Toolkit
Using Inventions in the Public Domain

Tool 2
Action Plan

WIPO

Tool 2/ Action Plan

In this document we will explain how to develop an action plan. Together with the project charter, the action plan is used to formally initiate a new product development (NPD) project.

What is the action plan?

As the name suggests, the action plan is a description of the tasks you will accomplish in order to achieve specific milestones within the schedule indicated and with the people and budget indicated. The action plan identifies:

1) the key stages of development;
2) the key tasks for each stage;
3) who is responsible for each task;
4) what milestones must be met to continue development; and
5) the resources and budget available for completion.

You likely do not yet know everything you will have to do in detail, nor everyone and everything you will need to complete all the tasks. Your action plan helps you work these things out.

If we extend the metaphor of NPD as a voyage of scientific discovery, then the action plan plots the anticipated course for that voyage: where you are going, and how you intend to get there. This is not the same as the course that actually will be steered because on a real voyage, factors such as weather, uncharted obstacles, equipment malfunction, solar winds and gravitational pull will come into play. Some of these factors can only be identified once you have embarked on the voyage – or, in the case of NPD, once you have begun working on developing the product or service.

From the perspective of risk management, the action plan focuses on managing execution risk. Execution risk refers to the ability of your organization or company to conduct NPD. An action plan addresses this risk by listing the specific tangible features and/or design requirements that will be necessary to realize the core benefits being sought, and then developing a framework that identifies the tasks and resources needed for each feature or design requirement at each stage of the NPD process. Because the action plan identifies specific tasks that must be completed, and predicts the resources and timelines for completing them, it presents a more detailed understanding of what will be required to successfully execute the NPD project than the project charter.

The more detailed assignment of tasks and resources is based on the “Preliminary project plan” section of the Project Charter workbook (see Figure 1). The process of developing the action plan may reveal that it is necessary to revise sections in your project charter to make it more realistic and persuasive. Pay particular attention to the preliminary project plan, scope, budget, spending authority and team members in your project charter. Because the project charter and action plan must align and are both

necessary to get a realistic overview of what an NPD initiative involves, the action plan is prepared before the formal initiation of NPD and submitted for approval together with the project charter.

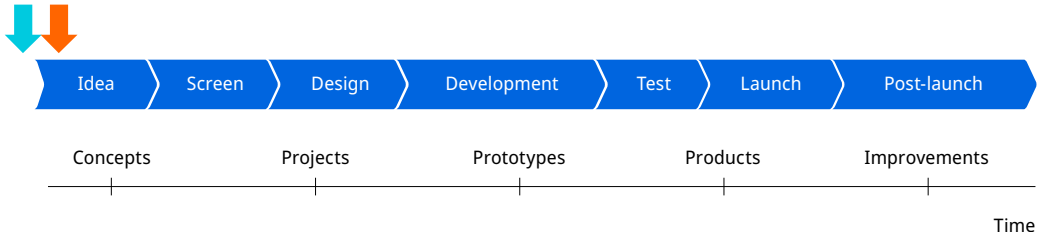
Figure 1: **"Preliminary project plan" section from the Project Charter workbook using the biofuels example.**

Preliminary project plan	Target date: 28/02/21	Actual date:
Product or service concept	31/05/2021	31/05/2021
Design project	31/10/2021	
Operational prototype for test	31/10/2022	
Tested and evaluated product or service	31/03/2023	
Launch	30/05/2023	

Submitted by	Bu Zubiran, Project Team Leader	Approved by	Komen Saetang, Manager
Date	21/01/2021	Date	30/01/2021

Like the project charter, the action plan is used at the gate for entering the Idea stage of NPD.

Figure 2: **The action plan is developed before starting NPD and is approved alongside the project charter. The red arrow indicates that it must be done in time to be used at the gate for entry into the Idea stage.**



It is important to review the project charter before starting the action plan, as that document defines the objectives which the action plan must realize. The entries for the action plan will come from discussions with the project team, people throughout the company or organization's value chain, external experts and consultants, and potential vendors, as well as web research. (The value chain is the set of activities needed to create, make, market, sell, deliver and support the product or service.)

It is not necessary to have every sub-task decided before the formal beginning of the NPD project. However, to prepare an effective action plan it is essential to know what the major tasks and sub-tasks will be, their milestones and how they will be accomplished, and to be able to indicate when and how you will decide the remaining sub-tasks and actions that will be required, so they can be included in time. Once the NPD initiative is approved, you can develop the schedule in more detail using a Gantt chart or other project management tools, for example project management software suitable for your technology area and type of product or service.

In short, in the action plan the focus is on scoping out what must be done in order to keep NPD on track to meet the goals and objectives in the project charter.

How do you enter data in the Action Plan tool?

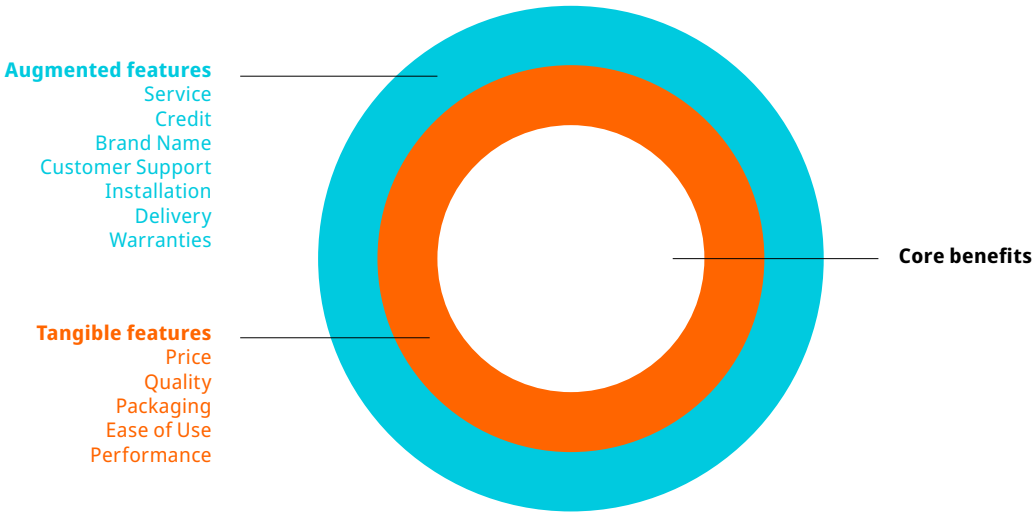
Begin by considering what product or service is being developed. That is described in the first section of your project charter, entitled "Product or service being developed." What is the core benefit (or benefits) the product or service will provide? In Figure 3, taken from the biofuels example in the Project Charter workbook, you can see that the product or service being developed is a mobile mini-refinery and the core benefit is the onsite production of biofuels such as biodiesel or ethanol out of organic waste materials. This description may also indicate some important features, such as the ability to link multiple units and provide onboard diagnostics.

Figure 3: **Core benefit(s) can be determined by reviewing the "Product or service being developed" section of the Project Charter workbook, as shown in that section using the biofuels example.**

Product or service being developed
We are developing a mobile mini-factory that converts organic matter from municipal or farm solid waste into biodiesel, ethanol, or hydrogen. This system utilizes a fungus - or potentially other organisms - to extract valuable oils from municipal solid waste and agricultural waste. The components and subsystems of the mini-refinery are commercially available. We plan to license the fungus or another suitable organism from Remarkable Biofuels LLC or a similar company. Alternatively, we might collaborate with a university or research institute to develop a proprietary organism. Multiple units can be connected to create a larger-scale system. We will sell both the production unit and the consumable organism. The system will be equipped for remote monitoring and control and will include on-board diagnostics to identify emerging or existing issues. We will develop our own suite of sensors and software for operations, preventive maintenance, and troubleshooting.

Next, consider what features your targeted customers and end-users will want the product or service to have. The core benefits are realized through the tangible and augmented features of the product or service, as shown in Figure 4. Tangible features are related to the physical performance of the product or service, its ease of use, its purchase price and the cost of using it. Augmented features relate to factors that make it more attractive to purchase, bring into operation, and reduce or spread out costs over time, thereby reducing costs in any given time period.

Figure 4: **Tangible and augmented features.**



Source: Courtesy of Foresight Science & Technology.

The core benefits are the primary reason customers and end-users will buy and use the product or service being developed. The core benefits you intend to provide are found in the "Targeted customer segments and why they will use it" section of your project charter. See Figure 5, taken from the Project Charter workbook using the biofuels example.

Figure 5: **Core benefits are found in the "Targeted customer segments and why they will use it" section of the project charter, as shown in that section from the Project Charter workbook using the biofuels example.**

Targeted customer segments and why they will use it
We are targeting farms and waste collection and treatment centers because these customer segments are likely to have substantial amounts of biomass and also purchase diesel fuel to operate vehicles, generators, and other equipment. The economic benefits for these segments will be most immediate, as no transportation is required to deliver the biomass to the mini-factory. Additionally, the output can be used internally to reduce or eliminate out-of-pocket expenses, which can be a significant cash flow drain.

The key tangible feature in this example is the ability to make biodiesel on site. Another tangible feature is the reduction in cashflow drain. This second feature is also seen in the project's "Success

metrics" section, which in the biofuels example includes a two-year payback period for customers, as shown in Figure 6, taken from the Project Charter workbook using the biofuels example.

Figure 6: The "Success metrics" section of the Project Charter workbook using the biofuels example.

Success metrics
95 percent customer endorsement for the product after one year, with a two-year payback period for customers facing ongoing fuel costs. After this period, the fuel will be available at below-market prices. The product offers an above-industry-average return on investment (ROI) for small companies and refineries, making it an attractive option for investors.

Note that augmented features are not discussed in either section of the biofuels example project charter. However, you can infer some augmented features associated with these two sections. For example, to reduce the time to payback, installation and training may be required. Financing might also help meet that objective.

The Action Plan workbook

The Action Plan tool is a workbook with two tabs for entering information, and a third tab for your notes and references. As noted above, the action plan being developed with the aid of this tool is focused on what is necessary to provide the benefit(s) driving product development. For that reason, the "Capabilities and capacities" tab begins by considering what are the critical tangible and augmented features for your buyers and end-users. As shown in Figure 7, these features appear in row 2 of the spreadsheet, entitled "Tangible features OR design requirements to realize core benefits sought."

The ability to determine what features to enter assumes some familiarity with the market. Even if you are in a company selling similar or related goods, it will help to visit some current or potential customers to discuss their requirements and preferences for a product or service like the one you intend to develop. Some internet market research is also recommended. If you are not currently in the market selling related goods, more extensive market research will be necessary, using Tool 3: Voice of the Customer.

Note that this approach begins with consulting relevant sections of the project charter and then determining the tasks and resources necessary to provide the core benefit(s). The "Capabilities and capacities" tab of the Action Plan workbook provides a structured approach that probes for information relevant to each feature. To illustrate this, for the feature listed in column A, rows 3 through 11 ask you to enter specific types of information about that feature. This approach helps to ensure the project charter and action plan are aligned. It is permissible to go back and revise the project charter based on insights gained while creating the action plan.

The second tab is labeled "Action plan framework." The spreadsheet on this tab guides you through the development of tasks and milestones for each feature, and then asks you to identify who is responsible for completing key tasks at each stage. This data can then be used to develop a Gantt chart or other project scheduling chart, which will also include who is responsible for deciding the tasks, budget and schedule.

Figure 7: A portion of the "Capabilities and capacities" tab of the Action Plan workbook using the biofuels example.

New product development capabilities and capacities

Tangible features OR design requirements to realize core benefits sought	Make biofuel	Ease of use sensor and software	Delivery	Biomass for testing	Downstream organisms - adapted for mini-refinery system and/or for different types of biomass.
Tasking	License system and organisms.	Find sensors and software, and adapt them for remote operations, monitoring, and maintenance of our system.	Determine how to ship it to remote locations with poor road conditions.	Identify various sources from all regions to test a range of biomass from each target country.	Better organisms.
Labor skills	Production capability and ability to handle organisms.	Sensor engineer and software programmer	Logistics manager	Logistics and procurement	Research and development (R&D)
Know-how	How to work with the specific licensed organisms and optimize the operation of the mini-refinery.	Experience with the technology	Logistics and packaging	Nothing in particular	R&D
Supplies and materials	Vats, conveyors, chippers, mulchers, filters, valves, piping, storage tanks, and organisms.	Sensors and software	Crates or containers that can be loaded with equipment and connected together.	Crop or crop waste, other organic waste.	Not sure
Equipment and facilities	As needed to assemble the system, and to grow, harvest, and package organisms for shipping. Quality Assurance Lab to ensure that organisms and products meet required standards. This could be rented.	Ability to test sensors upon delivery of the mini-refinery unit, and to use a model for running the software.	An efficient way to build or acquire packaging.	Equipment for preprocessing.	Intend to find R&D partner if we pursue this.
Technology and intellectual property	Obtain licenses from the holders of IP rights for the organisms and methods, such as Remarkable Biofuels LLC or similar entities. If necessary, also acquire licenses for mini-refinery technology.	"Obtain a license for the software. If adaptations are made, consider copyright or other data protection for the code. Additionally, if the adaptations are unique, explore patent protection for the changes implemented in the system. "	Most likely none	Most likely none	Obtain a license from a university or research institution holding IP rights. If new organisms are developed, we may generate our own IP.
Working capital	Approximately USD 1 million for prototypes.	USD 500,000	Depending on whether containerized, probably under USD 100,000.	Ideally, we can obtain this at no cost and only need to arrange pickup and delivery to the test site(s). Delivery charges should be under USD 25,000.	Uncertain; we may be able to secure government grants, such as small business grants or grants for biofuel research.
Vendors, contractors and partners needed	Sources for the equipment to be integrated	Sensors and software	Delivery company	Farms and waste collection facilities	University or research institution
Other factors	Need a regulatory expert to obtain any necessary approvals. Prepare manuals for biofuel production.	Manuals will be critical and the best way to handle the telecommunications aspect.	Hopefully, we can put this out for bid and have someone come up with a solution.	It is important to ensure we obtain a wide range of biomass for testing.	If we collaborate with a university or research institution, it would be beneficial to involve a graduate student who could potentially join us if the project succeeds.

The "Action plan framework" tab has two sections with different but related functions. The section on the left-hand side, entitled "Steps involved and percentage of anticipated progress toward completion," builds on the features and design requirements developed using the spreadsheet on the "Capabilities and capacities" tab. These features and requirements are reviewed by the NPD team. After reflecting on them, go to the section on the right-hand side of the "Action plan framework" tab entitled "How it will be accomplished and how you will know it is done" that focuses on developing high-level tasking. Here you can create a list of features or design requirements that are specific, concrete and addressable in column A. Columns B through H then determine the stage of NPD at which work on creating each tangible feature or design requirement should be done, and how much of the total effort is expected to be expended at each stage.

Figure 8: **The left-hand side of the "Action plan framework" tab of the Action Plan workbook using the biofuels example.**

	Steps involved and percentage of anticipated progress toward completion							
Tangible features OR design requirements	Idea	Screen	Design	Development	Test	Launch	Post-launch	Totals
Cutting and mulching waste equipment	5%	20%	20%	50%	5%	0%	0%	100%
Brewing vats and capture tanks	5%	20%	35%	25%	15%	0%	0%	100%
Cleanable filters	5%	20%	20%	40%	15%	0%	0%	100%
Piping and valves	5%	20%	35%	25%	15%	0%	0%	100%
Conveyors	5%	20%	20%	40%	15%	0%	0%	100%
Fungi/organisms for biodiesel, ethanol, and hydrogen	5%	25%	25%	25%	20%	0%	0%	100%
Controls for onsite and remote operations, monitoring, and preventative maintenance	5%	25%	25%	25%	20%	0%	0%	100%
Sensors for onsite and remote operations, monitoring, and preventative maintenance	5%	20%	25%	25%	20%	0%	5%	100%
Software for onsite and remote sensors and controls for operations, monitoring, and preventative maintenance	5%	25%	25%	25%	20%	0%	0%	100%
Modularize for transport	5%	15%	35%	30%	10%	0%	5%	100%
Should-cost price	5%	15%	40%	20%	10%	5%	5%	100%

Data is entered in columns under the heading "Steps involved and percentage of anticipated progress toward completion" only after conferring with the people who will be responsible for those tasks. This way of developing the action plan is called concurrent engineering, and it involves people from throughout the value chain in developing the tasks and detailed design requirements. The key tasks (high-level descriptions) are developed using the entries on the right-hand side of this tab, the entries on the "Capabilities and capacities" tab and the project charter as the starting point.

In the biofuels example shown, note that the previous tab ("Capabilities and capacities") listed complex, high-level tangible features and/or design requirements including "Make biofuel," "Ease of use sensor and software," "Delivery," "Biomass for testing" and others. However, on the "Action plan framework" tab, in the "Tangible features OR design requirements" column, you will enter more specific information on the features and requirements desired, such as "Cutting and mulching waste equipment," "Brewing vats and capture tanks," "Cleanable filters," "Piping and valves," "Conveyors," etc., so that an action plan to create them can be formulated. It is very important to break down the project into specific, manageable, addressable features for

this analysis tab. The features and requirements here must be "SMART": specific, measurable, achievable, relevant and time-bound.

The data in the columns under the header "Steps involved and percentage of anticipated progress toward completion" represents "guesstimates" based on the project charter, as seen in Figure 9. You should anticipate that these percentages will change as the critical tasks are developed using concurrent engineering. Indeed, the "Tangible features OR design requirements" entries may also change as key tasks are developed. That means you must be prepared to revise the "Capabilities and capacities" tab of this workbook as well as the project charter to ensure the two documents remain internally aligned, and aligned with each other. Be aware that you may have to revise the team members in the project charter if it is critical to include additional capabilities and capacities.

Figure 9: The "Preliminary project plan" and "Target date" sections from the Project Charter workbook using the biofuels example.

Preliminary project plan	Target date: 28/02/21
Product or service concept	31/05/2021
Design project	31/10/2021
Operational prototype for test	31/10/2022
Tested and evaluated product or service	31/03/2023
Launch	30/05/2023

One way to check how realistic your milestones are is to look at similar projects your company or organization has done. If it has not done any, you can examine government awards to entities doing similar work, and/or consult experts. The European Union's Community Research and Development Information Service (CORDIS) site presents projects and their results, together with project duration and budget. The United States' SBIR.gov site allows you to search for information on projects, award size and duration for the Small Business Innovation Research and Small Business Technology Transfer programs. Similar websites exist for award programs in other countries. Note that these sites also provide insight into the budget and duration for your action plan.

As an aside, another aspect of being realistic when you develop the action plan is to allow for time and budget to recover from unforeseen problems. By definition, *new* product development means it has not been done before. That, in turn, means something is quite likely to go wrong. Including contingency means that if something does indeed go wrong, it will not derail the entire NPD initiative. Precisely how much contingency is needed will depend on how similar this initiative is to ones which your team and your company or organization have done previously. For example, the James Webb Space Telescope was originally estimated to cost NASA USD 4.96 billion and launch in 2014. Instead, NASA spent USD 8.8 billion on spacecraft development between 2003 and 2021. The more boldly you go into the unknown, the greater the contingency needed.

Next, turn to the section on the right-hand side of the spreadsheet on the "Action plan framework" tab, entitled "How it will be accomplished and how you will know it is done." This section requires a different approach that involves thinking about the relevant milestones and progress to attain by the end of each step in your NPD. This section then requires you to determine the tasks that need to be done, the budget and the schedule in light of the tangible features or design requirements found on that tab. This section of the "Action plan framework" tab using the biofuels example is shown in Figure 10.

Figure 10: The right-hand side of the "Action plan framework" tab of the Action Plan workbook using the biofuels example.

	How it will be accomplished and how you will know it is done				
Stage	Key tasking	Who is responsible for completion	Completion milestone	Budget	Start and end dates
Idea	Determine the feasibility of sourcing necessary organisms, parts, components, and systems.		Validation that suitable organisms exist and can function in the mini-refinery.	USD 5,000	02/02/2021 - 20/02/2021
Screen	Assess market, technical, and financial viability.	Market work: market research expert; technical viability: engineering expert and legal consultant; financial: finance and budgeting expert	Competitive advantage and freedom to operate established; confirmed feasibility of market entry for the product concept; Technology Readiness Level (TRL) 2 achieved.	USD 25,000	01/03/2021 - 25/05/2021
Design	Establish a Business Model Canvas; finalize the technical approach, secure organism licenses, and establish proof of concept; complete the design project in alignment with the model.	Business model canvas: team leader; technical approach and design: engineering and technical expert, and design consultant; IP and supplier/vendor qualification and contracting: logistics expert, with legal consultant	Business canvas model approved; licenses for organisms obtained; TRL 3 achieved; design approved; vendors/ suppliers qualified and contracts in place	USD 100,000	01/07/2021 - 30/11/2021
Development	Develop a benchtop prototype and an operational prototype; raise the remaining necessary funding.	Engineering and technical expert, with production engineering consultant	TRLs 4, 5, 6, and 7 attained	USD 170,000 through TRL 4. Additional USD 1.3 million as raised	01/12/2022 - 28/10/2022
Test	Achieve all certifications and regulatory compliance; complete beta testing.	Engineering and technical expert and logistics expert, with legal consultant	TRL 8 and 9 attained; all necessary certifications and registrations received	USD 500,000	01/11/2022 - 28/03/2023
Launch	Prepare manuals and train market and sales personnel, sales representatives, installers, and maintenance repair staff; implement a marketing campaign; establish corporate and retail sales channels.	Training: team leader with training consultant; marketing and sales: business development expert and sales and marketing department manager	Personnel trained for launch and support; marketing campaign implemented; sales channels established; initial revenue targets hit	USD 200,000	01/04/2023 - 28/08/2023
Post-launch	Revise manuals and training materials as needed; enhance online training and support with improved software and platforms, if available and affordable; develop a list of desirable improvements, enhancements, and additions.	Product line manager. Team now acts as in-house consultants	Removal of product from sales plans	To be provided by product line manager as needed	15/01/2024 - 30/12/2043

Perhaps the most important thing to understand about the Action Plan tool is that its preparation is an iterative process. As people are pulled into concurrent engineering, new insights are gained and the data changes. Each time new data is entered, the rest of the entries in this workbook and in the workbook for the project charter must be re-examined for consistency. There is a back-and-forth process which seeks to combine the goals and objectives of the project charter with the practical realities of attaining those goals and objectives, as captured in the action plan. Only at the end of this iterative process can a project schedule be prepared with the aid of a Gantt chart or other project scheduling software.

How do you interpret the data in the Action Plan tool and use it in your NPD process?

Remember that the action plan is a plot of the anticipated course for an NPD initiative. Although the action plan is developed before the formal initiation of NPD and is an estimate of the tasks, time and resources that will be needed, it is important to be realistic. When both the project charter and the action plan align and seem reasonable, that is a good sign you are on the right path. When all the key players for completing NPD, product launch and market expansion have participated in the development of the action plan and are supportive of the plan, then you are ready to go. If realism, alignment or support are missing, it is wise to reconsider the NPD initiative.

wipo.int

WIPO
WORLD INTELLECTUAL PROPERTY ORGANIZATION