Integration Of IP Into The "Classical" Stage-Gate Model

By Christian Hackl and Sandrine Guillermin

Abstract

The Stage-Gate[1] Model is a widely used method for structuring the innovation process into defined phases, separated by distinctive gates. However, in its "classical" form, the model typically does not include any aspects of Intellectual Property (IP) as part of the process. Since a thorough IP process is needed for any successful innovation project, key elements of the IP protection have been integrated into the "classical" Stage-Gate Model. The company Transitions Optical is using such a well-developed new model and provides an effective case study for this process.

Introduction

Transitions Optical is a tech-based company founded in 1990 as a joint venture of two companies. It produces photochromic eyewear lenses. These lenses have a layer of photosensitive chemicals so that they darken when exposed to ultraviolet light, but are completely clear when not exposed, *e.g.,* indoors. Thus, they eliminate the need for changing between clear glasses and sunglasses when entering or exiting a building or domicile. In addition, they protect the eye against harmful UVA and UVB rays.

The company has been the leader in this field for many years and wants to keep this position as innovation leader. Therefore, creating and securing the competitive advantage is key. The company's innovation projects are all high-tech and high-performance, and take several years of intense R&D efforts. Securing this investment in R&D and the innovative position has been a key element from the very beginning, resulting in a portfolio of around 1,400 patents and patent applications.

The Stage-Gate Process

Just the sheer number of patents indicates the importance of IP, but it also creates the need to have a very clear and stringent process in place, not only for securing IP, but also for seamless integration of IP topics into the process of product development. The Stage-Gate Tool or Stage-Gate Process[2] is used for this purpose. It breaks down the innovation process from idea creation to launch of the product on the market into several phases, with distinct gates between the various phases. Passing each gate requires a definite go/no-go decision based on clearly defined information/answers to questions, which are specific to each of the gates, and specific to each of the defined stakeholders.

The advantage of this approach is that it provides a tool for a very systematic and clear process with clearly defined actions and deliverables for every phase and all involved parties (*e.g.,* R&D, marketing, sales, IP and legal). It also makes sure that all important aspects of the whole process and business environment are covered and taken into account when the decision to move on to the next phase is taken. This covers the process all the way from the initial idea to the market launch of the corresponding product. Therefore, this approach helps assess and mitigate risks by ensuring that all significant aspects are covered, giving confidence that the full picture has been accounted for when making important business decisions.

■ Christian Hackl,
Managing Director,
TUM-Tech GmbH,
Munich, Germany
*E-mail: christian.hackl@
tumtech.de*

■ Sandrine Guillermin,
Global IP Counsel,
Transitions Optical,
Tuam, Ireland
*E-mail: sandrine.guillermin@
transitions.com*

Changing from Start-Up Mode to a Structured Approach

The process itself looks quite cumbersome and involves a lot of data, some of which can be difficult and time-consuming to acquire. However, in its early years, Transitions Optical was in a start-up mode, having a more agile footing with sometimes fast decision making. Even though agile processes are in vogue these days, they bear the risk of overlooking important details and not taking relevant aspects—including risks—seriously enough, which can ultimately lead to failures (*e.g.*, market failure or IP litigation, which can lead, in a worst-case scenario, to a complete loss of significant investment). The company had unfortunately learned of these difficulties through direct experience with some of their products, so today its management is convinced that the Stage-Gate Process is time and effort well invested.

This change from the start-up approach to the clear process model not only reflects the growth of the company, it also mirrors the change in the business environment to one that acknowledges the increasing importance of making sound business decisions that are based on a thorough analysis of the various aspects of the Stage-Gate Model during the development of a new product.

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1. Stage-Gate® is a registered trademark of Stage-Gate Inc.

2. Developed by Cooper, Robert (1986): "Winning at new products." *Addison-Wesley.*

The Individual Phases of the Stage-Gate Model

As mentioned before, the Stage-Gate Model divides the innovation process into several phases with clearly defined gates between the various phases. In order to pass a gate a clear go/no-go decision is required, based on information that is specific to each of the gates.

There are some variations to the Stage-Gate Model and some companies or industries use their own adaptions, but in most of the cases there are five main phases with four important gates (sometimes, as in our case, there is a phase six for support, once the product has been launched). See Figure 1. The main focus at the beginning (Gate 1: "Idea Screening") is to have a strict filter for the many early ideas, between the phases of discovery/ideation and scoping. Ideally, the most promising ideas will be selected and brought into the next phase (scoping), and all other ideas will be sorted out. This will ensure that the valuable resources of the company will be spent on the most promising ideas only. To give some idea of the narrowing-down process, typically less than 50 percent of ideas will make it to the second phase, and only 5 percent of the time (spent in all phases on one idea/project) is spent on the first phase. The main questions to be answered in order to pass the first gate are the potential benefit for the customer and the identification of a customer need to be fulfilled or a technical opportunity (market pull versus technology push). This is a rather basic question to start with. In general, the level of detail in the answers necessary to pass each gate significantly increases with each step.

Gate 2 separates the scoping phase (realizing proof of concept, start of narrowing the product definition) from the "building the business case" phase, which means investing significant resources to finalize the concept development and perform a thorough analysis.
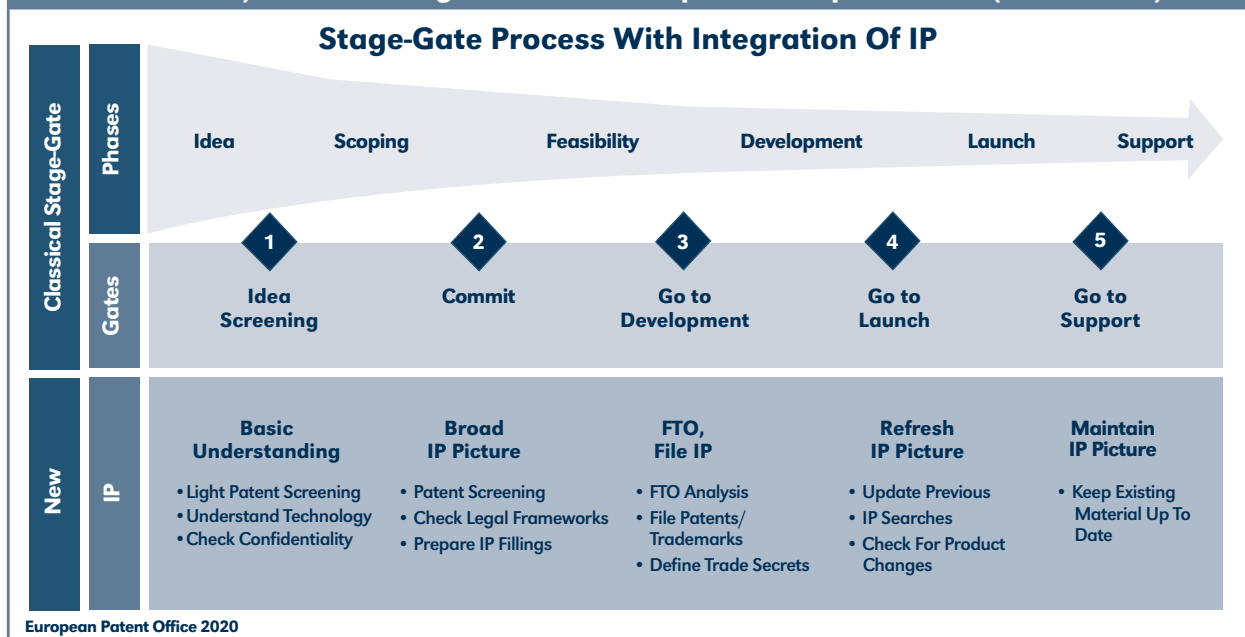
A large portion of the necessary due diligence is performed at Gate 3, since it is the hurdle prior to entering product development, where lots of resources are required. As a result, it is critical that, if an idea passes Gate 3 and goes into development, it is based on a sound decision that utilizes high-quality data. In addition, if a project passes Gate 3, it should be apparent that it will also pass Gate 4 (which is the gate for launching the product on the market). When implementing the Stage-Gate Process, the success rate of market launches is 40 percent higher on average, so it certainly brings benefits!

Integration of IP into the "Classical" Stage-Gate Model

Along the lines of the Stage-Gate Process, each stakeholder has to come up with a plan of actions to be followed through each stage and deliverables to be provided for each gate. The Stage-Gate Model defines phases and gates for the innovation process, however—in its "classical" form—it typically does not include the topic of IP. Since a thorough IP process should be put in place to ensure safe management of each project, key elements of the IP protection have been added to the "classical" Stage-Gate Model. The main IP-related questions to be addressed along with each of the phases and gates are generally as follows:

- For the first gate there will be a first light patent screening to understand the picture around the technology, as well as a check of confidentiality, to know who was involved in the idea inside and outside of

Figure 1. The "Classical" Stage-Gate Model (Upper Part, Consisting Of Phases And Gates) And The Integration Of The Important Aspects Of IP (Lower Part)

the company, and who is authorized to access the information pertaining to the project. In case of highly confidential or key projects, even employees might be subjected to a specific NDA in order to clearly state the sensitivity of the information, as well as identify and protect associated know-how.

- For the second gate, there will be a screening for patents from other parties in order to get a broad IP picture around the planned product (the planned product at this stage should be more specific than the initial idea) to evaluate the patent landscape and raise any potential patent risk. There should also be a thorough check of the legal frameworks in place or in need for the project. At this point, if patent/trademarks filings are envisaged, they should be identified clearly with a filing date target.

- For the third gate, a Freedom-To-Operate (FTO) analysis is conducted in order to make sure there are no valid third-party patent rights that could constitute a risk of infringement for the planned product. As an FTO analysis is a legal opinion, it should be performed in each country (taking into account national laws) considered key for the business. A similar analysis should be conducted for any trademarks intended to be used. This gate is the most critical one to pass for all stakeholders and dimensions, including the IP dimensions, so in order to have a valuable IP assessment, the product should already be defined very precisely, and in its final or close to final version. In addition to the FTO analysis, identified patents/trademarks should also be filed, or on their way to completion. Know-how involved in the project should be identified as well in order to put in place appropriate trade secrets measures to protect it.

- Gate 4 consists only of a refreshment on the IP situation. It is basically an update of the previous searches to check if any new IP rights have come up since the last searches. It is also wise to check if there was any change made to the product specifications during the development stage, as this may have an impact on the FTO opinion, or may necessitate new patent filings.

- Gate 5 is a less important gate for IP in the Stage-Gate Process, as other aspects related to the technology and market dominate. It is mainly about an additional check (or update, if needed) of the existing material and information about the IP rights collected thus far.

How It Finally Works

As mentioned before, the Stage-Gate Model allows for a clear and transparent structure for the whole innovation process. Every party involved knows what information is needed at what stage.[3] In practice it works as follows:

- Every party involved (*e.g.*, R&D, sales, marketing, IP, legal, etc.) creates its own template for the specific needs at each phase. It can feature standardized documents where specific information is added at each phase so that, at the end, the whole document is completed with all necessary information (*e.g.*, broad IP landscape at the beginning, detailed patent FTO/trademark clearance at the end) or it can have individual documents for each gate.

- The project manager has the central role in this process. Each department provides the specific information for each gate in a structured form to the project manager so that he/she has all the relevant information at hand.

- Decisions regarding go/no-go at the various gates will be made by a specific group, involving top management in regular and formal meetings. The task of the project manager is to compile all information and bring it all together in summary slides, which present the full picture.

- In these meetings the status of each project will be reviewed, and decisions regarding gate crossings (go/no-go) will be made based on the supplied information. Sometimes a decision will be deferred to the next meeting if additional information is deemed necessary or technical problems need more time to be addressed.

- For each project, there is a high-level project plan at the beginning, specifying the expected duration of each of the different stages and when each gate is expected to be crossed.

Some Points of Focus

• Patentability/Freedom to Operate (FTO)

As mentioned above, Gate 3 is the most important gate, especially with respect to IP. It involves the topics of FTO and patentability. One tries to collect a complete picture of relevant IP in this field.

Concerning patentability, since a formal prior art search can be very costly, one option is to do a quick search in-house on the free Espacenet.[4] If nothing conclusively obstructive is found, a patent application is filed, which will likely uncover additional prior art, since the search is performed by the EPO. These prior art search results are typically received within nine months from filing.[5]

Concerning FTO, a formal search for relevant patents and their legal status should be conducted since a sound risk assessment is key. A close cooperation with the project manager is very important during this process, in particular to understand the business strategy (bigger volumes mean

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3. A free tool for the analysis and evaluation of an invention, making sure no important aspect is missed, is IPscore. It can be downloaded from the website of the EPO (*www.epo.org/ipscore*).

4. *worldwide.espacenet.com*, see also *epo.org/best-of-search-matters.*

5. Mean average for receiving a search report from the EPO in 2019 was 5.5 months. See *www.epo.org/about-us/annual-reports-statistics/statistics/2019/statistics/quality-indicators.html.*

bigger risks) and the geographical scope of the launch (having a significant impact on the FTO strategy).

FTO can be done internally or externally depending on the nature of the invention/product. If the product is one with very specific topics of which the company already has sound knowledge, it is best to perform the FTO internally (since the experts will be in-house). In contrast, if the new product is cross-functional or in other fields, *i.e.*, ones that are not the core business of the company, the FTO should be executed with the support of external counsel.

Also, if some patents are found to constitute a potential risk, invalidity opinions of such patents might be conducted in order to understand the real level of the risk and establish strategies to mitigate it.

• Consideration of Legal Aspects

Another very essential aspect of making a project successful, and which is often cross-linked with the IP aspect, is the legal side. This may consist of co-operation contracts, confidentiality and collaboration. One has to know what rights will be used in the project, and one has to make sure that all these rights are available to the company (either because it has ownership, or because it has obtained said right by agreement, license, etc.). This is especially important if the project is realized within a collaboration/joint development, or if the idea for this project is the result of a cooperation. It is important to make the project manager aware of topics that he/she has to be careful about: for example, sometimes special materials are used during the R&D work which may have special IP-protection or be bound to special legal restrictions.

• From Preliminary Assessment to Protection to Exploitation

The overall goal of these activities is to get a complete picture and, based on this information, be able to say with confidence "I am safe to use this invention." This breaks down into three essential parts:

1. **Legal rights:** Check the legal framework, identify key players, both internally and externally.

2. **Obtaining rights:** Obtain relevant IP rights, re-check the status of this throughout all gates, with a particular focus on Gate 3. Constantly think about which inventions can be patented, but don't forget the other forms of IP, such as trademarks, copyrights and trade secrets.

3. **Exploitation:** Make sure you don't violate any third-party rights. If you identify third-party rights that may be an issue, in particular patents, check other options proactively such as obtaining a license, designing around or evaluating the strengths/weaknesses of the patent to measure its enforceability.

• Marketing Statements

Marketing statements are separate topics that need careful attention since they are legally based as well. For example, product claims of superior performance or uniqueness of technology ("New product twice as efficient as any other product on the market," "x patents filed on this new technology") must be analyzed and validated. Most of the time there are not only patents involved in these claims, but other forms of IP as well. The phase before Gate 3 is the specific gate where the sound legal basis of these marketing statements should also be secured.

• Risk Mitigation

Risk mitigation is an important topic during the whole process. However, there is a different focus in earlier versus later phases. During the earlier stages the focus is on identifying and analyzing the main risks. This is achieved by building IP landscapes and highlighting areas where there are red flags, for example. The later phases are more about mitigating the risk. For example, Gate 3 is about how to deal with the identified risks and how to find solutions, *e.g.*, through in-licensing or other negotiations with third parties.

In general, the level of investment is lighter in the first two phases and much heavier in the third and fourth phases.

Best Practices

• Do not think only about patents, there are other forms of IP that are highly relevant as well (especially in combination with patents).

• Define a clear IP topic owner (usually from the IP department) as soon as the project is initiated: it should be one dedicated person responsible for the whole project from beginning to end.

• Establish regular transversal meetings involving the IP owner, the project manager and the other designated stakeholders to facilitate alignment and ensure key questions are properly answered. Cross-functional interaction and information sharing is highly important. It is sometimes difficult and time-consuming, but it is all interlocked at the end, so almost every bit of information has implications for the other parties involved.

• The Stage-Gate Model allows for a clear and transparent structure for the whole innovation process. Every party involved knows what information is needed at what stage.

• Deliverable templates can be tailored to each company model and the type of project handled, but in any case should be clear and concise, so as to facilitate comprehension without adding too much complexity.

Some Considerations at the End

• This is not a one-size-fits-all approach: Every innovation project is different and has its own particularities, so it is essential to be able to adapt to the inevitable challenges. There are likely as many different Stage-Gate Models as there are different companies, even if they are all based on the same principles. Each specific Stage-Gate Model reflects the uniqueness of each company and also shows that, in order for it to work, it has to be tailored to the business. The Stage-

Gate Model is made to help the management of projects, make the overall process more sustainable and less risky, and all without creating more issues or complexity. It is vital to spend the right amount of time initially to think about your business and create a process that will be effective for it.

- The creation of such a process can also include some adaptations to move from a very strict ("one-size-fits-all" process, as the Stage-Gate Process was sometimes seen at the beginning) to a more flexible and adaptive model that takes into account more recent requirements regarding the innovation process, such as being more adaptive and/or agile. Such modifications can include the building of multiple spirals or iterations of development that allow for experimentation among users. Each of these spirals would consist of four items: build, test, feedback, revise.

- There is a risk that, due to the strict gates, a promising idea might be killed early on. This is especially true for some disruptive ideas or ideas in need of more resources or knowledge than the company may have at that juncture. These promising yet challenging ideas might be dismissed pretty quickly at early stages. It means that the business needs are not yet aligned to push the product on the market, but it does not mean that the idea should be forgotten. Usually, such "premature" ideas are documented (for traceability reasons) and reviewed regularly (at least twice a year) to evaluate if the context has changed (maybe at some point, the market will be ready for such a new product, or maybe the right partnership will be found and allow things to move forward). Project management is all about the right timing!

- Finally, a company should consider the various options with respect to Open Innovation at this point, such as cooperation with a partner, to further develop such promising, but challenging ideas. An alternative approach would be out-licensing such technologies to a third party once it has been decided that the technology itself is promising, but is not aligned with the company's current strategy. Another opportunity for out-licensing would exist if the technology bears the potential for several distinct applications and the current company only wants to pursue one or a few of them. The other(s) can be out-licensed to a third party. ■

Available at Social Science Research Network (SSRN): *https://ssrn.com/abstract=3583063*