

Streamline Your Open Innovation Process and Reconcile it with Intellectual Property

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Technology cross-pollination and globalization, along with the demise of silo mentality, have put significant pressure on the front-end innovation process to identify ideas worthy enough for development and commercialization. The most efficient innovation processes include Design Thinking and Stage-Gates. We propose a new model where software will help manage data integrity, quality control, multiple outputs and open collaboration. When the chaos serves the efficiency, the ability to get better at innovating will not be lacking.

Introduction

AI, Big Data, 3D printing, Blockchain ... these themes are as familiar to an automotive engineer as a pharmaceutical scientist. While a clinician applies Deep Learning in conjunction with sophisticated bioinformatics tools to assist cancer diagnosis and prognosis, the coffee maker Starbucks wants to use a blockchain system that will track beans from farm to cup. Technologies cross-pollinate, the process of combining previous separate concepts, and while not new, globalization has made the phenomenon more significant and impactful. This leads to several changes, including how a company understands and inserts itself into a market and how a company innovates.

Historically a company monitored its market by knowing its competitors, customers and narrowly evolving technologies. This vertical market monitoring, where a market is viewed as a silo, was efficient and succeeded in covering risks and anticipating changes. Technologies are now moving from one field to another with unprecedented speed, making market walls porous. Applying that scenario to a company like Toyota the question becomes who will compete with in the future. Will it be Ford, the fleet of self-driving vehicles of Waymo or even a personalized jet pack device manufacturer?

Paradigm shift

It's difficult to anticipate who will emerge as a new leader or competition in the marketplace. It's also almost impossible to bring a disruptive innovation into the marketplace without collaborating with another entity with a different and complementary set of skills. This scenario requires horizontal market monitoring, with the need to watch products and services meeting the needs of a wider range of buyers across different sectors of an economy. It means identifying the start-up you may need to acquire or the technology you need to master that are not part of your traditional market sector. The range of possibilities for meeting consumers' demand is exploding. Technology cross-pollination, globalization and the end of the silo mentality are creating challenges for a company trying to innovate.

This situation puts a lot of pressure on the innovation process, especially in its early stage where opportunities are identified, and concepts are developed. It must evolve too, helping corporations perform better to identify and roll out new products in the market with shorter idea-to-launch time while remaining flexible and open to external collaboration. The goal of this article is to explain how to streamline and upgrade internal processes to improve the effectiveness of innovation.

Literature review

The innovation process may be divided in two parts: front-end innovation (FEI) and new product development. The FEI phase is the period when an opportunity for a new product or service is first considered to when the product idea is judged ready to enter formal development [1]. Conversely the new product development phase is goal-oriented with a project plan focused on sequential and well-practiced routines. FEI is often seen as a dynamic and unstructured process, requiring more energy and more divergent and expansive thinking. However, this lack of structure is illusory as different tasks and

stages must be accomplished to run a good front end process. Depending on the methodologies and models applied by an entity, the stages may differ, but all manage the development of the ideas and define checkpoints to control quality.

Among all the innovation models, two are widespread and successful enough to be credible and worthy of further consideration.

The first one is “Design Thinking” as it is applied to the innovation process. Emerging in the 1950’s and based on creativity techniques, the methodology has delivered a multitude of models and a toolkit of methods. It was popularized in the 21st century by Stanford University and its d.school¹ [4] but also by authors like T. Brown, C. Meinel or H. Plattner in severable published articles and books [2; 5]. It is a system of overlapping spaces rather than a sequence of orderly steps. It is a chaotic model that consists of five major iterative steps [2].

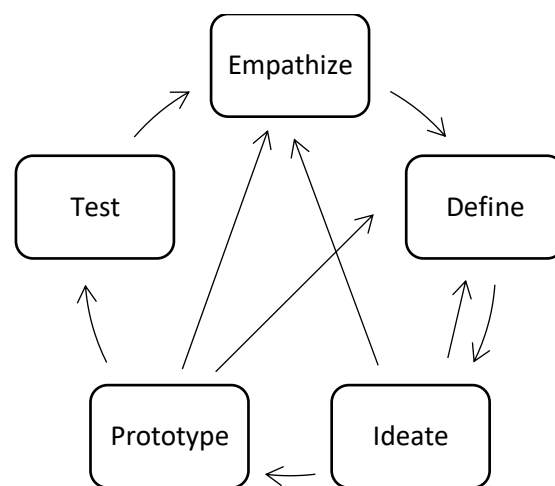


Figure 1. d.school Design Thinking process

FEI matches the first 3 and half steps (Empathize, Define, Ideate and part of Prototype) of the Design Thinking process, as it stops once the concept, a feasible idea meeting a business opportunity according to a specific business model, is defined the team in charge to develop the idea. As a rule, a proof of concept (PoC) in the form of a prototype can be done to prove the technical feasibility, but it must be differentiated from the prototype developed during the new product development phase. Among the limitations of the Design Thinking approach, literature and specialists [6; 7] insist on its intuitive and creative sides which can move it away from reality, preventing it from scaling up and removing the barriers of the ecosystem. Moreover, the methodology can generate too many outputs, putting pressure on the process which by design is “open”.

The second innovation model is called the Stage-Gate process. The traditional methodology was described by Robert G. Cooper (1990) [3] and applies the process management methodologies to the product innovation process. The Innovation process is divided into several stages where activities takes place and deliverables are expected. Between each stage is a gate to control quality.

¹ The Hasso Plattner Institute of Design at Stanford, commonly known as the d.school, is a design thinking institute based in Stanford University

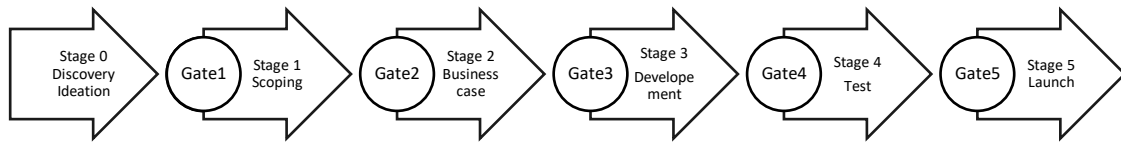


Figure 2. Stage-Gate process is taken from: R.G. Cooper (2017) [3]

As a rule, the FEI process is covered by the first few stages, from stage 0 to gate 3. Although this process is efficient, the main limitations of the Stage-Gate approach are its lack of flexibility, iterative cycles, emphasis on external collaboration and data integrity [3]. The lack of data integrity is caused by teams gathering data on their own, including gathering inconsistent data using non-homogeneous methods and uncertain sources.

Proposed method

We are presenting, in this article, an efficient Front-End Innovation process, based on the strengths of the two previous approaches. It utilizes a suite of software to streamline the workflow and resolving some important pitfalls such as: data integrity, quality control, multiple outputs management and open collaboration.

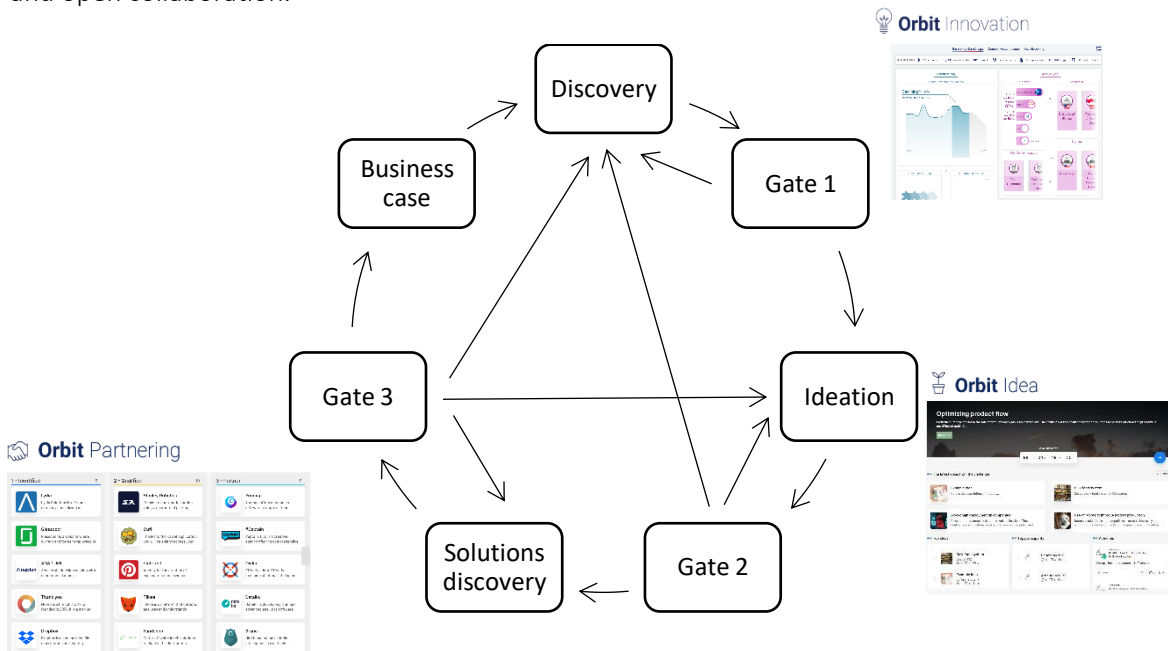


Figure 3. Questel Front End Innovation process

Gates are transformed into questions or metrics used to judge the inputs while phases will become actions and deliverables. Here are the definitions.

Discovery: When searching for new product ideas it is beneficial for an organization to look at the outside world for potential business opportunities. This phase helps identify market trends, potential technology cross-pollination and unmet consumer need occurring in the market. The objective is to deliver a list of problems and/or opportunities based on that information.

Gate 1: The role of this gate is to scope or prune the list of opportunities, identifying the ones closest to the company's strategy. *Which opportunity is the most in line with my corporate strategy?* The opportunities should be expansively defined to encompass as many different potential products as possible.

Ideation: From each of the selected opportunities or problems, internal and/or external challenges could be launched. The challenges can include brainstorming, utilizing all methods to generate as many *ideas* as possible. The objective is to deliver a list of detailed ideas related to the opportunity identified during the discovery phase.

Gate 2: The best ideas move to the next phase based on metrics that evaluate their potential to disrupt the market, popularity, and/or potential business or market need. *Which ideas most disrupt the market needs?*

Solutions discovery: This phase assesses the feasibility and potential for success of the selected ideas including identifying personnel with the expertise to develop those ideas. It might also be the time to scout potential external partners, e.g. small and medium size enterprises (SMEs), startups and/or universities. This phase also identifies potential competition and assesses the related intellectual property.

Gate 3: This challenging gate is the hardest as the ideas start becoming concepts with the output being a plan. The plan will address: *What resources will be involved? How will we manufacture the product? What will be the competitive advantage?*

Business case: This last phase of the FEI process creates a business plan and estimates the market. There is confidence that the product can be made as shown by the prototypes and/or validated proof-of-concepts of the use cases. The deliverable is a document that defines the product and provides the rationale for developing it. True product development begins and joins stage 4 of the Stage-Gate process.

Now, we are going to focus on how Questel can bring you solutions to carry out this method.

Discovery

Understanding the requirements of unfamiliar markets can be challenging for organizations trying to speed-up innovation. Value-focused insights on how transformative developments will impact future markets are needed. It's also important to understand how mega trends are acting on a market. These mega trends can be technological, social, strategic and/or economical. At this early stage, it is important to have data integrity as the data will impact the innovation processes down the road. Moreover, the more robust the information gleaned from the data, the more robust the decisions made at the first gate. This means the data sources must be reliable, homogenous and consistent between the different processes. Using the power of Big Data and advanced visualization tools, innovation intelligence software provides this level of integrity. It cross-searches through several data sources, collecting patents, scientific publications, clinical trials, research and development (R&D) projects, startups, mergers & acquisitions data and webpages on a specific search topic. This needs a large result set that's not technologically bound and yet related to a desired effect or market application to be relevant for the discovery phase.

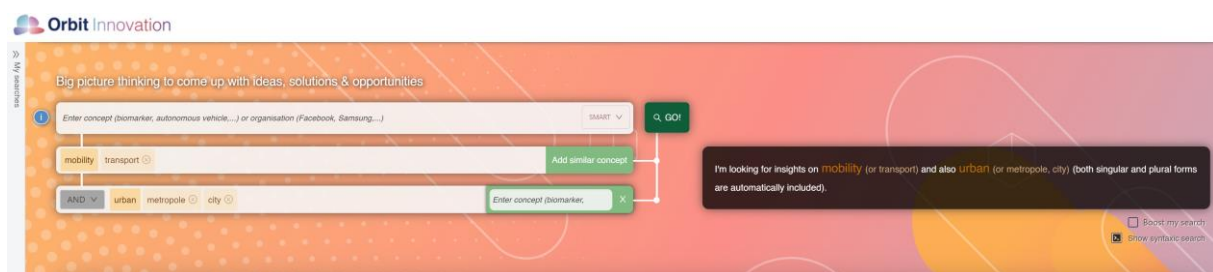


Figure 4. Orbit Innovation™ search engine

The diversity of the data is key to understanding the business environment along with patents and articles bringing the necessary structure to make the analysis reliable. The news and business information keep the results up-to-date and provides current insights. But data diversity comes with



Title	Ty...	URL	Organisation	
Data	html	http://www.eurocities.eu/eurocities/working_group/Data&tpl=home	EUROCITIES	
http://mws.eurocities.eu/MediaShell/media/EUROCITIES_general_information_leaflet_2019.pdf	pdf	http://mws.eurocities.eu/MediaShell/media/EUROCITIES_general_information_...	EUROCITIES	
Aistom to supply 10 extra Citadis trams to Bordeaux Métropole	html	http://www.aistom.com/press-centre/2018/01/aistom-to-supply-10-extra-citadis-1...	Aistom Ltd	
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Montpellier Fab lab LABSud is loaded with makers Invest In Montpellier	html	https://www.invest-in-montpellier.com/en/actualites/montpellier-fab-lab-labsud-lo-...	Montpellier Agglomération	
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Innovation	html	http://www.eurocities.eu/eurocities/working_group/Innovation&tpl=home	EUROCITIES	
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SENSE - PHD summer school on Urban Metabolism and Water Management: Smart Solutions for L...	html	http://www.sense.nl/courses/past/10869211/PHD-summer-school-on-Urban-Met-...	Sense Research School	
SENSE - Course	html	http://www.sense.nl/courses/search/item/10869211/PHD-summer-school-on-Urb-...	Sense Research School	
A first in Europe: an experimental on-demand transport service provided by autonomous vehicles, L...	html	https://www.transdev.com/en/press-release/a-first-in-europe-an-experimental-on-...	Transdev (ex Veolia Transdev)	
social affairs	html	http://eurocities.eu/eurocities/forums/social-affairs&tpl=home	EUROCITIES	
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Urban Planning in 3D: How Creating a Digital Twin Leads to Smarter Cities	html	https://meetingoftheminids.org/urban-planning-3d-creating-digital-twin-leads-sm-...	Meeting of the Minds	
culture	html	http://eurocities.eu/eurocities/forums/culture&tpl=home	EUROCITIES	
Urban Air Mobility: is the future of mobility be in the air? - Blog Sopra Steria	html	https://blog.soprasteria.com/urban-air-mobility-is-the-future-of-mobility-be-in-the-...	Kentor	

Excel Document

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HTML Page

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The Urbanist

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Name	A.K.A.	Type	Cost	Funding	Date
Coordination and support Action for Mobility in Europe: Research and Assessment	CAMERA	H2020	€1,4M	€1,14M	2017 - 2021
Support Action Towards Evaluation, Learning, Local Innovation, Transfer and Excellence	CIVITAS SATEL...	H2020	€2,99M	€2,99M	2016 - 2020
CIVITAS ELEVATE - CIVITAS 2020 Coordination and Support Action	CIVITAS ELEVA...	H2020	€2,99M	€2,99M	2019 - 2023
Nacht der Wissenschaft in der Kiel Region 2018/2019	SCIENCE4FUT...	H2020	€166,75k	€166,75k	2018 - 2019
Rail Infrastructure Systems Engineering Network	RISEN	H2020	€1,17M	€1,05M	2016 - 2020
The definitive 100% energy autonomous, CO2-free and recyclable last mile solution	BICAR	H2020	€71,42k	€50k	2018
Open social transport network for urban approach to carpooling	SocialCar	H2020	€5,95M	€5,38M	2015 - 2018
ENHANCED ON-STREET PARKING MANAGEMENT SYSTEM	FastPik-2	H2020	€2,15M	€1,5M	2016 - 2018
MOBILIZING FOR BASIC INCOMES. SOCIAL INNOVATION IN MOTION	MOBILISE	H2020	€304,72k	€304,72k	2019 - 2022
European Research Area for Climate Services	ERA4CS	H2020	€78,28M	€25M	2015 - 2020
Innovative customer forecasting system with 32% savings in Taxi operational costs	Smartaxi	H2020	€71,42k	€50k	2016 - 2017
City Platform as a Service - Integrated and Open	CPaaS.io	H2020	€1,78M	€1,32M	2016 - 2018
ATS Rotorcraft 2035 Forecast	FORROT2035	H2020	€149,97k	€149,97k	2017 - 2018

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The key to creativity, according to Steve Jobs, is to think about “the best things that humans have done and then to bring those things into what you are doing.”² The objective is to use innovation intelligence software tool to identify a list of technological mega trends, based on data sources that are reliable and accessible by the entire team. It’s important to remember that technology cross pollination and horizontal market intelligence can describe an unfamiliar market segment. For that crucial first step, it’s necessary to be equipped with a software tool that’s capable of providing accurate, concise, useful information quickly and effectively. That’s what Orbit Innovation™ helps to do.

Ideation

The ideation phase means generating a lot of new ideas around a business opportunity. Idea generation can take many forms including an internal challenge harnessing the employees’ collective intelligence, an innovation hackathon involving external participants to find solutions and/or simple brainstorming activities. One of the main criticisms of this phase is the chaos generated and the difficulty of capitalizing on the multitude of inputs. Collecting, centralizing, structuring and ranking the ideas are the main features of this phase. An idea management platform is what we propose to leverage the ideation phase.

The first step of this trend, from the example above, is that *urban mobility has to be respectful of nature (green spaces) and of people (commuter behavior)*. The next task is to reformulate this trend into a challenge, a question, that will be asked of our panel of contributors: *How can personalized travel (people) align with urban ecology (green spaces)?*

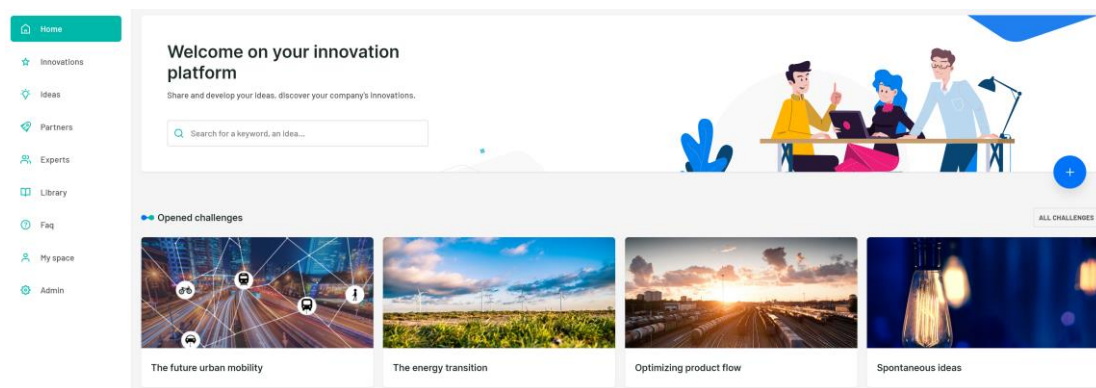


Figure 7. Orbit Idea™ Open a new challenge on the urban mobility

Orbit Idea™ can be used to collect and organize the results of brainstorming instead of relying on sticky notes (electronic or physical) or Word documents. Orbit Idea™ uses the principles of gamification to rank contributions, sets up some rules for the challenge and provides “likes” functionality that can be linked to rewards. **This can be coupled with animation for the event and workshop as the platform both encourages and captures participation.**

² Steve Jobs, the cofounder and former CEO of Apple Computer, amplified this sentiment in a 1994 interview

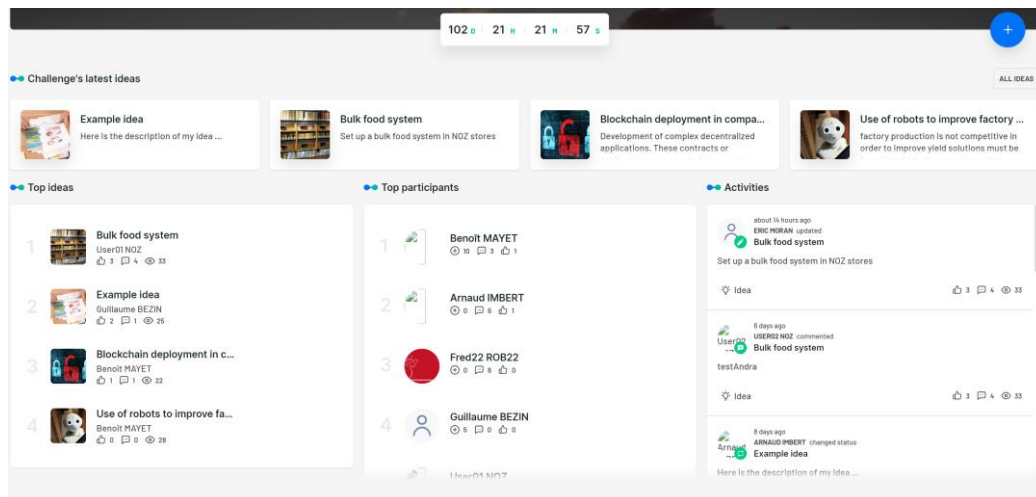


Figure 8. Orbit Idea™ Challenge page where the activity is displayed

Without much effort, it's possible to manage a huge amount of data including outputs, ideas and new concepts as they can be organized according to themes, business units and teams. Synergies can be found automatically with our similarity algorithm which can also help identify new concepts. The functionality also allows for the efficient use of built-in advanced searching and filtering and tracking and analyzing idea success rates.

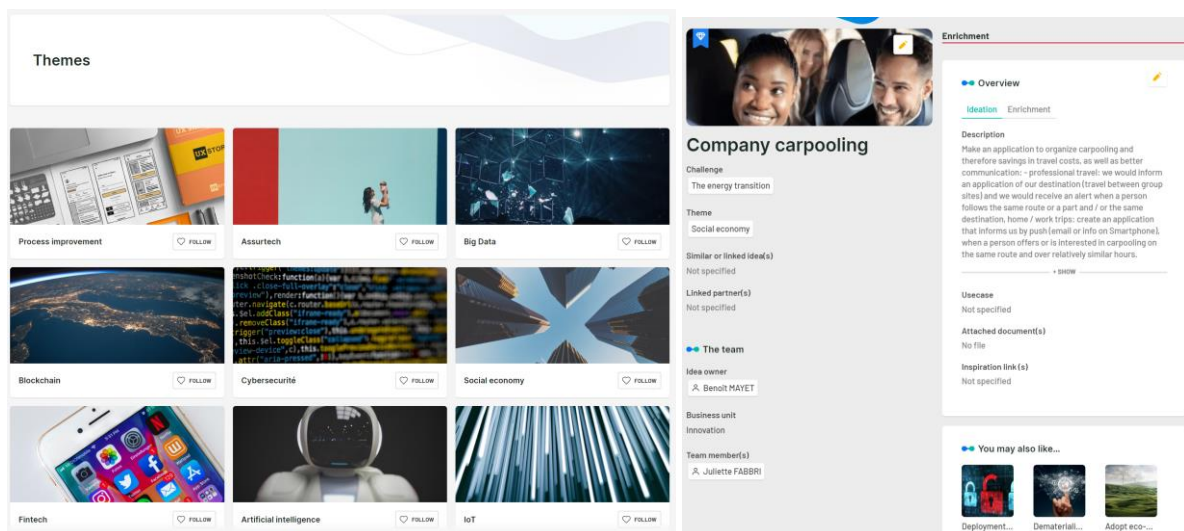


Figure 9. Orbit Idea™ Themes distribution and Idea profile

Because everything is saved in the same place, you can merge different challenges, ideation sessions and creativity workshops. The platform also works as a digital suggestion box. The problems with iterative processes will be solved as you return to the discovery stage and/or relaunch a challenge on another theme without losing the benefits of the previous ones. You will be more efficient and remain in control of the data.

Gate 2

This gate is equally important as it determines which ideas will potentially progress into the following phases. It also triggers the need to think about protecting the intellectual property rights involving the ideas. Even if technical solutions are not mature yet, it might be wise to favor ideas where the patent landscape looks like white space and not a minefield.

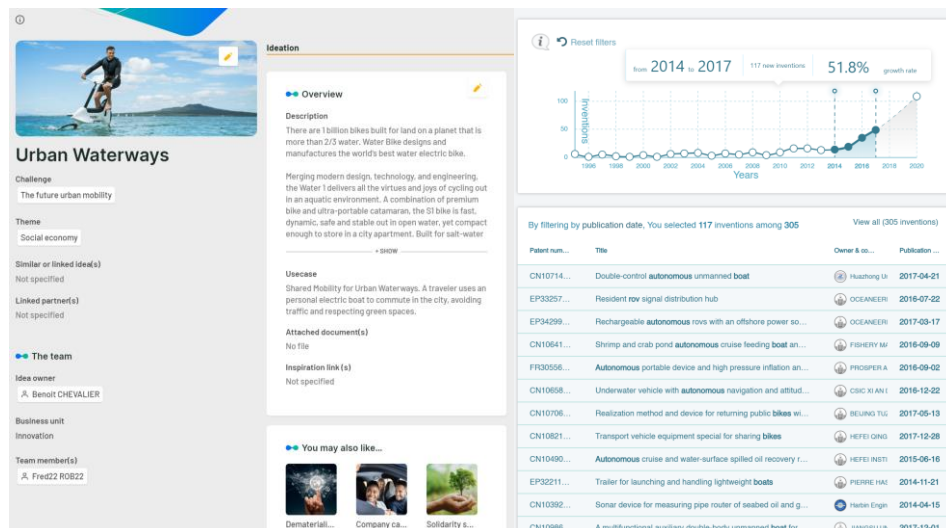


Figure 9. Orbit Idea™ and Orbit Innovation™ Patent landscape on the best ideas

Patent landscapes and white space analyses are often conducted by professional patent searchers familiar with the technology and the markets and experienced with patent search techniques. For the other selection criteria, we will focus on the idea's usability, stickiness, originality and value proposition in the context of the business opportunity.

Solutions discovery

At this point the challenge has been a success with lots of good ideas, the greater volume the better. Hopefully some ideas are particularly original and capable of creating high value for the company and future customers. This phase begins with the analysis of the technical feasibility and potential integration of the chosen ideas. The first step is to determine whether there is the appropriate internal expertise and resources to develop the idea. A product definition will take shape with the identification of the necessary building blocks for its development. A roadmap and project plan will be established. This matching of expertise/ideas to the plan/roadmap can be facilitated and accelerated by Orbit Idea™. The semantic search can be used to detect internal experts or external partners to fill in the missing pieces and reduce the uncertainty of the project.

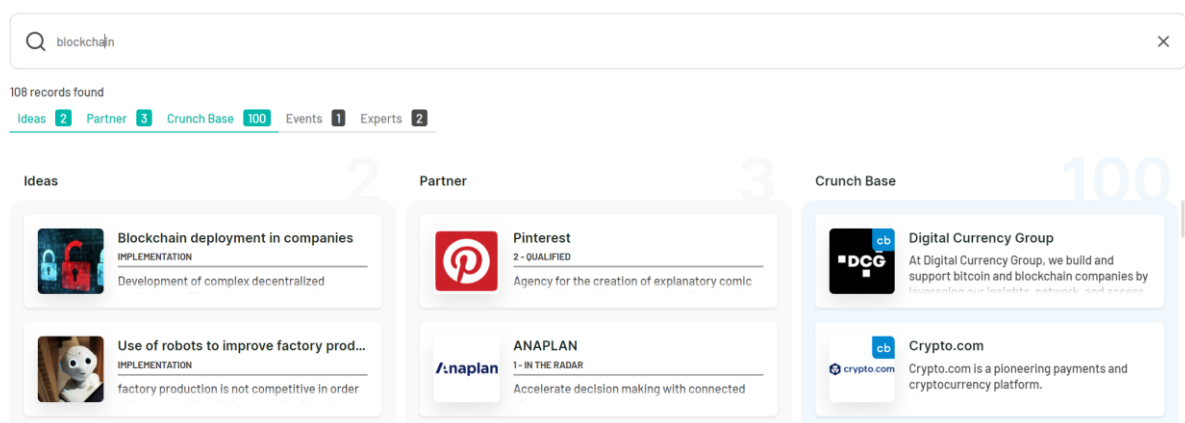


Figure 10. Orbit Idea™ search engine to identify corporate's expertise on a topic

For ideas that are highly original, or even disruptive, there remains the risk of not having all the skills internally to implement it. This realization becomes a new journey, walking the path of open innovation and we have a tool called Orbit Partnering™ to help with that. Orbit Partnering™ maps startups, partners, projects & collaborators while providing key performance indicators (KPIs) and

reporting tools to track their performance. It supports the open innovation projects and centralizes the information.

Open innovation projects start with the need to identify innovative and disruptive technologies and partners from pre-seed stage, seed stage, mature startups and SMEs to respond to missing building blocks. The earlier example of urban mobility suggests that if a company knows how to manufacture a bike or a boat, even electric, they may have no expertise in making an autonomous vehicle. The input search seeks to detect entities to collaborate on making a bike or boat autonomous.

Questel Consulting has resources including technology sourcing, utilizing engineers and/or PhDs, to search and find partner candidates, qualify them, interview them and convince them to become your next partner. Orbit Innovation™ is also a great resource as it has the unique capability to identify, rank and categorize potential partner companies to potentially fulfill the needs of the specific projects.

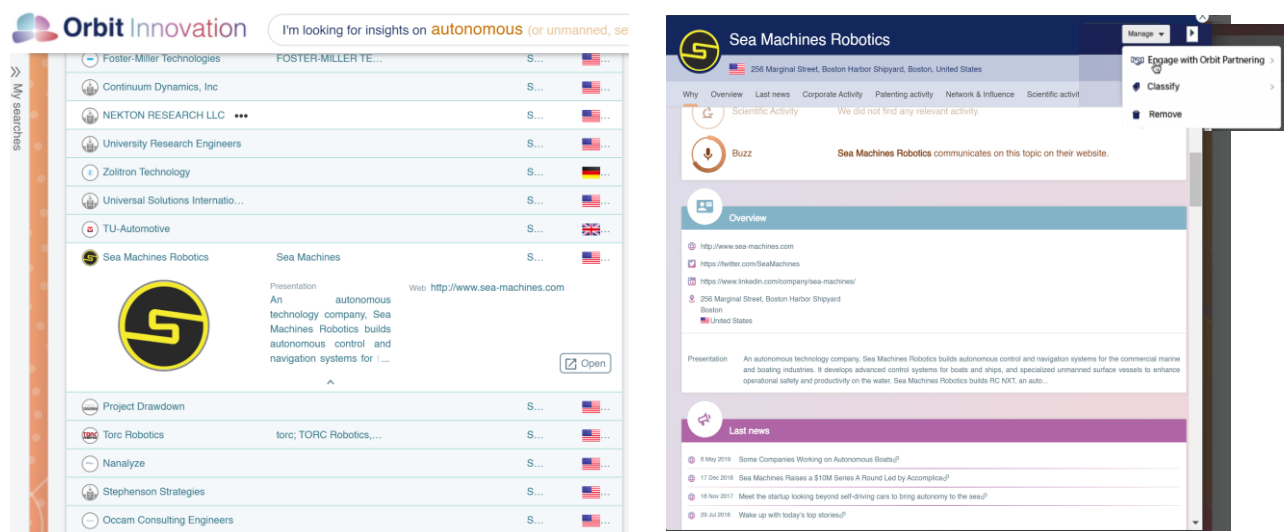


Figure 11. Orbit Idea™ search engine to identify corporate's expertise on a topic

Orbit Partnering™ becomes the repository of information regarding potential partners identified by either consultants, analysts and/or technology scouts. This is accomplished through its automatic entry module which can crawl the web. The information can be visualized in the Kanban view, monitoring the activity as part of a process or workflow.

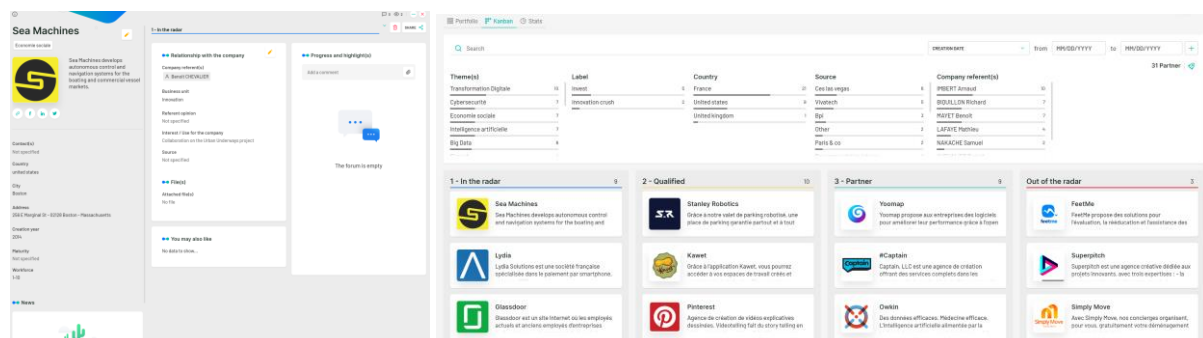


Figure 12. Orbit Partnering™ company's profile and Kanban's view

Orbit Partnering™ supports a highly iterative process, easily assigning a partner to an idea or proof-of-concept project and modifying the links. The internal workflow can be displayed and shared with the stakeholders. The open collaboration status is clearly displayed, and the opportunities are effectively tracked.

Gate 3

Questions at this checkpoint include: *What resources are involved? How will we manufacture the product? What will be the competitive advantage?* Orbit Partnering™ platform can assist in answering these questions by creating a PoC project. The project can be linked to the related ideas, the team and the selected partners, allowing for the linking of the information and workflow along with a timeline for the whole team to see in real-time.

Figure 13. Orbit Partnering™ the PoC project form

Business case

This is the last phase of FEI. Typically, the phase begins with a prototype, a good product definition, a feasibility review and, because of Orbit Idea and Orbit Partnering, access to all the information collected in the previous steps. The next step in the process is to decide whether the product should move forward. The information can be utilized in substantive reports building the business case for the decision-making process. This can be to present to the steering committee and, hopefully, passing the last check before the new product development process.

IP should be considered again as it may be necessary to file patents and trademarks, and not be restrained by others. IP may become valuable assets for the business case. Pre-patentability search reports, trademark availability search reports and white space analyses are common at this stage of the innovation process. They can help get the new products into the market faster and with less risk.

Conclusion

In order to streamline and upgrade the internal process to improve the effectiveness of innovation, we propose a hybridization of the Stage Gate process and the Design Thinking methodology. This hybridization includes the use of dedicated business intelligence and innovation software tools and platforms to manage data integrity, quality control, multiple inputs/outputs and open collaboration. Digitizing the information in one place encourages users to utilize many pathways throughout many phases and for many forms of investigative work. This saves time while preserving small details of the information for use within the phases for the benefit of all the projects and the stakeholders.

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