NGI101x - 1.4B - Problem demarcations part II

Warning: The video clip that you are about to watch may suggest that problem demarcation is as easy as child's play! The means-ends analysis presented here in a few minutes may take days in real life, because problem demarcation is an iterative process in close dialogue with your client.

Hi! I'm glad that you're watching, as problem demarcation is a crucial step in policy analysis. In this short video clip,

I will use a somewhat stylized case example to illustrate the techniques for problem demarcation I explained in the first video clip on this topic.

Let me start with a quick recap: Problem demarcation is a crucial step for three reasons:

(1) You help your client to establish what is the problem that is most relevant to analyze.

(2) By focusing only on issues that matter, and at the right level of detail, you save time and effort.

(3) And by explicitly defining the scope of your analysis, you and your client can reflect on how this will eventually limit the conclusions that you can draw, and the recommendations that you can make.

As I explained in the first video, problem demarcation starts by choosing one issue that appears to be of immediate interest to your client. This issue becomes the starting point for means-ends analysis, which helps you to identify the related issues. You then develop alternative problem statements, and analyze these further so that you and your client can decide what problem to focus on.

Let us again assume that your client is the Port of Rotterdam, and that in your first talks it appears that the Port is thinking about ways to reduce its emissions of carbon dioxide.

This provides an excellent starting point for further analysis. Let me recall that the key concept in means-ends analysis is the means-ends, which we draw as a rectangle labelled with a single verb phrase. Using verb phrases is important because you want to make clear that a means-ends box not only represents something your client wants to achieve (an end), but also something your client can do (a means).

You perform the means-ends analysis by repeatedly asking only these two questions:

1. Why? Why do you want to achieve this?

2. And How? How can you achieve this?

The why questions help you identify your client's higher aims (also called "end objectives"); the How questions help you identify more and more concrete means for your client. So let's do it!

Starting with the initial aim to reduce CO2 emissions, we ask Why? Why would the Port of Rotterdam seek to reduce its CO2 emissions? Well firstly, the Port wants to gain recognition as the world's "greenest" port. Becoming CO2-neutral is instrumental in obtaining this "eco-image". But at the same time, assuming that industries have to pay for their CO2-emissions, providing CO2-neutral services will also reduce the cost for new companies that consider making large capital investments the Port area.

So why would the Port of Rotterdam want to improve its eco-image and reduce cost for investors? Simply: to attract more business to the Port of Rotterdam. That is, after all, their main concern.

Now you can start asking 'How' questions. How can the Port of Rotterdam make itself more attractive, in addition to being the world's greenest port and offering the prospect of low CO2 emission costs? The Port then tells you that potential investors also want the prospect of ample space for expansion, and – of course – that the port can provide industrial services that meet the highest standards.

To create space for future expansion, the port not only develops new areas, such as the second Maasvlakte, but may also consider redeveloping existing industrial sites that near the end of their economic life span.

To improve its eco-image, the Port may also try to phase out polluting industries. To reduce costs for investors, the Port may also lower the rent and fees it asks from companies, or increase efficiency by investing in upgrading its infrastructures, such as quays, roads, and pipelines.

You then observe that improving infrastructures will also improve the quality of service. But the Port will say that in addition to the "hardware" it also needs to improve logistic services.

You can see that by asking many Why and How questions you have gained a much better understanding of the many ways in which the Port of Rotterdam strives to be Europe's preferred port. It puts the issue of reducing CO2 emissions in perspective, and it may lead to a change of focus for your analysis.

But for this example, let's assume that the focus remains on reducing CO2 emissions.

So you continue asking: How?

The port could reduce CO2 emissions by creating facilities for carbon capture and storage, so that CO2 can be stored in, for example, depleted natural gas fields. The port could also increase the installed capacity for generating electricity from renewable sources, such as wind or biomass.

Evidently, you can continue in this way to elaborate the means-ends diagram in more detail.

As I mentioned at the start of this clip, constructing a means-ends diagram is in practice an iterative process of discussing with your client. In this process, you will make mistakes. Let me briefly point out three common mistakes for which you should check:

First, you should check for causality: does your diagram contain “false arrows”, that is, an arrow from box A to box B while the means A does not really help achieve end B. It may be that you placed A too high or too low in the diagram, and that you should link it with another box.

Secondly, you should check whether your client can actually do what is stated in each box. A common pitfall of asking How is that you forget that the means should be in line with the capabilities of your client.

Thirdly, you should check with your client that you did not overlook important issues. If you start asking How questions too soon, you start detailing sub-issues before you have understood the full scope of your client’s situation.

Once you and your client agree that you’ve got the whole picture, you start using the means-ends diagram to establish the proper focus for your analysis. You do this by making alternative problem statements for each means-ends box in the diagram:

You select one box as your focal objective .You look at the means by which this objective can be reached. You ask yourself what may be undesirable side effects of these means

And then formulate the problem as “How can the client achieve this focal objective with none, or only little, of these side effects?”

If we start at the top of our diagram, the means to make the Port of Rotterdam more attractive are formulated only globally, but it is clear that they will require large investments, and investments in port infrastructure will also require approval from a range of authorities.

A good problem formulation at this global level could be: “How can the Port of Rotterdam make itself more attractive without going bankrupt or breaking the law?”

If we focus on ways to make Rotterdam the “greenest” main port of Europe, and consider the means we identified, the undesirable side effects of phasing out polluting industries could reduce the variety of port industry to the point of becoming, while measures to reduce CO2 emissions are costly. Demanding higher rent and fees to recover these costs could cause other industries to move out, so either way, the port runs the risk of losing money.

If we move down one more level, we consider the undesirable side effects of carbon capture and storage, and of renewable energy sources. Capturing CO2 is costly, while storing CO2 underground is known to raise concerns from the public. The variability of wind and solar energy puts more strain on the transmission grid. The problem can therefore be summarized

as “How can the Port of Rotterdam reduce its CO2 emissions without increasing costs for companies, losing public support, or decreasing the security of supply of energy?”

If we move down in the diagram once more, we find that we cannot complete a problem formulation at this level without identifying additional means, in this case: means that facilitate CCS.

This illustrates that in real life, you will find yourself often going back to your client with additional questions, and that more specialized people in your client’s organization may get involved in the process. Let us assume that experts can clarify how the port could facilitate CCS.

The port will not store CO2, but provide for its transport to underground storage areas. One means of transport would be a pipeline; an alternative means would be tanker ships. A pipeline would have high capacity, but takes long to build and is costly. Tanker ships are cheaper and more flexible, but have limited capacity. Both technologies would entail safety risks. The problem of the port at this level can be summarized as "how can the Port of Rotterdam facilitate carbon capture and storage without incurring losses, demand exceeding capacity, or increasing the risk of incidents?"

As you have seen, I have traversed the means-ends diagram from top to bottom. In real life, I would have considered all means-ends as potential focal objectives.

Let me quickly show how you would proceed once you have formulated a wide variety of problem statements. I will use the last problem statement as an example. The next step is to elicit the criteria that your client should use when deciding on this problem.

You do this by making an objectives tree

The first objective follows from the first part of the problem statement: the port wants a large transport capacity for CO2. The without-part of the problem statement suggests three more objectives] low cost, sufficient transport capacity, and low safety risk. The overall objective that summarizes this could be formulated as "Efficient CCS facilities".

You then make this summary of what your client wants even more precise by translating the objectives into measurable criteria.

The transport capacity for CO2 should, for example, be at least one million ton per year, , the marginal cost of transport should be less than two euro per ton, capacity should always be greater than demand, and the probability of a grave accident should be less than one in a hundred thousand year

The means for facilitating CCS, and the criteria to decide which one (if any) should be planned for, neatly demarcate this particular problem.

Note that the initial focus shifted only a little bit: we started with the issue of reducing CO2 emissions, and now focus on one way of achieving this: carbon capture and storage. We might just as well have discovered that the issue of providing space for expansion was more urgent for the port, and that would have radically changed the focus of our analysis.

Problem demarcation means thinking systematically about what to focus on. Together with your client, you iteratively scope out, and then zoom in again.

It may seem a lot of work, but think: when you're going to spend several weeks of your time on investigating a problem, it is worth investing one or two days to find out what the real problem is.

Problem demarcation is not child's play… Because real world problems matter!