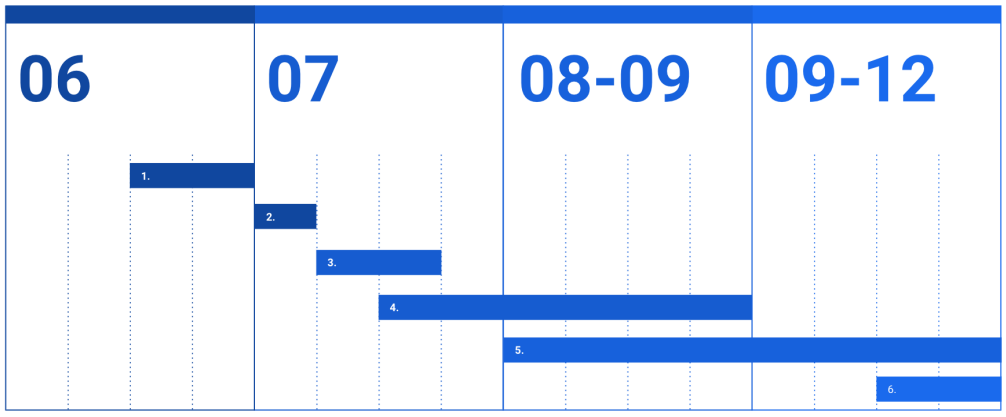


Figure 12.3 Gantt chart for Technology commercialization strategy validation

1. Run a pilot with sales and marketing for one of the current offerings to fulfill gaps and make improvements based on checklists and gate passing criteria.

2. Present in the next Strategy Session the Technology commercialization strategy as a new initiative to decide if this will be used in the Company.

3. Define the working group responsible for the Strategy implementation project, present and define the scope of work and create a working plan for changes.

4. Launch R&D Unit in pilot mode as a small group with shared from Production (Delivery) engineering resource and get through the introduction phase 2 new and 3 current updated offerings with business cases described.

5. Transfer knowledge and marketing materials to the Company sales and marketing team to update marketing resources, sales pitches, client segments target, etc. with offerings updates to run campaigns and check conversion from MQL to SQL.

6. Check on offerings performance and P/L results and decide either to continue incubating the R&D unit, but with its own engineering resources, run another pilot cycle, or kill the initiative.

SECTION XIII

CONCLUSIONS

In this projects the key business problems, technology, and business environments were identified for the Company in relation to its state, business development, and managerial practices. The found problems and growth opportunity factors were analyzed with the approach to the Technology Commercialization model, processes, tools, and practices use.

The implementation project's success results for the Company were also identified and look like this:

— the Company gets to the market leaders group with its business cases and competitive offerings in innovative technologies just entering the "In Use" phase.

— the Company has a sustainable ability to commercialize effectively on technologies "In Use".

— the Company has a balanced portfolio to stay profitable with no gaps in cash flow.

The methodology stack was selected to tackle the problem and embrace the technology market opportunities. Solutions based on customization for the Goldsmith Technology Commercialization model, Phase Gate process, selection of the research and experiments practices for Testing business ideas and designing innovations were proposed. Technology portfolio management practices are outlined with the use of technology maturity level and adoption horizon identification built in a model with horizons with 10 years projections.

The customized model with components approaches in business development, and changes in the company required were formalized to form the Technology Commercialization Strategy.

The implementation proposal with changes in organizational structure, responsibilities, units, metrics, and KPIs is ready. The financial model is created and describes company revenue and value growth in relation to billable and not billable engineering units including R&D growth and technology commercialization horizons for the Company portfolio. The pilot process for the Technology Commercialization Strategy phases was detailed on the Gantt chart as an imitation of the changes proposed in this project.

SECTION XIV

EXHIBITS

Exhibit 1: Example of Goldsmith phase with steps descriptions

	Technical Market	Market	Business
CONCEPT PHASE			
Stage 1 Investigation	Step 1 Technology Analysis	Step 2 Market Needs Assessment	Step 3 Venture Assessment

Goldsmith Concept phase with Stage 1 Investigation includes 3 first steps to complete Technology analysis, Market needs and Venture assessments.

Step 1 Technology Analysis

To have commercial value, the product or service should solve a real world problem better, cheaper, or faster than existing solutions, and the feature advantages of the new product must be more advanced than existing ones. You should remember that existing products and services are often supported by huge advertising budgets, aggressive marketing strategies, and fierce customer loyalty.

The purpose of this activity is to assess the intellectual property status of any technology involved in the product. This involves determining whether the product or any of its components are covered by intellectual property protection such as patents or copyrights.

Technical Activities

During the technical concept analysis step the following activities must be completed:

Define the concept fully

Demonstrate that performance assumptions are viable

Assess critical barriers to production

Survey the state-of-the-art of the technology

Estimate the working models costs

Milestones: Provisional patent, patent, copyright, patent scan, license agreement

Technical Information: The technical concept analysis will usually result in knowledge about the features of the technical concept, performance expectations, prior art, and other similar or related research and development activities.

Key Questions to validate technology market opportunities

Have you completed a technology database search?

Have you researched related patents or copyrights?

Have you researched technical journals and trade magazines?

Have you discussed the topic with experts?

Do you know the current state-of-the-art competitive technologies?

Have you selected the technologies for the application?

Have you determined the advantages of this technology?

Have you determined the risks for this technology?

Do the benefits of this technology or product offer significant advantages over the existing solution?

Step 2: Market Needs Assessment

At this level of analysis, the information comes primarily from secondary sources, existing market studies etc. The permissible margin for error at this level is large. This activity is designed more to qualify the market opportunity than quantify it at this point in the process. The purpose here is to develop a level of confidence about the marketability of the product.

Definition: The process of determining whether the concept demonstrates superior ability over current solutions to meet a market need.

Objective: The objective of a market needs assessment is to identify a potential market for the concept, estimate the market size and determine a preliminary value of the product.

Product: The product of this step is a short summary of information from trade journals, databases, and interviews which follows the marketing section of a standard business plan format.

Marketing Activities

The marketing activities common to this step are those necessary to demonstrate that the product is unique and sustainable in a competitive marketplace.

During the conceptual phase the following activities must be completed:

Identify three unique features or benefits of the product

Identify the competition

Establish customer requirements for the product

Identify potential market barriers

Identify market distribution channels

Identify product pricing criteria

Marketing Information: Completion of the conceptual marketing step will usually result in a rationale of why the product will receive a positive market response, gross estimates of the market and its segmentation, a simple explanation of how the product will be marketed, and an estimated price for the product.

Key Questions to validate marketing opportunities

Have you assessed the needs of the market?

Do you know the product uniqueness?

Do you know the product competition?

Do you know the customer requirements?

Have you identified the barriers to market entry?

Have you identified distribution channels?

Do you know the pricing criteria?

Step 3: Venture Assessment

This step initially involves answering a series of questions in logical sequence: Does it make more sense to license this product opportunity to a company that can take it to market, or does the entrepreneur have the resources and ability to pursue a commercial venture?

If the entrepreneur decides to pursue a venture, the next questions are: what experts are needed, how much and what kind of capital will is required, and what role will the founder play in the venture? The ultimate question, however, is: will this venture opportunity generate sufficient return on investment to justify the risk?

Definition: The process of determining whether the business opportunity demonstrates profit potential.

Objective: The objective of the venture assessment is to determine if the concept offers sufficient profit potential to pursue additional investment of time and money for additional research.

Product: The product of this step is a brief description of the business model.

Business Activities

The research activities common to this step are those necessary to demonstrate that the concept will generate a profit and that the organization is capable of taking the product to market.

During the conceptual phase, at least the following must be completed:

Identify financial, physical, and human resources required for commercialization

Identify the status of intellectual property requirements

Establish a positive profit potential

Business Information: Completion of the conceptual business step will usually result in an estimate of the revenues and costs of product sales, identification of source and use of capital for the development phase.

Key Questions to validate business opportunities

Do you have experience in launching a business enterprise?

Does this venture appear to have profit potential?

Are you the right person to commercialize the product?

Is your enterprise the right one to commercialize the product?

Have you estimated the resources (capital and service providers) required to launch your venture?

Have you researched the intellectual property considerations?

Exhibit 2: Offerings creation validation steps checklists analysis

Commercialization step	**Validation question**	**BaaS**	**Core & Pay Integrations**	**Middleware & Modules**
1. Technology Analysis	Have you researched online publications?	N	Y	Y
1. Technology Analysis	Have you researched related patents or copyrights?	N	N	N
1. Technology Analysis	Have you discussed the topic with experts?	Y	Y	Y
1. Technology Analysis	Do you know the current state-of-the-art competitive technologies?	N	N	Y
1. Technology Analysis	Have you selected the technologies for the application?	Y	Y	Y
1. Technology Analysis	Have you determined the advantages of this technology?	Y	Y	Y
1. Technology Analysis	Have you determined the risks for this technology?	Partly	Partly	Partly
1. Technology Analysis	Do the benefits of this technology or solution offer significant advantages over the existing solution?	N	N	Y
2. Market Needs Assessment	Have you assessed the needs of the market?	Y	Partly	Y

2. Market Needs Assessment	Do you know the solution uniqueness?	Y	Y	Y
2. Market Needs Assessment	Do you know the solution competition?	Partly	Partly	Partly
2. Market Needs Assessment	Do you know the customer requirements?	Y	Y	Y
2. Market Needs Assessment	Have you identified the barriers to market entry?	Y	Y	Y
2. Market Needs Assessment	Have you identified distribution channels?	Partly	Partly	Partly
2. Market Needs Assessment	Do you know the pricing criteria?	Y	Y	Y
3. Venture Assessment	Does this venture appear to have profit potential?	Y	Y	Y
3. Venture Assessment	Are you the right person to commercialize the product?	Y	Y	Y
3. Venture Assessment	Is your enterprise the right one to commercialize the product?	Y	Y	Y
3. Venture Assessment	Have you estimated the resources (capital and service providers) required to launch your venture?	Y	Y	Y
3. Venture Assessment	Have you researched the intellectual property considerations?	N	N	N
4. Technical Feasibility	Do you have an engineering prototype of the solution?	Y	Y	Y
4. Technical Feasibility	Have you identified what critical resources (components, expertise, budgets etc.) you will need?	Y	Y	Y
4. Technical Feasibility	Have you conducted final tests on the prototype?	Y	Y	Y

4. Technical Feasibility	Do you have a pilot production process?	Y	Y	Y
4. Technical Feasibility	Do you know how reliable the manufacturing will be?	Y	Y	Y
4. Technical Feasibility	Have you defined quality standards?	Partly	Partly	Partly
5. Market Study	Have you conducted a market study?	Partly	Partly	Partly
5. Market Study	Have you identified factors critical to the market environment?	Partly	Partly	Partly
5. Market Study	Have you identified the economic and industry trends?	Partly	Partly	Partly
5. Market Study	Have you quantified the market size?	N	N	N
5. Market Study	Have you identified the market segments?	Partly	Partly	Partly
5. Market Study	Have you identified the size, growth rate & competition of the market segment?	N	N	N
5. Market Study	Have you analyzed business capability for market share, competitive position, product capabilities, and resource capabilities?	Partly	Partly	Partly
6. Economic Feasibility	Does the venture demonstrate a positive economic feasibility?	Y	Y	Y
6. Economic Feasibility	Have you developed a break-even financial analysis for the venture?	N	N	N
6. Economic Feasibility	Does the venture offer financial returns that justify investment?	Y	Y	Y

6. Economic Feasibility	Have you compared the merits of licensing to venture?	N	N	N
7. Engineering Prototype	Do you have an engineering prototype of the solution?	Y	Y	Y
7. Engineering Prototype	Have you identified what critical resources (components, expertise, budgets etc.) you will need?	Y	Y	Y
7. Engineering Prototype	Have you conducted final tests on the prototype?	Y	Y	Y
7. Engineering Prototype	Do you have a pilot production process?	Y	Y	Y
7. Engineering Prototype	Do you know how reliable the manufacturing will be?	Y	Y	Y
7. Engineering Prototype	Have you reached the quality standards?	Partly	Partly	Partly
8. Strategic Market Plan	Have you defined the competitive advantages of the enterprise and the solution?	Partly	Partly	Partly
8. Strategic Market Plan	Have you defined market objectives for the solution, market image, service levels, market share, and sales levels?	N	N	N
8. Strategic Market Plan	Have you selected target markets?	Partly	Partly	Partly
8. Strategic Market Plan	Have you selected your market niche?	Y	Y	Y
8. Strategic Market Plan	Have you selected solution features?	Y	Y	Y
8. Strategic Market Plan	Have you selected a price?	Y	Y	Y

8. Strategic Market Plan	Have you selected distribution channels?	Y	Y	Y
8. Strategic Market Plan	Have you obtained direct market feedback?	Partly	Partly	Partly
9. Strategic Business Plan	Have you developed and formalised a strategic business plan?	N	N	N
9. Strategic Business Plan	Have you finalized the intellectual property requirements?	N	N	N
9. Strategic Business Plan	Have you finalized the business organizational structure?	Y	Y	Y
9. Strategic Business Plan	Have you selected advisory team including external senior experts?	N	N	N
9. Strategic Business Plan	Have you finalized agreements on any concurrent break-through?	N	N	N
9. Strategic Business Plan	Have you developed a formal financial plan that includes the strategy and timing of present and future funding rounds?	N	N	N
9. Strategic Business Plan	Have you developed a detailed business plan for solution development including objectives, schedules, milestones and allocations of the required financial and human resources?	N	N	N
9. Strategic Business Plan	Can you ensure that management has critical experience and expertise in technology/product/market and business development?	N	N	N

9. Strategic Business Plan	Have you formed a cohesive commercialization team (design, manufacturing, marketing, management)?	N	N	N
10. Business Start-Up	Have you initiated business activities?	Y	Y	Y
10. Business Start-Up	Have you established hiring criteria?	Y	Y	Y
10. Business Start-Up	Have you hired and trained core personnel?	Y	Y	Y
10. Business Start-Up	Have you executed contracts?	Y	Y	Y
10. Business Start-Up	Have you arranged for the next stage of financing?	Y	Y	Y
10. Business Start-Up	Do you convene regular board of director meetings?	Y	Y	Y
10. Business Start-Up	Have you developed a business policy and procedure manual?	Partly	Partly	Partly
10. Business Start-Up	Have you established control mechanisms for cash expenditures that correspond with the business plan?	Partly	Partly	Partly
10. Business Start-Up	Have you established a dynamic process for strategic and tactical planning for the enterprise?	Partly	Partly	Partly
11. Pre-Production Prototype	Do you have a production prototype of the solution?	Y	Y	Y
11. Pre-Production Prototype	Have you conducted pilot production?	Y	Y	Y
11. Pre-Production Prototype	Have you selected the production process?	Y	Y	Y

11. Pre-Production Prototype	Have you selected the production resources?	Y	Y	Y
11. Pre-Production Prototype	Have you conducted full scale production?	Y	Y	Y
11. Pre-Production Prototype	Do you have a commercial-level design?	Y	Y	Y
11. Pre-Production Prototype	Do you have quality control procedures?	Y	Y	Y
12. Market Validation	Have you conducted limited solution sales?	N	N	N
12. Market Validation	Have you quantified the volume, rate, and demographics of sales?	Partly	Partly	Partly
12. Market Validation	Have you designed and implemented a customer survey?	N/A	N/A	N
12. Market Validation	Have you analyzed customer feedback (price, design, function, delivery)?	N/A	N/A	Y
12. Market Validation	Have you analyzed your competitor's response?	N/A	N/A	N
12. Market Validation	Have you incorporated marketing modifications into the market plan?	N/A	N/A	Y
12. Market Validation	Have you transmitted design modifications to technicians?	N/A	N/A	Y
13. Production	Do you support commercial production?	N/A	N/A	Y
13. Production	Do you have after market support for the solution?	N/A	N/A	Y
13. Production	Have you improved the production process?	N/A	N/A	Y
13. Production	Do you support a warranty?	N/A	N/A	Y

14. Sales and Distribution	Have you established solution distribution and sales?	N/A	N/A	Y
14. Sales and Distribution	Have you identified areas for market expansion?	N/A	N/A	Y
14. Sales and Distribution	Have you assessed customer satisfaction?	N/A	N/A	Y
14. Sales and Distribution	Have you assessed distributor satisfaction?	N/A	N/A	Y
14. Sales and Distribution	Have you refined solution features?	N/A	N/A	Y
15. Business Growth	Are you engaged in full-scale production?	N/A	N/A	N
15. Business Growth	Have you arranged for full scale production financing?	N/A	N/A	N
15. Business Growth	Have you institutionalized a corporate vision, mission, and policy?	N/A	N/A	Partly
15. Business Growth	Do you have a process to monitor business trends and practices?	N/A	N/A	N
15. Business Growth	Can you identify opportunities and threats to enterprise profits?	N/A	N/A	Partly
16. Production Support	Do you support commercial production?	N/A	N/A	Y
16. Production Support	Do you have after market support for the solution?	N/A	N/A	Y
16. Production Support	Have you improved the production process?	N/A	N/A	Y
16. Production Support	Do you support a warranty?	N/A	N/A	Y

17. Market Diversification	Have you diversified your solution?	N/A	N/A	N
17. Market Diversification	Do you have a market environment scanning process?	N/A	N/A	N
17. Market Diversification	Do you make resource allocations for continual improvement?	N/A	N/A	N
17. Market Diversification	Do you make resource allocations for new solution development?	N/A	N/A	N
18. Business Maturity	Are you optimizing the company's profit potential?	N/A	N/A	Partly
18. Business Maturity	Have you implemented an internal company diagnostic process?	N/A	N/A	Partly
18. Business Maturity	Do you provide continuing education and training opportunities?	N/A	N/A	Y
18. Business Maturity	Do you explore alternate management technologies?	N/A	N/A	Y
18. Business Maturity	Do you reinvest profits?	N/A	N/A	Y
18. Business Maturity	Do you monitor product life cycles in the enterprise portfolio?	N/A	N/A	N
18. Business Maturity	Do you monitor opportunities and treats to enterprise profits?	N/A	N/A	Partly
18. Business Maturity	Can you identify opportunities and threats to enterprise profits?	N/A	N/A	Partly
18. Business Maturity	Do you conduct strategic and tactical planning for the enterprise?	N/A	N/A	Y

Y — Done

N — Not Done

Partly — Done partly (incomplete action)

N/A — not applicable to commercialization project state

SECTION XV

SOURCES

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