Why Landscape Maps?

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As organizations turn their attention to innovation as a strategic imperative, they are realizing they need to adapt the planning and project management processes that were honed to support their more routine developments; processes that more often inhibit rather than promote innovation. One of the critical parts of such an innovation friendly toolkit is a robust roadmapping process. One that not only lays out chosen development paths, but more importantly, one that organizes the diverse information on emerging needs, technologies and the external environment into a manageable framework that facilitates planning the front end of innovation. The landscape roadmap, using the Customer Focused Technology Planning (CFTP™) framework, is one of those tools.

Types of roadmaps

Roadmaps help us plan and act in unfamiliar areas by providing information to help us make decisions. They can be verbal ("go two blocks and turn left at light for half a block"), textual (a listing of flights from Heathrow to Boston), but most often we think of them as a graphical representation of information (e.g., a map showing restaurants in an area to help decide where to eat, or a route outlined by a travel app showing the preferred path to your destination). Roadmaps come in two forms: landscape maps and route maps.

Landscape maps. Landscape maps help us make decisions by having information useful in making the decision easily accessible. They are developed by collecting extensive information on factors that will likely affect the quality of a decision and eliminating all but the most important and relevant pieces. Not all activities need landscape maps as they require significant time and energy to be built well. They are most helpful when trying to navigate in new areas where you are faced with high levels of uncertainty; e.g., when developing innovative products or services or extending your products or services into new markets or mission spaces.

Landscape mapping is a central part of the Customer Focused Technology Planning™ (CFTP™) framework (Paap, 2016). The first few steps in this planning approach are used to develop the information needed to populate the landscape map. The last steps use the landscape map to generate and select innovative ideas for development. Attachment 1 provides a brief summary of CFTP™ and Figure 1 outlines the underlying logic involved in building landscape maps using the CFTP™ framework.

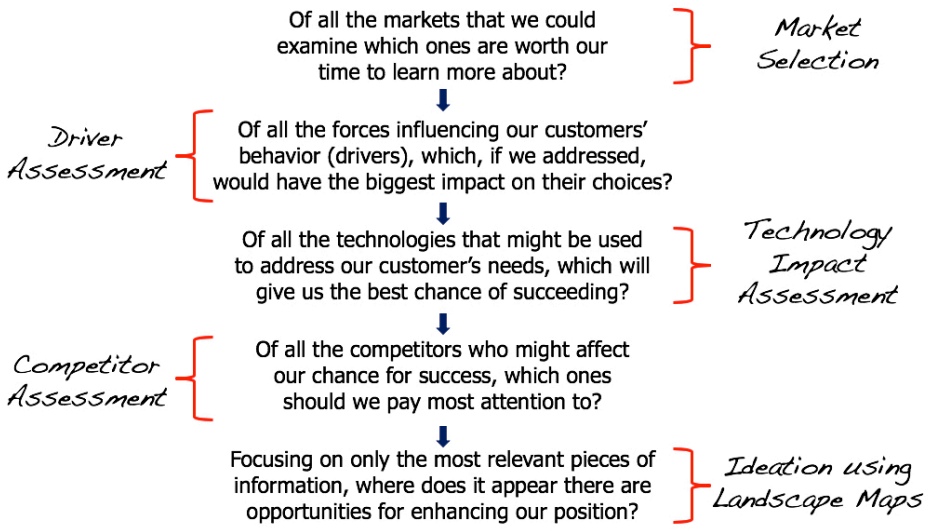

Figure 1: The logic behind landscape mapping

Route Maps. Route maps show a chosen direction over time and help guide the implementation of a decision. These are the roadmaps most often associated with technology and product planning. Almost any project can benefit from having a route map. Building on your decisions about what you plan to do they outline the actions to be taken over time: who will do what, when, and how; and who will be affected. These can be powerful tools for communicating, coordinating, and controlling project progress.

Route maps are usually prepared either in response to a directive from the leadership team to pursue an activity of interest or as a result of an internal planning process, such as the CFTP™ landscape roadmapping framework. The basic thinking behind route maps is illustrated in Figure 2.

Figure 2: The logic behind route maps

Planning developments with high levels of uncertainty

How organizations should approach planning and development depends to a large extent on the level of uncertainty of the project. Many organizations differentiate how they approach project planning in terms of their being either disruptive or incremental. While useful from an historical perspective to research patterns of innovation, it is less useful in planning. You only know for sure if something is incremental or disruptive after it is developed and you attempt to commercialize it. Some innovations predicted to be disruptive, e.g., the Segway, turned out to be incremental at best. Some apparently minor improvements of an existing product often brought surprising disruptions. For example, the iPod was introduced as a more stylish MP3 player with greater storage and easier access to music and totally changed the music industry, eventually dominating mobile music.

From a planning and development standpoint, a more useful way to differentiate potential innovations is the level of certainty one has about the endeavor. Routine projects with high levels of certainty can be effectively managed using traditional New Product Development (NPD) tools. While most are likely to be incremental, occasionally they end up as major game changing innovations.

Most innovative projects are full of uncertainties: about the market receptivity to the concept, the technical soundness of the approach, and the probable competitive response. It is uncertainty, not disruption, that requires a different approach to planning and executing projects. When traditional screening approaches are used for proposals having significant uncertainties they are usually rejected because they lack the numbers to fit into the formulas used to assess their value. This does not mean they cannot be defended, just not defended the way routine projects can.

Planning under conditions of certainty

For routine projects, marked by high levels of certainty, the planning process is usually numbers driven. If we spend 'x' we get 'y', where 'y' is sales, margins, share, sponsor funding, or another hard number. The process usually starts with soliciting ideas from customers, employees, and even vendors, anyone familiar with the current offering who sees an opportunity to make an improvement. Ideas are collected and assessed in terms of their costs, benefits, and fit with strategy and/or portfolio guidelines. Selected projects are then scoped, matched with resources, prioritized, and a route map prepared that provides a guide to the actions to be taken, their timing, and interdependencies; information required to effectively manage the project.

It is a logical and straight forward approach to planning projects and is supported by many software tools to help assess proposals and develop route maps for those selected. This approach works well, but only for projects where there is a high degree of certainty about the numbers that populate the assessment formulas, a high degree of confidence that the formulas used will work in the future being considered, and relative confidence that the outlined path will have few surprises. When the developments are incremental and the time horizons short, the numbers and formulas can usually be used with confidence, decisions easily made, and route maps developed outlining the path forward.

Planning under conditions of uncertainty

Unfortunately, innovative efforts rarely have defensible hard numbers on costs, user acceptance, sales, margins, market share, growth forecasts, and the other inputs required by traditional planning processes. When developing innovative new products and services, the demand for hard numbers in the formula-based approaches creates a barrier to innovation and makes such projects almost impossible to be funded.

<u>Informed judgment</u>

How can you screen projects when the level of uncertainty means there are no defensible hard numbers? There is another approach, one based on over five decades of cognitive research on rational decision making: Simon (1947), McKinney & Keen (1974), Dijksterhaus (2006), Gigerenzer (2007), and Guwande (2009). It is the approach often used by venture capitalists when assessing the merits of business plans submitted by would be entrepreneurs and one followed by the most innovative organizations.

A 'visionary' has data on unmet needs, on a technology that appears to provide an answer to those needs, on a market that is or will soon be ready, a business model that outlines how to tap into that market, and a strategy and supporting plan for marshalling the resources to exploit the opportunity. Is it a sure thing? No. Are their hard numbers? No. Are there huge uncertainties? Yes. Is there comfort in moving forward? Yes. Because there is a strong story based on the best data possible that indicates there is ‘a reason to believe’ this could be a success.

<u>Making rational defensible decisions without hard numbers</u>

There are a few basic requirements for making rational decisions in situations where numbers do not exist:

- identify the questions to be asked (e.g., NOMMAR™ - see Attachment 2)
- gather the best information possible on the factors affecting the decision; e.g., for innovative developments insights on current and future customer needs, technologies, and the competitive environment.
- focus on the most relevant dimensions and data points to avoid being overloaded
- immerse yourself in the data
- make an informed judgement whether it makes sense ("this could be a winner"), and if it does, whether it is worth trying because it fits your organization’s goals, strategy, and resources

Intuition is NOT data free

An important point. This approach, what is sometimes called gut feelings or intuition, is not data free. It is only effective if it is based on the best information possible on customers, technology possibilities, and the competitive environment. It is how one processes the data that differentiates systematic or formula-based decisions from decisions using informed judgment. They both require data. Using formulas and programs to process the data works in many situations, but only when there is a high degree of certainty on not only the validity of the data inputs, but also the relevance of the formulas used to process that data, formulas usually based on the past that oftentimes are often not relevant to the future.

Avoid being overwhelmed

It sounds simple. Collect as much information as possible and use it to make informed judgements about what to pursue. However, the more information that is collected the greater the chance of becoming overwhelmed. The mind has limited ability to process the potentially huge amounts of information on customers, technologies and markets that is available. As Miller (1956) points out, humans have a limited ability to process information, what he referred to as 'the magical number seven, plus or minus two.'

Thus, an important step in the planning process is to narrow the focus to only the most relevant bit of information. It is analogous to the divergence and convergence process that is part of many models of creativity. Think broadly to minimize missing something (divergence), then screen out the noise so that the mind can focus on only the most relevant information (convergence).

Landscape Maps and the CFTP™ planning framework.

The landscape map presents only the most relevant information necessary to make sound decisions about new product and service opportunities. It is grounded in three key concepts

- Innovation starts with information not ideas - planning that begins with collecting and screening ideas is limited to the knowledge the idea generator(s) have about the needs and possible technologies to address those needs and rarely leads to innovation. Paap and Katz (2004), drawing on work done at MIT in the 1960s to study how innovation works (Meyers and Marquis, 1969) argue the key to generating innovative ideas is to first collect the best information possible on current and future needs and technologies and then generate ideas based on that broader understanding of what is needed and what is possible.
- in those cases when numbers and formulas are not reliable due to the uncertainty of the data and fit of the formula to the proposal , rational decision making requires using informed judgement,
- it is critical to filter out extraneous information given the limits of the mind's processing capacity; filtering allows the team to focus on the most relevant data needed to make a sound decision.

The landscape building process asks three questions:

- Of all the things that our future or current customer might need, which ones are most likely to drive their behavior? Let's focus on those.
- Of all the technologies that might be used to address those needs, which ones are could we best use to address our customer's unmet needs? Let's focus on those.
- Of all the competitors we might face in our attempt to retain or capture this customer's business, which ones represent the most serious challenge? Let's focus on them.

The subset of high impact needs, technologies, and competitors are placed onto the landscape map so that all the critical information needed to develop and assess innovative ideas are in front of you. If done well, you have

screened out the extraneous information and what is left can be easily processed without resorting to mental crutches like weighting and ranking schemes.

The process flips the standard approach of first generating ideas and then seeking supporting information. Here you collect information first and let the ideas flow from what you uncover.

The focus is on thinking not forms

One reason it is so highly adaptable is that it is based on a series of questions not on a series of forms. Large complex organizations typically develop formal processes to answer the questions and create forms to ensure uniformity throughout the organization. However, smaller operations can generate the same insights through a much more informal process, as long as they carefully work through each step and answer the questions with the best information available.

Planning using the landscape map

At this point no planning has taken place. All that has been done is to collect, organize, and select the key information 'nuggets' required for planning. Once developed, the landscape maps can be used by the planning team to start make connections between high impact unmet needs and technologies.

The landscape map is similar to the maps used when planning a vacation. When looking for lodging, we turn to guides that have reviewed hundreds of offerings and rated them and categorized them. As we plan our vacation we don't consider hundreds of places, but juggle maybe half a dozen that meet our requirements for price, quality, convenience, and other features we find important. Someone screened all the possible places, so we could focus on those most likely to meet our requirements. Similarly, we use filtered guides to attractions, restaurants, and transportation options. The planning guides developed by AAA, Google, Mobil, Zagat, Fodor's, etc. are basically landscape maps of our vacation options. Someone looked at all the options and chose only a few to consider so planning could be comprehensive without being overwhelming. The CFTP™ Landscape maps do that for planning the front end of innovation.

Keys to making good landscape maps

Use cross functional teams. While the maps can be done by a special innovation team or within R&D, having cross functional increases the chance of success. Not only is the team likely to have more and better information, selling your recommendations will be easier when the conclusions come from a team representing the key functions. Since the proposals likely lack hard numbers, selling is based on being able to tell a convincing story. A story developed by representatives from multiple functions who have delved into the information is an easier sell.

Develop supporting processes. Roadmapping is but one of the processes critical to being innovative. To be done well it needs the best information possible, which means organizations need to invest in three supporting processes:

- customer insight provides information on current and future drivers of your customers' behavior. Innovative organizations develop skills in a broad range of tools that help understand and anticipate customer drivers, from traditional market research and Voice of the Customer, to other techniques such as lead user, Gemba, scenario planning, technology forecasting, and crowd sourcing.
- technology scouting provides information on existing and emerging technologies that can be used to address your customers' needs. Scouting is more than looking for a technology to fill a deficiency gap. In its broadest sense it can be used to stimulate innovative ideas by identifying technologies used by others to address similar problems, to anticipate new capabilities through tech forecasting, and identify potential partners, suppliers, or customers.

- competitive intelligence provides information on external factors likely to impact the success of your effort. It includes competitor intelligence that seeks to anticipate your competitors' actions and reactions, but also looks at economic and political scanning to understand the external environment in which you are likely to be operating in and provides tools useful for collecting information on current and emerging needs and technologies.

Conclusions

There is a place for traditional planning activities that find, screen and select projects based on formulas to assess their value, using standard metrics concerning costs, sales, growth, etc. These work well for projects addressing certain futures. For innovative projects characterized by high levels of uncertainty, the numbers are just not there. The formulas do not work. What is needed is to immerse the team in the relevant data needed to make an informed judgement as to the logic of pursing an opportunity; and to do so without being overwhelmed. Landscape maps have proven effective in helping organizations organize and focus the relevant information needed to identify opportunities for growth through innovation.

Attachment 1
Customer Focused Technology Planning™ (CFTP™)

The CFTP™ roadmapping framework was developed based on the pioneering work on innovation conducted at MIT starting in the 1960s when researchers were asked by NASA to help develop planning and management processes to support the Apollo program (Marquis and Meyers, 1968). This research showed the importance of collecting information on current and future customer needs and technology options prior to generating ideas. It is a highly adaptable 'framework' and has been used globally by hundreds of organizations in multiple industries ranging from small firms with a few dozen product development staff to large multinationals with thousands involved in the development process. It was the basis for the CEB best practice recognition of Timken in 2014. (CEB, Roadmapping Best Practices, 2013).

Building the Landscape Map – Two Approaches

The landscape mapping process used in the Customer Focused Technology Planning™ framework can take one of two forms. The classic approach uses teams of 4-6 people who meet a few hours each week for 4 to 6 weeks to work through the steps with the resulting filtered information on needs, technologies and competitors entered into landscape maps. A more detailed description of this process can be found in "CFTP™: An Overview" (Paap, 2016). Figure 3 shows the basic steps involved.

Another approach uses the same thinking and information processing steps but completes most of the work in 2 to 3 days using larger teams of 12-17 people. The work is done with post-it© type notes and flip charts. This has become popular with firms whose functional units are spread globally and weekly meetings becomes difficult.

The basic steps. Regardless of the approach used there are 8 stages in the planning framework, each focused on a particular question that provide the building blocks for the final route map.

Plan the planning – What is the goal and planning horizon, and who should be involved?

Step 1 – Focus on high impact segments – What areas are worth our time learning more about?

Step 2 – Assess customer needs – What drives our customer to purchase and/or use our product?

Step 3 – Assess technology impact – What technical options could we use to address our customer's needs?

Step 4 – Develop Landscape Maps – What are the critical pieces of information we should focus on?

Step 5 – Generate ideas for projects/initiatives – Looking at the key information what ideas emerge?

Step 6 – Select ideas – What ideas should we pursue to have a balanced development portfolio?

Step 7 – Develop Route Maps – What roadmaps should we build to improve our chance for success?

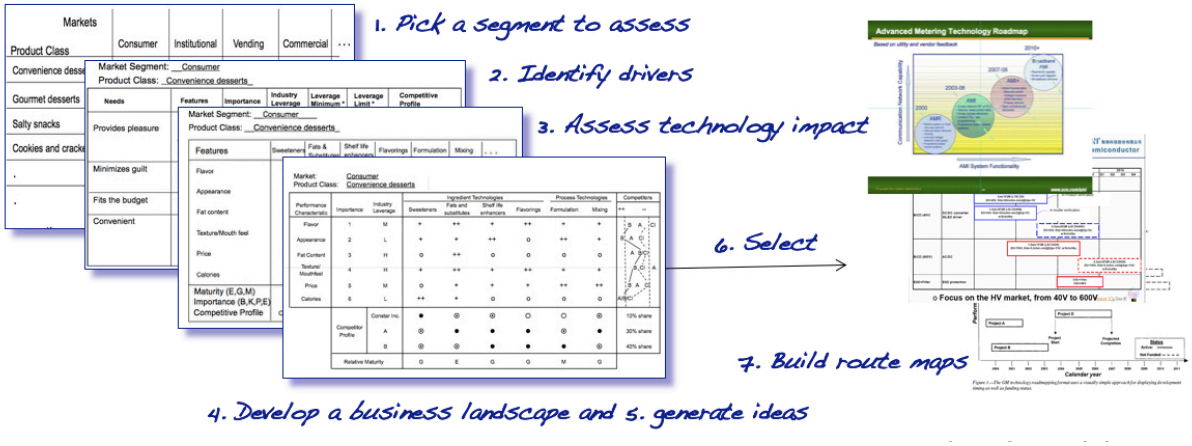

Figure 3: Steps in building roadmaps

Attachment 2
Using NOMMAR™ to Build a Business Case and Review Projects

When assessing an idea's value, a business case is always needed: a link between technical, product and service investments and a return: sales, funding, image, etc. It is different than a business plan. A business plan has the details on the proposed activity: how it will be developed, how and where it will be produced, the expected timing, costs and benefits, and so forth. It provides direction for executing an approved project.

A business case is the logic of the proposed activity – why it makes sense for an organization to pursue it. It requires defensible answers to six critical questions (NOMMAR™)

- Is there a customer **N**eed? (someone will want it)
- Are their technology **O**ptions? (someone can meet the need)
- Is there a potential **M**arket? (someone will pay and/or adapt their processes to use it)
- Is there a business **M**odel? (someone could do it)
- Do we have a realistic **A**pproach? (we could do it)
- Does it make sense, is it **R**elevant? (we should do it)

If defensible numbers exist, they of course should be used. Unfortunately, most innovative proposals lack hard numbers, but there can still be defensible answers to the questions using the best information available. You may not know the exact size of the expected demand for your offering. However, by having information attesting to the existence and strength of the need and the potential benefits to customers by using your proposed offering, you can reasonably conclude that there 'appears to be strong enough interest' to 'make this a winner.'

The six NOMMAR™ questions can be the basis for not only the initial screening but can also be used for reviews throughout a staged development process (e.g., Coopers Stage-Gate©, Cooper, 2011). At each gate ask the questions anew, updating the answers with information developed since the last review. Based on the assessment of the updated business case the organization can decide whether to continue as planned, slow down, speed up, modify, table, or kill the project.

For most routine developments, the customer **N**eed, technology **O**ption, **M**arket readiness, business **M**odel, and organizational **R**elevance are well understood before the project begins and are unlikely to change. Thus, many organizations take a shortcut and at each gate ask the one question in doubt: is our **A**pproach working? If the project is on plan, it passes; if not, it is killed. This leads organizations to diverge from Cooper's original intent of asking the broad question ("should we continue") with a much easier one ("are we on plan"). It is one reason that innovative projects often have difficulty navigating stage and gate development processes. Innovative projects rarely proceed to plan and the abridged approach to gate reviews ends up killing them when they are off plan.

The key to making stage-gate type processes work for innovative projects is to focus on the opportunity not the plan and revisit the business case at each gate. NOMMAR™ can be useful in these reviews. At each gate, look at what was learned about the answers to the six questions and decide whether the opportunity is still attractive. Being on plan is important but it is not the only consideration. A project can be on plan, but you learned a competitor's approach makes yours unlikely to succeed; or the customer need may have changed, and other needs now drive their behavior. In each of these situations the project may be 'on plan' but not worth continuing.

Similarly, an innovative project may be late, over budget, and have shifted its focus, yet the organization may continue its development. You may have discovered the need and approach are even stronger than originally forecast and the opportunity is even more compelling, despite the development snags.

Whether used for initial screening or ongoing project reviews, NOMMAR™ has proven to be an effective tool in assessing the value in pursuing innovative products and services.

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