A Green Analysis of a Value Stream

There's a lot of talk these days about the "greening" of business processes. In some cases, the goal is to reduce energy consumption. In other cases, the goal is to reduce the emission of greenhouse gasses, to reduce the consumption of water in an area experiencing a drought, or to reduce paper consumption. These are all important goals and, in this Advisor, we want to consider how a process redesign team might approach a "greening" objective.

Before getting down to specifics, let's begin with two definitions. A **value chain** describes ALL of the business activities required to produce a product or service. It includes the activities directly involved in producing the product or service and it also includes the management and support activities required to enable the core or operational activities. This was Porter's definition of a value chain when he coined the term in 1985 and we continue to find it useful today. Most companies do not focus on value chains, however, because they don't find it convenient to assign management and support processes to specific sets of operational activities. Instead, they focus on the set of core or operational activities that are directly involved in producing the product or service. (See Figure 1.) This set of activities is increasingly termed the **value stream**. In essence, a value stream is the core set of activities in a value chain. Throughout this Advisor we will focus on value streams—on core sets of activities required to generate a product or service of value to a customer.
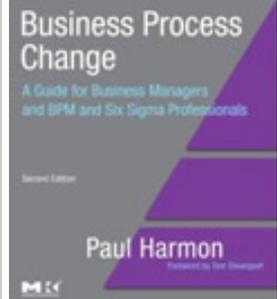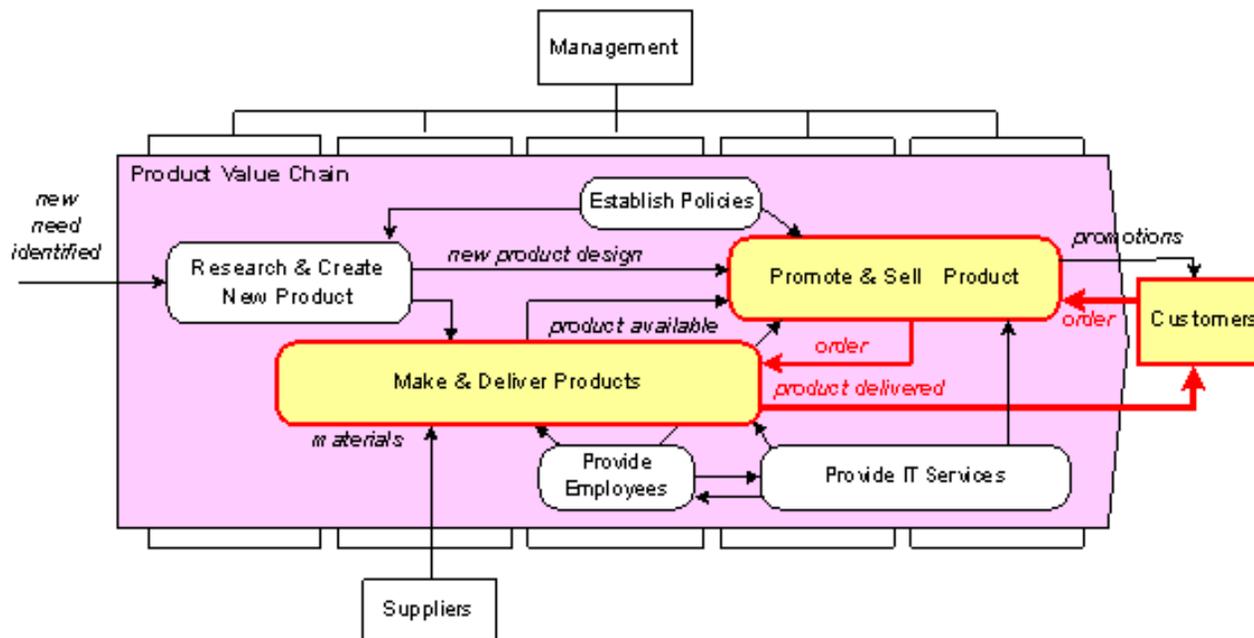
**Figure 1. A Value Chain and a Value Stream
(The Value Stream is highlighted in red.)**

To begin any analysis, we must first ask whether the organization in question has identified its value chains or value streams. This usually turns out to be a question about the process maturity of the organization in question. Immature organizations focus on specific processes, often within specific departments or silos. More mature organizations create a process architecture as a way of understanding and managing their overall business. Thus, a CMMI level 3 organization probably has a general overview of its value streams and the major processes that comprise each specific value stream. Level 4 organizations have usually refined their understanding of exactly how each value stream's processes work together, have managers who are responsible for the value streams and the major processes that comprise each one and have good metrics for evaluating the effectiveness of the value streams and their component processes.

Many modelers represent value streams as circles that begin with a customer request and end when the customer receives the product. This approach to modeling reflects the fact that the term "value stream" originated in Lean work at Toyota and that it was originally focused primarily on the analysis of manufacturing processes. Today, and especially when one is modeling service processes, a BPMN (or Rummler-Brache) diagram organized by swimlanes is more useful. Figure 2 illustrates a very simple BPMN model of a value stream. (I used yellow to highlight the activities that make up the value stream.) Note that the customer process is shown in the top swimlane or pool and a support process is given in a pool below the Rent Car value stream. Also, although we have not indicated it here, each of the processes that make up this value stream can be decomposed into subprocesses and further subdivided into activities.
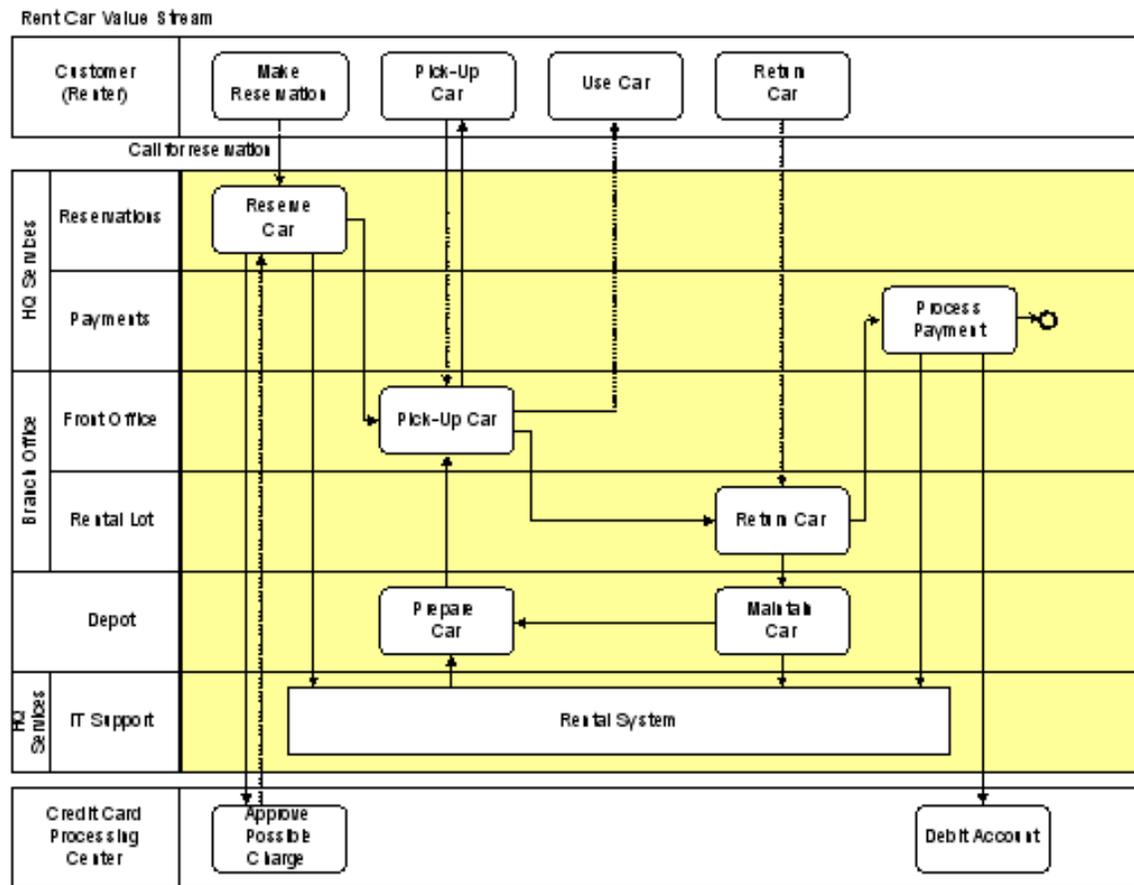
Rent Car Value Stream

Figure 2. A Rental Car Company Rent Car Value Stream

Any company with this kind of understanding of its value stream processes is in a good position to think very seriously about the environmental impact of its operations. Assume that this process was redesigned by competent process analysts. There are metrics for each interaction with the customer, and metrics for each process and subprocess output which are regularly monitored. Let's assume, further, that an earlier redesign effort looked at a more detailed process map and that each subprocess was challenged during redesign to determine what value it was contributing to the overall value stream. (In other words, non-value adding subprocesses have been eliminated.)

If we were to focus on the internal metrics involved in this value stream, we might use the model that appears in Figure 3. In this case we have eliminated all unnecessary detail to focus on the metrics that describe the overall efficiency of the process and the internal efficiency of the activities. We use a circle outlined with a dotted line and a "measurement number" to indicate each measure. (This is a business notation that BPTrends uses, which is derived from Rummler and Brache.)
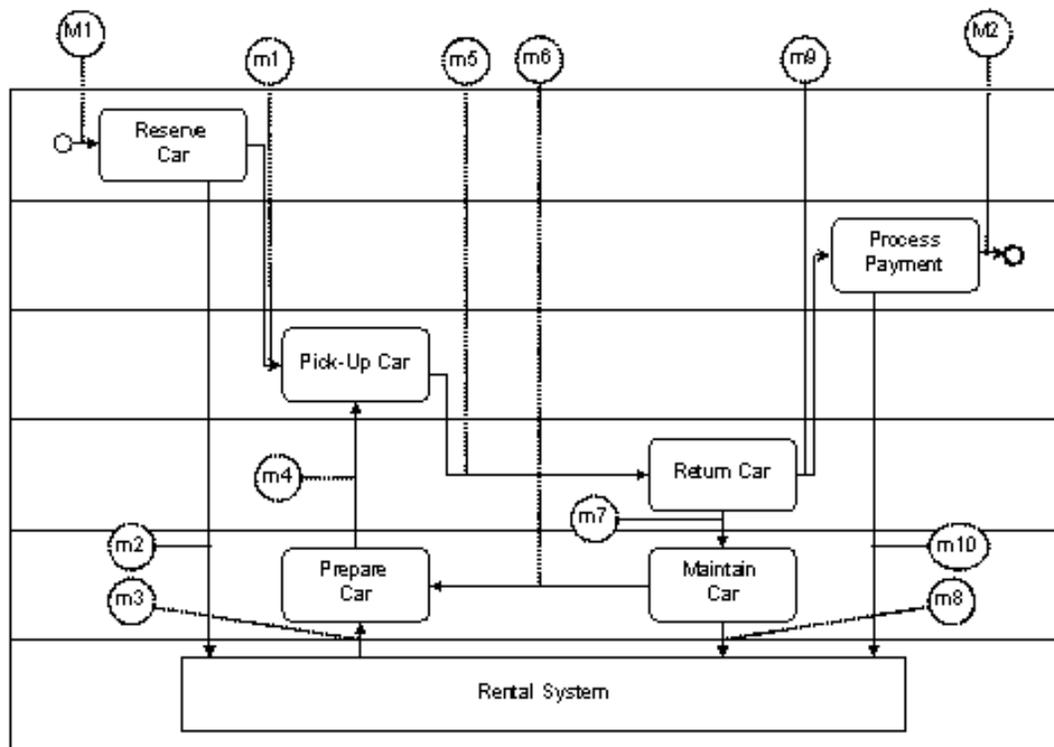
Figure 3. The Value Stream with some measurement indicated.

Without going into details, to evaluate the cost of the value stream, we would want to know all the costs associated with an instance of this value stream from M1 to M2. Then, we would want to gather enough data on enough instances to have good average numbers. To refine our analysis, we would want to know what was spent to accomplish each of the activities that make up the overall process. We could, of course, do this a little differently and subtract from the total, moving from right to left, and ask what value each activity added to the final product.

Of course, any mature process organization would track other metrics besides cost and would be able to determine if each subprocess was producing its outputs on time, in sufficient quantity, and in a manner that satisfied customers.

So far, we have simply recapitulated what mature process organizations have been doing for the past decade or two. The effort that has gone into developing Business Process Management into a useful technology has been focused on understanding how work gets done, what activities are critical, what value they add, and what they cost. When we have this data and we want to cut costs, we know which activities are the most costly, we know what outputs are most valuable, and we are well positioned to ask what we might do to reduce costs without reducing quality and customer satisfaction. The precision that a good process architecture provides managers is what creates much of the value derived from BPM efforts.

Organizations that lack these kinds of models tend to handle problems with a brute force

approach. For example, every department or every activity will be required to reduce its cost by 10%, without regard for whether or not the activity is critical and without a detailed understanding of which activities are already efficient and which have fat that can be removed.

Process architecture work was important in the past, but it is about to become much more important. Good process models provide managers with a detailed understanding of how work gets done. They also provide the organization with a systematic framework for data gathering. Mature process organizations can draw on historical data from months or years of past effort, enabling them to be precise about where changes will really make a difference and where changes will exacerbate a bottleneck and cause really painful side effects.

The emphasis on environmental concerns is going to focus senior management on new initiatives to change the way work gets done within their organizations. If your executive is concerned with the cost of energy, he or she should be asking what activities consume energy. Starting at the value steam level, if your organization has more than one value stream, ask which value steams consume the most energy?

Next, ask how critical energy is to the product or service being produced. If you are producing aluminum, you will need to consume large amounts of energy. Aluminum companies locate plants near waterfalls and dams to help deal with this consideration. In other cases, however, energy is consumed, not of necessity, but simply because it has been cheap and no one has focused on trying to control its consumption.

How much energy does it take to produce a typical instance of your product or service? Consider a business rule at our Car Rental company that requires the branch office yard staff in winter climates to have cars running when the customers come to pick them up. It seemed like a nice idea when it was initiated some years back: Have a nice warm car waiting for the customer! It's delightful; but a little math shows that it's also consuming a lot of energy. Is it worth it? Could we accomplish the goal in another way that consumed less energy?

Just as we have used value-add analysis to define which activities really add value to our processes and which don't really need to be done, we are now about to enter an era where we will do energy-add analysis, waste-generation analysis, water-consumption analysis, and many other types of use or consumption studies.

The same basic approach that has worked to improve the efficiency of our processes in the past can be used to help us with these environmental problems. Business process practitioners ought to be in the lead in helping their companies address these problems. Just as in the past, however, companies that do not understand their processes and that lack good data on what happens, and where it happens, are going to use blunt force instruments and, in many cases, cause more damage than they intend, while positioning themselves for acquisition or bankruptcy.

This is the time for organizations to make a serious effort to become more mature, to become more process oriented, and to develop a business process architecture. Any investment made in the development of a process architecture and systematic process data gathering today, is going to pay off in big returns in the near future. Organizations that already have BPM Centers

of Excellence should probably be considering adding a new role or position—an environmental process analyst—who can start gathering the data that the organization will need in the years ahead as it begins to refine its business processes to make them greener.

As in the past, organizations that understand their processes are well positioned to move quickly. Organizations that don't will just get further behind, faster.

Till next time,

Paul Harmon