

# SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis Tool Description

In this document we will explain how to use the SWOT (strengths, weaknesses, opportunities, threats) Analysis Tool and interpret the results.

SWOT 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 once introduced. The SWOT Analysis Tool examines if the proposed product or service and the design requirements emerging from the Screening 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 NPD, as the further into the Design stage you go, the more rapidly cash outlays (expenses) rise. Therefore, ensuring that the risk of NPD failure can be minimized is important. This combination of risk and rising cost is called 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 below).

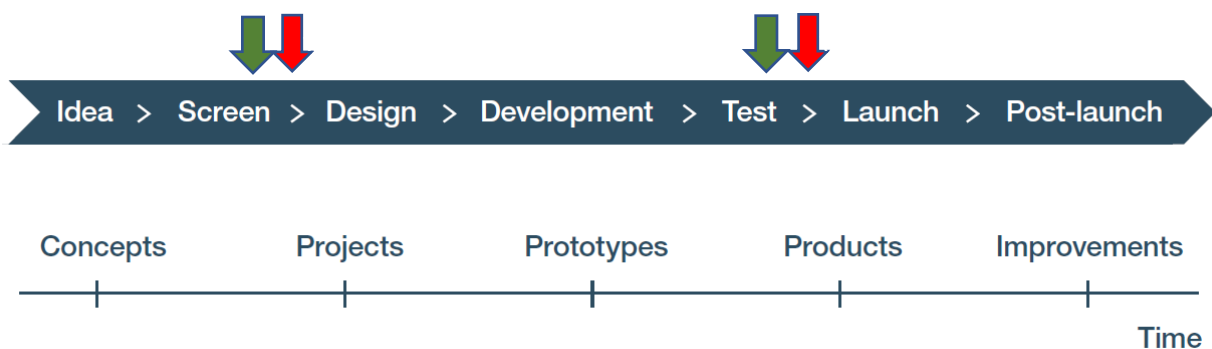


Figure 1: The arrows show that the SWOT Analysis Tool can be used before entering the Design Stage as a concurrent engineering exercise to validate that the requirements that will drive the design are reasonable for the downstream market success. It should be checked again and revised as necessary before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

The use of a SWOT analysis here examines critical internal and external factors that could influence your market entry and expansion strategy and that strategy itself in order 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 below. There are various ways to make a SWOT Analysis matrix. Figure 2 reproduced from the WIPO publication *Using Inventions in the Public Domain: A Guide for Inventors and Entrepreneurs* (2020) presents the SWOT Analysis matrix used for this tool.

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

Figure 2: The SWOT Analysis matrix

## What is a SWOT Analysis?

The SWOT Analysis Tool is designed to be a tool 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 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 Tool is a heuristic tool that provides techniques for gathering and evaluating information, and then brainstorming to discover new insights in ways that help you 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 below explains each of the 4Ps found in a marketing mix, using excerpts from the descriptions on page 61 of the WIPO

publication *Using Inventions in the Public Domain: A Guide for Inventors and Entrepreneurs* (2020).

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.”	- Product tangible features and features providing performance and ease of use.  Product 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 costs of using the product is sometimes considered part of the price, that includes any costs of disposal, cost of utilities required, cost of any special equipment or facilities needed to use the good 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 a warehouse  Download from the web  Use by logging in to a site on the web  Delivered via an app
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

Figure 3: The 4 Ps

Sometimes, a marketing mix model refers to the five Ps. 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, People, 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 Tool 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 SWOT Analysis 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 factors to mitigate or circumvent bad 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 refers to 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 market 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 backward 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, then the design needs to be rethought.

We emphasize that the SWOT Analysis Tool can be used to help explore options in any stage of NPD or any part of business operations. SWOT analyses are a very 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 to do a SWOT analysis. 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 searching 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 factors is shown in the next three figures. Figure 4 displays the Factors tab of the SWOT Analysis Tool workbook for the Biofuels Example.

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

Figure 4: The Factors tab of the SWOT Analysis Tool workbook for the Biofuels Example

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 (figure 5, below, from the Biofuels Example) and the Operations tab of the Value Chain Tool (figure 6, below, from the Biofuels Example). If there were significant risks to Operations for which solutions were not found, then you would most likely not enter the technical team as a strength.

Team members
Ayubu (Bu) Zubiran, Project Team Leader; Sarah Lao, Engineering and Technical Research Expert; Roberto de la Manago, Market Reseach and Business Development Expert; Dieter Mench, Logistics Expert; Gwendoline (Gwen) Jones, Finance, Budgeting, and Adminstrative 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 5: The Team members section of the Project Charter Tool workbook of the Biofuels Example

Operations part 1										Operations part 2										
Risk 3 High 2 Medium 1 Low	Average of risks	Production methods and facilities/equipment concerns								Average of risks	Mini-refinery hardware	Outputs/product systems/major components								
		Spoilage/deterioration	Waste disposal	Labor availability at affordable price	Special fixtures or machinery	Energy consumption	Welding and other connections	Sensor system	Operations and maintenance module			Organism kit	Regulatory approvals and certification	User and remote operation manuals						
Parts, components, etc.																				
Vats	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Piping and valves	1	1	1	1	1	1	1	1	1	1.5	3	1	2	1	1	1	1	1	1	1
Sensors	1.5	1	2	2	1	1	1	2	2	2	2	2	2	3	1	2				
Organism	2.3333	3	3	2	3	2	1			2.3333	2	2	2	3	3	2				
Mats for organism	1	1	1	1	1	1	1	1	1	2	1	2	2	3	2	2				
Conveyers	1.1667	1	1	2	1	1	1	1	1	1.1667	1	1	2	1	1	1	1			
Chippers/mulchers	1.3333	2	2	1	1	1	1	1	1	1.1667	1	1	2	1	1	1	1			
Filters	1.3333	2	1	1	2	1	1	1	1	1.3333	1	1	2	1	1	2				
Software for monitoring and maintenance	1.1667	1	1	2	1	1	1	1	1	2.1667	2	2	2	3	2	2				
Telecom for data and remote control	1.1667	1	1	2	1	1	1	1	1	1.6667	1	2	2	1	2	2				
Average risk for operations part 1										Average risk for operations part 2		1.6333								
Average risk for operations overall		1.4667																		

Figure 6: Operations tab of the Value Chain Tool workbook of the Biofuels Example

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. An example of an internet penetration map is at <https://www.internetadvisor.com/key-internet-statistics#post-navigation-14>.

Once you have identified the factors you think are important and you have entered them into one of the quadrants of the SWOT matrix (Opportunities, Strengths, Threats, Weaknesses), next go to the “Analysis of intersections” tab. An embedded function in the spreadsheet automatically places 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 about what those intersections suggest about that part of the marketing mix. Continue until you have used all cells and addressed product, price, place, and promote. 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 below shows the completed analysis of the “Analysis of intersections” tab from the SWOT Analysis Tool workbook for the Biofuels Example.

SWOT analysis			
		Internal	External
		Strengths	Weaknesses
		Remarkable Biofuels LLC is interested in licensing to us and has signed NDA	Lack of working capital to complete development
		Core technical staff and NPD team in place together with competent ad hoc management team	Founders have not been in this industry and do not have any experience supporting or selling to these customer segments
		Low cost, energy-efficient production system amenable to upgrading in hardware, software, sensors, filters, and organisms	Need to hire logistics, production, sales, and service staff and President/COO with industry experience
		Cooperative agreement with leading national research university to develop upgrades and next generation technology	Final license for process, organisms, and related know-how remains to be signed as to supply agreement for organisms, or license to grow our own
		0	0
		0	0
		0	0
<b>External</b>		0	0
		0	0
		0	0
		0	0
		0	0
		0	0
		0	0
<b>Opportunities</b>	Increased interest and awareness of the benefits of biofuels in targeted customer segments	<b>Product:</b> Small mini-refinery, modularized so multiple vats can be plugged into a single grinder/mulcher on the front end and a single filtering unit and multiple storage tanks on the back end. It is instrumented with monitoring sensors, automated operation, alerts and reminders, and preventative maintenance alerts. Remote troubleshooting/diagnosis and, where appropriate, remote routine maintenance and repair can be done. Begin next generation R&D initiative funded by government and foundation grants to us or to university, with emphasis on better digester organisms or other refining methods which can be retrofitted into basic system. The mini-refinery is designed so repair is a matter of pulling out this and plugging in that (with the parts shipped to the site) or a software download. Remote support is included and walks users through troubleshooting and diagnosis and any repairs if the unit is still in the 10 year warranty period. If need be, on-site support is provided at no extra cost during this period and can be purchased thereafter.	<b>Promote:</b> Seek grants and contracts from local, regional, and national government agencies, including military bases, for demos and purchases for normal operations. In addition, seek beta testers from influential, well-respected potential buyers and end-users with agreements to do a trade press article if they like it. Since a theme is ease-of-use, use social media like YouTube, TikTok, Instagram, Facebook, and Twitter to post videos on how to use and maintain the product as well as how to save money through use of our product (also posted on company website). Highlight younger users in videos. Prepare and provide sample grant applications and documentation for tax incentives. In addition to targeted customer segments, also promote to investors and relevant mid-size and large regional businesses who may wish to diversify and lease mini-refineries to co-locate among the targeted customer segments. Finally, promote with universities, trade schools, and professional associations to find necessary staff and management as well as new technology of interest.
	Government incentives for innovative start-ups		
	Concern in targeted customer segments over fuel availability and cost		
	Government incentives to adopt biofuels		
	Reliable cell coverage in place in some regions of country and plans to complete network within 3 years		
	Increased government support for relevant R&D at universities and research institutes		
	0		
0			
0			
0			
<b>Threats</b>	Competition from other biofuel vendors using similar, co-location or refinery/blender business models	<b>Place:</b> Put emphasis on ease-of-use and local company. The entire system can be placed in link-together shipping containers or delivered on pick-up truck beds for plug together in a building or shelter provided by the buyer. The inclusion of delivery, installation, and training plus a year of remote support addresses low absorptive capacity and builds personal relationships which inhibit competitors.	<b>Price:</b> Target full-price purchase is equal to three to five years of current fuel costs; a lease to buy option pays out over 10 years, with break-even in year 1 and some positive ROI as learning curves kick and production volumes increase. Burst transmissions and a robust client-side embedded computer minimize costs of data transmission. A satcom unit can be bundled for areas with poor telecom coverage. Delivery, installation, and training is included in both options as is 10 years of warranty and support-- as noted under Place. One year supply of organisms is included, with fixed 10 year price for annual subscription for additional organisms. Remote operations and maintenance is an add-on.
	Buyer reluctance to make major investments without quick payback periods and financing		
	Transportation for shipping to buyers		
	Reliability of internet and cell to support remote operations, monitoring, and maintenance		
	Lowballing by large foreign providers of biofuels		
	Low absorptive capacity among end-users with respect to biofuel mini-refineries		
	0		
0			
0			
0			

Figure 7: The Analysis of intersections tab from the SWOT Analysis Tool workbook for the Biofuels Example

## 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 require revising the NPD Project Charter and Action Plan, which may trigger another set of questions and tasks. If the current design cannot be brought into coherence with the design from the SWOT analysis, or if necessary modifications to the Project Charter or Action Plan are significant, then the NPD initiative should be put on hold until solutions are found or a decision to terminate the NPD project is made.