Toolkit
Using Inventions in the Public Domain

Tool 7
SWOT Analysis

WIPO

Tool 7/ SWOT Analysis

In this document we will explain how to use the SWOT Analysis tool and interpret the results.

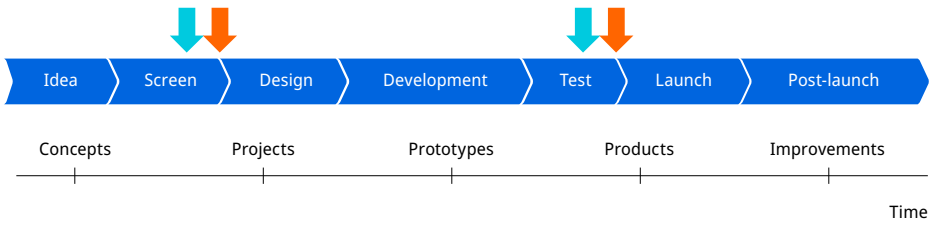
SWOT (strengths, weaknesses, opportunities, threats) analysis is discussed in several places in the WIPO publication *Using Inventions in the Public Domain: A Guide for Inventors and Entrepreneurs* (2020), in particular in section 8.8 of Module III "Strengths, weaknesses, opportunities, threats (SWOT) analysis," which states that a SWOT analysis is "useful for evaluating the options and making more informed decisions during NPD."

In this Toolkit, we use the SWOT Analysis tool mainly before entering the Design stage to enhance the likelihood that your design will result in a successful product or service. The SWOT Analysis tool examines whether the proposed product or service and the design requirements emerging from the Screen stage will likely lead to a product or service that can be successfully marketed, or whether market entry and sales expansion concerns suggest the design requirements may need to be revised.

It is recommended to use the SWOT Analysis tool early in new product development (NPD), as the further into the Design stage you go, the more rapidly cash outlays (expenses) rise. Therefore, minimizing the risk of NPD failure is important. This combination of risk and rising cost is known as "the Valley of Death," as additional funding often must be released or found to continue NPD.

The SWOT Analysis tool should also be checked again and revised as necessary before entering the Launch stage (see Figure 1).

Figure 1: The arrows show that the SWOT Analysis tool can be used before entering the Design stage as a concurrent engineering exercise to check that the requirements that will drive the design are reasonable for downstream market success. It should be checked again and revised as necessary before entering the Launch stage. SWOT analysis can be useful throughout the NPD process when focusing on a relevant strategic question.



The use of SWOT analysis here examines critical internal and external factors that could influence your market entry and expansion strategy. They also examine the strategy itself to make sure any necessary revisions to the design to enable the product or service to succeed are made during the final design process. Both good (positive) and bad (negative)

factors are included, as shown in Figure 2. There are various ways to make a SWOT analysis matrix. Figure 2, this part of the sentence can be removed since the figure has been redrawn and is not the one used in the Guide mentioned shows the SWOT analysis matrix used for this tool.

Figure 2: SWOT analysis matrix.

	Good factors	Bad factors
Internal factors	Strengths	Weaknesses
External factors	Opportunities	Threats

What is a SWOT analysis?

The SWOT Analysis tool is designed to help you gather and arrange information in a way that will help you develop a market entry strategy based on key considerations that apply to your type of product or service.

A SWOT analysis looks at both internal and external factors, as well as good (positive) and bad (negative) factors. Internal factors are under your control, such as your product concept, your NPD team, your value chain and your intellectual property (IP) position. External factors are outside your control, such as customer and end-user requirements, market forces and barriers, enforceable IP owned by others and competition. Good or positive factors are those factors that support your successful completion of NPD and market entry. Conversely, bad or negative factors are those factors that hinder or prevent your successful completion of NPD and market entry.

In this Toolkit, the SWOT Analysis workbook is a heuristic tool that provides techniques for gathering and evaluating information, and then brainstorming how to develop a viable market entry strategy or "marketing mix" for your product or service.

The SWOT Analysis tool uses the results of a SWOT analysis in a "4Ps" marketing mix model, where the 4Ps are product, price, place and promotion. Figure 3 explains each of the 4Ps, using excerpts from the descriptions on page 61 of *Using Inventions in the Public Domain: A Guide for Inventors and Entrepreneurs* (2020).

Figure 3: The 4Ps.

Category	Description	Examples
Product	"The product is what will be sold. It is not just the core item being developed; it also includes ancillary tangible benefits (such as packaging, brand, quality, warranties, etc.) – in other words, everything needed to meet the user's need."	– Tangible features and those providing performance and ease of use – Intangible features making it easier to buy the product
Price	"The price is what the product is sold at. The price needs to cover expenses and produce an acceptable profit, while being attractive to buyers and within the limits the targeted customer segments are prepared to pay (to avoid 'sticker shock' – an unexpectedly high price that does not reflect the customers' expectations of the product or service delivered)."	– The cost of the product in currency – The life cycle cost of using the product is sometimes considered part of the price; includes any costs of disposal, utilities required and any special equipment or facilities needed to use the product or service, etc.
Place	"Place is how the products are delivered to customers. It can be at a building that is the point of sale, via mail after ordering on an online platform, or a download, as is the case with software generally. Place depends on the complexity of the product, with complex products and services often needing personalized delivery and training, while simpler products can be drop-shipped."	– Pick-up at store – Delivered to customer – Pick-up at warehouse – Download from the web – Use by logging in to a site on the web – Delivered via an app

Category	Description	Examples
Promotion	"Promotion is how customers become aware of the product and its net benefits. It includes the communication channels used to reach them and the content, format and length of the messages that they will read, hear or view. How a product is promoted depends on how it is positioned in the market in relation to competitors and customers (for this reason, many marketing professionals use 'position' as an alternative for this particular P)."	– Advertising – Articles in trade publications – Press releases – Websites – Blogs – Social media – Presentations and papers at trade shows and professional meetings – Beta testing and free samples

Sometimes, a marketing mix model refers to "5Ps." The fifth P, people, is described on page 61 of the WIPO guide as follows: "People are those who market, sell and deliver the product. They may work for the company (staff) or be distributors, direct customers (in the case of an original equipment manufacturer (OEM) product) or sales representatives. They are the ones downstream in the supply chain that reaches from the firm to the consumer or other buyer. They must have the requisite capabilities to execute a marketing strategy and ensure success in the market; therefore, most companies will use a mix of internal staff and outside contractors."

Our approach to using a SWOT analysis to develop a market entry strategy uses the 4Ps model. Using the 4Ps makes it easier to leverage the matrix structure of the SWOT for brainstorming the marketing mix. People are discussed elsewhere as a strength or a weakness, so the fifth P is not included in this analysis.

This tool uses a two-step method that can be repeated over and over as you gain insight and refine your ideas. First, you populate a SWOT analysis matrix as provided at tab 1 of the SWOT Analysis workbook, entitled "Factors." Next, you look at the intersections of the external and internal good (positive) and bad (negative) factors at tab 2 of the workbook, entitled "Analysis of intersections." In each cell of the intersection, you brainstorm what the factors for that intersection would mean for one of the 4Ps in a successful market entry. You use good (positive) factors to mitigate or circumvent bad (negative) factors. As you work through the SWOT intersections, you iterate the process as new insights are gained.

An important function of a SWOT analysis is to gain insights that can be used in addressing adoption risk, which is the risk of whether the intended customers will buy a product or service, and whether end-users will deploy it. A SWOT analysis helps you focus on how each of the 4Ps of a market entry strategy would apply to the product or service you want to develop, and how they should work together in the marketing mix. In addition, insights from SWOT analyses can be used to support the process of backward chaining to address execution risk related to the ability of your organization or company to actually conduct an NPD initiative that includes successful market entry. Backward chaining begins with the desired end-state (a successful market entry) and works back to the current state (the current design or project plan) to determine if, at each step of the chain, you have what you need to create the desired end-state. If your SWOT analysis indicates that the current design does not support a successful market entry strategy, the design needs to be rethought.

We emphasize that the SWOT Analysis tool can be used to explore options at any stage of NPD or in any part of business operations. SWOT analyses are a widely useful heuristic tool.

How do you enter data in the SWOT Analysis tool?

In general, very little new research is needed to use the SWOT Analysis tool. Rather, you are reviewing what you have done before in connection with other tools. To use the SWOT Analysis tool, you take information and observations you have already generated, and look at them in a different way that lets you gain new insights. That said, it is useful to also do web research on market forces and barriers which may apply to your product or service, and update your Freedom to Operate and Competitive Advantage workbooks if you learn new information.

An example of how to use your prior work to discover new factors is shown in the next three figures. Figure 4 shows the "Factors" tab of the SWOT Analysis workbook using the biofuels example.

Figure 4: The "Factors" tab of the SWOT Analysis workbook using the biofuels example.

Factors for SWOT analysis

Opportunities	1	Increased interest and awareness of the benefits of biofuels among targeted customer segments	**Threats**	1	Competition from other biofuel vendors using similar co-location or refinery/ blender business models
	2	Government incentives for innovative startups		2	Buyer reluctance to make major investments without quick payback periods and available financing
	3	Concerns in targeted customer segments regarding fuel availability and cost		3	Transportation for shipping to buyers
	4	Government incentives for adopting biofuels		4	Reliability of internet and cell networks to support remote operations, monitoring, and maintenance
	5	Reliable cell coverage in place in some regions of the country, with plans to complete the network within three years.		5	Lowballing by large foreign biofuel providers
	6	Increased government support for relevant research and development (R&D) at universities and research institutes.		6	Low absorptive capacity among end-users regarding biofuel mini-refineries
	7			7	
	8			8	
	9			9	
	10			10	
Strengths	1	Remarkable Biofuels LLC is interested in licensing to us and has signed a non-disclosure agreement (NDA)	**Weaknesses**	1	Lack of working capital to complete development
	2	Core technical staff and new product development (NPD) team in place, along with a competent ad hoc management team		2	Founders lack experience in this industry and do not have experience supporting or selling to these customer segments.
	3	Low-cost, energy-efficient production system that is amenable to upgrades in hardware, software, sensors, filters, and organisms		3	Need to hire logistics, production, sales, and service staff, as well as a President/ CEO with industry experience.
	4	Cooperative agreement with a leading national research university to develop upgrades and next-generation technology		4	Final license for the process, organisms, and related know-how remains to be signed, including the supply agreement for organisms or a license to grow our own.
	5			5	
	6			6	
	7			7	
	8			8	
	9			9	
	10			10	

Note that the second strength identified here is the core technical staff and team. This strength comes from examining the "Team members" section of the Project Charter workbook (Figure 5, using the biofuels example) and the "Operations" tab of the Value Chain tool (Figure 6, using the biofuels example). If there were significant risks to operations for which solutions were not found, you would most likely not enter the technical team as a strength.

Figure 5: The "Team members" section of the Project Charter workbook using the biofuels example.

Team members
Ayubu (Bu) Zubiran, Project Team Leader; Sarah Lao, Engineering and Technical Research Expert; Roberto de la Manago, Market Research and Business Development Expert; Dieter Mench, Logistics Expert; and Gwendoline (Gwen) Jones, Finance, Budgeting, and Administrative Assistant. The team will have access to Harriet Goldman, Design Consultant; Quincy Algiers, Production Engineering Consultant; Lupelele Hana, IP and Legal Consultant; and David Muro, Training Consultant, as needed and within budget. The Senior Manager for reporting purposes and funding is Komen Saetang.

Figure 6: The "Operations" tab of the Value Chain workbook using the biofuels example.

Operations part 1

Risk: 3 High, 2 Medium, 1 Low — Parts, components, etc.	Average of risks	Production methods and facilities/equipment concerns: Spoilage/deterioration	Waste disposal	Labor availability at affordable price	Special fixtures or machinery	Energy consumption	Welding and other connections
Vats	1	1	1	1	1	1	1
Piping and valves	1	1	1	1	1	1	1
Sensors	1.5	1	2	2	1	1	2
Organism	2.33333	3	3	2	3	2	1
Mats for organism	1	1	1	1	1	1	1
Conveyers	1.16667	1	1	2	1	1	1
Chippers/ mulchers	1.33333	2	2	1	1	1	1
Filters	1.33333	2	1	1	2	1	1
Software for monitoring and maintenance	1.16667	1	1	2	1	1	1
Telecommunications for data transmission and remote control	1.16667	1	1	2	1	1	1
Average risk for operations part 1	1.3						

Operations part 2

Risk: 3 High, 2 Medium, 1 Low — Parts, components, etc.	Average of risks	Outputs/product systems/major components: Mini-refinery hardware	Sensor system	Operations and maintenance module	Organism kit	Regulatory approvals and certification	User and remote operation manuals
Vats	1	1	1	1	1	1	1
Piping and valves	1.5	3	1	2	1	1	1
Sensors	2	2	2	2	3	1	2
Organism	2.33333	2	2	2	3	3	2
Mats for organism	2	1	2	2	3	2	2
Conveyers	1.16667	1	1	2	1	1	1
Chippers/mulchers	1.16667	1	1	2	1	1	1
Filters	1.33333	1	1	2	1	1	2
Software for monitoring and maintenance	2.16667	2	2	2	3	2	2
Telecommunications for data transmission and remote control	1.66667	1	2	2	1	2	2
Average risk for operations part 2	1.6333						

Average risk for operations overall	1.4667

Now look at the fifth factor listed in the "Opportunities" quadrant, which addresses expansion of cell coverage into remote, isolated locations where the mini-refinery product might be used. Clearly this is an external market force that you cannot control. One way to identify if this really is an opportunity is to do web research to find coverage maps for countries of interest from several years ago and then compare these with recent coverage maps to see how coverage is expanding. Another way to evaluate this factor is to find a site with market research or a government report discussing trends in cell and internet coverage in those countries.

Once you have identified the factors you think are important and you have entered them into one of the quadrants of the SWOT matrix, go to the "Analysis of intersections" tab. An embedded function in the spreadsheet automatically puts the factors from the previous tab in the correct place. Now pick any one of the 4Ps, look at an intersection between factors in separate quadrants, and start brainstorming what those intersections suggest about that part of the marketing mix. Continue until you have used all cells and addressed product, price, place and promotion. Review your work to see if you should iterate and revise what you have proposed. When iterating, it is acceptable to move the Ps into different cells.

Figure 7 shows the completed "Analysis of intersections" tab from the SWOT Analysis workbook using the biofuels example.

Figure 7: The "Analysis of intersections" tab from the SWOT Analysis workbook using the biofuels example.

SWOT analysis

		Internal	Strengths	Weaknesses
			Remarkable Biofuels LLC is interested in licensing to us and has signed a non-disclosure agreement (NDA)	Lack of working capital to complete development
			Core technical staff and new product development (NPD) team in place, along with a competent ad hoc management team	Founders lack experience in this industry and do not have experience supporting or selling to these customer segments.
			Low-cost, energy-efficient production system that is amenable to upgrades in hardware, software, sensors, filters, and organisms	Need to hire logistics, production, sales, and service staff, as well as a President/CEO with industry experience.
			Cooperative agreement with a leading national research university to develop upgrades and next-generation technology	Final license for the process, organisms, and related know-how remains to be signed, including the supply agreement for organisms or a license to grow our own.
			0	0
			0	0
			0	0
			0	0
External			0	0
Opportunities	Increased interest and awareness of the benefits of biofuels among targeted customer segments		**Product:** A small, modular mini-refinery designed so that multiple vats can be plugged into a single grinder/mulcher at the front end and a single filtering unit with multiple storage tanks at the back end. The system is equipped with monitoring sensors, automated operations, alerts and reminders, and preventative maintenance notifications. Remote troubleshooting and diagnosis are available, and routine maintenance and repairs can be performed remotely when appropriate. The mini-refinery is designed for easy repairs: components can be swapped out with new ones shipped to the site, or updated via software downloads. Remote support is included, guiding users through troubleshooting, diagnosis, and repairs if the unit is still within its 10-year warranty period. If necessary, on-site support is provided at no extra cost during this period and can be purchased thereafter. We will initiate the next-generation R&D initiative, funded by government and foundation grants to us or a university, focusing on improving digester organisms or refining methods that can be retrofitted into the existing system.	**Promote:** Seek grants and contracts from local, regional, and national government agencies, including military bases, for demonstrations (demos) and operational purchases. Additionally, identify influential and well-respected potential buyers and end-users to serve as beta testers, with agreements to feature a trade press article if they find the product satisfactory. Emphasize the ease of use by leveraging social media platforms such as YouTube, TikTok, Instagram, Facebook, and Twitter to post videos demonstrating how to use and maintain the product, as well as showcasing how it can save money. These videos should also be featured on the company website and highlight younger users. Prepare and provide sample grant applications and documentation for tax incentives. Beyond targeting specific customer segments, also promote the product to investors and mid-size and large regional businesses that may wish to diversify by leasing mini-refineries to co-locate with targeted customers. Finally, collaborate with universities, trade schools, and professional associations to recruit necessary staff and management and to discover new technologies of interest.
	Government incentives for innovative startups			
	Concerns in targeted customer segments regarding fuel availability and cost			
	Government incentives for adopting biofuels			
	Reliable cell coverage in place in some regions of the country, with plans to complete the network within three years.			
	Increased government support for relevant research and development (R&D) at universities and research institutes.			
	0			
	0			
	0			
	0			

SWOT analysis

Threats	Competition from other biofuel vendors using similar co-location or refinery/blender business models	**Place:** Emphasize the ease of use and the local aspect of the company. The entire system can be shipped in linked containers or delivered on pickup truck beds, allowing for assembly in a building or shelter provided by the buyer. The package includes delivery, installation, and training, as well as a year of remote support. This comprehensive service addresses low absorptive capacity and fosters personal relationships, setting us apart from competitors.	**Price:** The full-price purchase target is set at the equivalent of three to five years of current fuel costs. The lease-to-buy option spans 10 years, with a break-even point in the first year and a positive return on investment (ROI) as learning curves improve and production volumes increase. Burst transmissions and a robust client-side embedded computer help minimize data transmission costs. A satellite communication unit can be bundled for areas with poor telecom coverage. Both purchase and lease options include delivery, installation, training, a 10-year warranty, and support, as detailed under "Place." The initial purchase includes a one-year supply of organisms, with a fixed 10-year price for an annual subscription for additional organisms. Remote operations and maintenance are available as an add-on.
	Buyer reluctance to make major investments without quick payback periods and available financing		
	Transportation for shipping to buyers		
	Reliability of internet and cell networks to support remote operations, monitoring, and maintenance		
	Lowballing by large foreign biofuel providers		
	Low absorptive capacity among end-users regarding biofuel mini-refineries		
	0		
	0		
	0		
	0		

How do you interpret the data from the SWOT Analysis tool and use it in your NPD process?

Once you have completed a SWOT analysis that you think is comprehensive and provides useful guidance, you then examine the current design of your product or service for its compatibility with the SWOT analysis you have developed.

The term “design” can include design of the product or service, as well as the project design for developing, training and supporting the product or service. Use backward chaining to make this determination, starting from a SWOT analysis that suggests a design for a successful future market entry, and working back to the current design. If the SWOT analysis and design do not cohere well, either the SWOT analysis or the design should be revised. That, in turn, may necessitate revision of the NPD project charter and action plan, which may trigger another set of questions and tasks. If the current design cannot be made coherent with the design from the SWOT analysis, or if necessary modifications to the project charter or action plan are significant, the NPD initiative should be put on hold until solutions are found or a decision to terminate the NPD project is made.

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