By Whynde Melaragno – February 2010

Business Architecture: A Key Enabler for Sustainability Strategy Development and Implementation

Executive Summary

Organizations that develop and execute a strategy to become more sustainable not only improve the state of the environment and society, but also obtain real business benefits such as competitive advantage, cost savings, new markets, employee retention and long-term business security. Business Architecture enables a sustainability strategy by serving as the link between strategy development and execution. As with any strategy, Business Architecture informs it and translates it for execution. Organizations that do not have a Business Architecture may be challenged to quickly and effectively implement a defined sustainability strategy, and some actually may not end up implementing it at all. Business Architects are great resources to engage throughout development and implementation of a sustainability strategy. They bring a holistic and objective perspective to any problem or discussion, and can serve as leaders, role models and change agents to help organizations make one of the most important transformations of our time.

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STRATEGIC TECHNOLOGY ARCHITECTS

333 W. Wacker Drive, Suite 850
Chicago, IL 60606
312.332.1900
www.stagrp.com

Introduction

As the pursuit for sustainability becomes a more urgent and mainstream driver for organizations today, many business leaders are asking themselves how they can quickly and most effectively develop and implement sustainability strategies aligned with their core business strategies. At the same time, the growing numbers of Business Architects working in these organizations are asking themselves what the concept of sustainability means to the Business Architecture discipline, as well as how the discipline can best be used to help develop and implement new sustainability strategies. The audience for this paper is primarily intended to be Business Architecture practitioners, although business leaders may find it equally useful to learn how the discipline of Business Architecture can be a significant enabler for sustainability strategy development and implementation. This paper will address the following questions:

- How do the concepts of sustainability and Business Architecture relate to each other? Is there even a relationship between them?
- How can the techniques, frameworks and thought processes used in the Business Architecture discipline help an organization to develop and implement a more sustainable strategy?
- Does an organization's Business Architecture change as it becomes more sustainable over time?
- Does the concept of sustainability change the way that the Business Architecture discipline is practiced?

Note: This paper assumes that the reader has basic knowledge about the concepts of Business Architecture and sustainability. To ensure common understanding within this context, both will be defined, but not addressed extensively.

The Emerging Transformation of Business

You've heard the claims and you've seen the stats. Climate change and environmental and social degradation are a real concern for many organizations and are impacting the way we do business. Examples of recent changes affecting organizations include the following: [1]

- The science of climate change and its implications are now generally accepted and are impacting industries, businesses and communities across the globe
- Government policy positions are changing rapidly and new legislation is being enacted at all levels
- There are organizations in every sector that now recognize that sustainability is a real and strategic issue, not merely one where simple compliance is acceptable
- Opportunities for business are emerging everywhere (e.g. renewable energy, social entrepreneurship, etc.) as well as threats to existing industries and businesses (e.g. rising insurance premiums, increased incidence of severe storms and weather, crop failures, etc.)
- Community expectations are ramping up rapidly and applying pressure to organizational and governmental behavior
- Science and technology are developing new tools to help with forecasting and technological solutions (e.g. climate change modeling and carbon sequestration)

Whether you believe the science or acknowledge the concerns, a significant number of organizations are reacting to them for different reasons, which makes this a very real business issue. In fact, authors Andrew J. Hoffman and John G. Woody, in their book titled Climate Change: What's Your Business Strategy, state that climate change should not be thought of as an environmental issue at all, but instead as a market transition which will affect virtually all sectors of the economy to varying degrees. They state further that, "as in any market transition, there will be winners and losers…you can remain completely agnostic about the science of climate change but still recognize its importance as a business issue."

Organizations are demonstrating that these challenges can actually be *opportunities* for obtaining competitive advantage, innovation, cost savings, new markets, employee retention and business security, while simultaneously meeting compliance objectives. According to environmental and business experts:

> *"Smart companies seize competitive advantage through strategic management of environmental challenges."*
>
> *"Environmental leaders see their businesses through an environmental lens, finding opportunities to cut costs, reduce risks, drive revenues, and enhance intangible value. They build deeper connections with customers, employees, and other stakeholders. Their strategies reveal a new kind of sustained competitive advantage…"*
>
> *- Daniel C. Esty and Andrew S. Winston, Green to Gold, 2006*

> *"Sustainability isn't the burden on bottom lines that many executives believe it to be. In fact, becoming environment-friendly can lower your costs and increase your revenues. That's why sustainability should be a touchstone for all innovation."*
>
> *- Ram Nidumolu, C.K. Prahalad and M.R. Rangaswami, "Why Sustainability is Now the Key Driver of Innovation," Harvard Business Review, September 2009*

The way we do business is transforming. This is not just a matter of incremental improvement, and goes much deeper than recycling or participating in Earth Day. The way in which we conduct business is shifting to focus not just on the bottom line and profitability, but on the "triple bottom line" which also takes environmental and social aspects into consideration. Organizations that take this approach will ensure long-term business viability as well as the betterment of people. They may very well emerge as the "winners," and in more ways than just the bottom line.

Green Roof on top of City Hall in Chicago
Photo by Diane Cook and Len Jenshel
(National Geographic)

A Brief Discussion of Sustainability

Overview

The United Nations Environment Programme (UNEP) defines sustainability (sustainable development) as:

> *"Meeting the needs of the present without compromising the ability of future generations to meet their own needs."*
>
> *This definition generally includes the responsible use of natural resources, the minimization of environmental impacts and fair and equitable treatment of people.*

So what does that really mean? According to The Natural Step framework, originally developed by Dr. Karl-Henrik Robért and John Holmberg and refined in cooperation with an international network of renowned scientists, a truly sustainable society (or organization) adheres to four system conditions: [2]

1. Extracted substances from the Earth's crust (e.g. fossil fuels, metals and other minerals) must not systematically increase in the biosphere
2. Substances produced by human society (e.g. DDT, PCBs, freon, etc.) must not systematically increase in the biosphere
3. The productivity and biodiversity of the Earth itself must not systematically be physically deteriorated (e.g. by deforestation, overfishing, etc.)
4. Human needs must be met with a fair and efficient use of energy and other natural resources

The unsustainable direction of business and society is described by Dr. Karl-Henrik Robért, using a funnel as shown below in Figure 1. In this funnel, the walls close in as resource availability decreases and resource demand increases. As the funnel narrows, companies have fewer options available for conducting business (e.g. because fewer natural resources are available). Proactive, responsible companies should direct their activities and investments towards the center of the funnel, rather than towards the walls which represent the limits described by scientific principles.[3] As the funnel illustrates, an organization which does not act sustainably may eventually encounter serious business implications such as increasing costs for scarce materials (or a complete lack of them), inability to meet demand, or even loss of a business that is no longer viable.

FIGURE 1: RESOURCE AVAILABILITY AND RESOURCE DEMAND FUNNEL
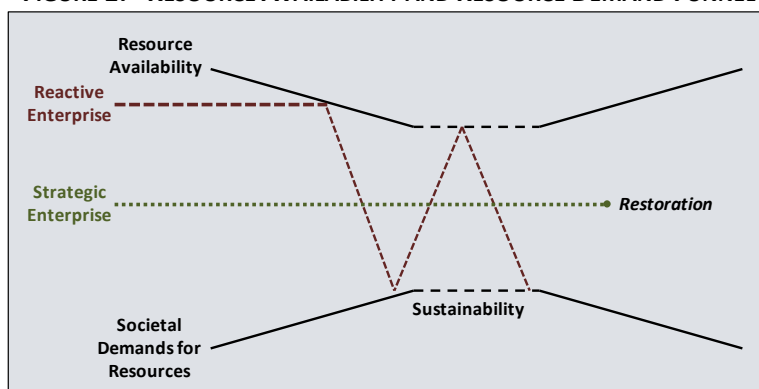
Source: Dr. Karl-Henrik Robért/The Natural Step (www.naturalstep.org)

Components

Sustainability typically includes three components: Social (People), Environment (Planet) and Economics (Profit). (See Figure 2.) Thus, any sustainability initiatives must address the needs of the society (e.g. standards of living, health care, education, etc.), aim to protect the environment (e.g. by conserving resources) and focus on providing the best standard of living while still remaining competitive in a world market.

Many people refer to sustainability as a "lens" under which to look at an organization, similar to what one might do for a topic like customer experience.

FIGURE 2: SUSTAINABILITY COMPONENTS

Environmental Aspects

An environmental aspect is an "element of an organization's activities, products or services that can interact with the environment."[4] The aspects which apply to an organization vary based upon the industry. However, the aspects which are typically managed include:

- Air pollution
- Water usage and pollution
- Energy usage
- Fuel consumption

- Solid and hazardous waste generation
- Land usage and contamination
- Raw material usage
- Other local issues (e.g. noise)

These environmental aspects directly or indirectly lead to some of the major issues facing society today such as climate change, ozone layer depletion, deforestation and loss of biodiversity.

Examples of Sustainability in Practice

- An "industrial ecosystem" was created in Kalundborg, Denmark, involving an electric power generating plant, an oil refinery, a biotechnology production plant, a plasterboard factory, a sulfuric acid producer, cement producers, local agriculture and horticulture, and a district heating facility. This ecosystem reconceptualized the idea of "waste" and turned the output of one facility into the useful input for another. The new approach saves its participants the cost of new materials and waste disposal, reduces regulatory risk and reduces environmental impact.
- Since 1997, Interface, Inc. (manufacturer of modular carpet), led by CEO Ray Anderson, has set out to produce zero waste, and not only to become the first sustainable corporation in the world, but following that, become the first "restorative company." These goals have not only significantly reduced the organization's environmental impact, but also have enabled it to become the number one company in modular carpet worldwide and achieve significant cost savings.

A Brief Discussion of Business Architecture

Overview

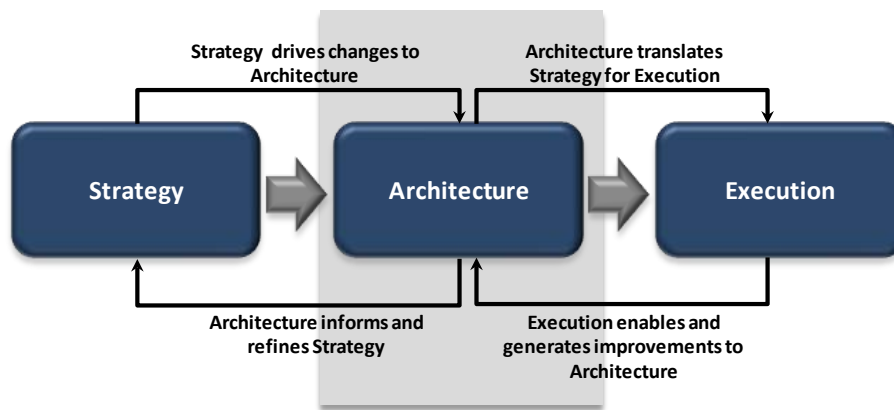The Business Architecture Institute defines Business Architecture as:

> *"A blueprint of the enterprise that provides a common understanding of the organization and is used to align strategic objectives and tactical demands."*

A Business Architecture can help an organization to:

- Develop a perspective on its strategic/competitive differentiators, and fully understand what it is and what it is doing
- Understand the key value streams used to deliver its value proposition
- Provide a way to quickly and effectively implement its strategy through defined approaches, processes and enterprise frameworks
- Make better-informed and more comprehensive business decisions
- Solve complex enterprise business problems
- Define detailed business needs, to be used as input for business and IT solutions
- Ensure the success of an Enterprise Architecture (if applicable), by serving as the driving force for the IT Architecture

Within an organization, Business Architecture exists between strategy and execution as shown below in Figure 3. Many organizations do not use a Business Architecture, and instead move directly from strategy to execution. However, this commonly leads to lack of direction, redundancy of efforts or lack of executing the strategy entirely. These issues are especially common within large organizations.

FIGURE 3: BUSINESS ARCHITECTURE FIT WITHIN AN ORGANIZATION

Strategy drives changes to Architecture

Architecture translates Strategy for Execution

Strategy → **Architecture** → **Execution**

Architecture informs and refines Strategy

Execution enables and generates improvements to Architecture

Components

The components contained within an organization's Business Architecture vary based upon the objectives for which it was put into place. However, the superset of components typically used fall within the categories of Business Context, Business Process, Business Capability and Business Information. Specific components are shown below in Figure 4.

FIGURE 4: BUSINESS ARCHITECTURE COMPONENTS

Note: Business Architecture components are not yet standardized industry-wide. Some models include additional components such as strategy and metrics. These additional components have strong ties with those shown here, but were not included as they are not themselves Business Architecture components in this context.

Examples of Business Architecture in Practice

The following examples are from a large insurance and financial services company.

- Business Architecture was used to quickly perform a comprehensive, end-to-end current state review of the business and IT supporting a federally regulated program in which the company participated. This review resulted in a detailed analysis of potential risks and business opportunities, which was presented to all department heads involved. Business Architecture was then used to develop a more cohesive future state for supporting the program.
- Business Architecture was used to help develop an RFI/RFP to identify vendors for a particular type of product line processing. The entire list of vendors to which the RFI was sent changed as the business better realized what capabilities they were looking for and how the current list of vendors did not fit the required capabilities. The IT department was able to get a better understanding of what the business required as well.

Sustainability and Business Architecture – Is There a Relationship?

So, sustainability is a concept, or a vision for business and society that ensures we can "meet the needs of the present without compromising the ability of future generations to meet their own needs." On the other hand, Business Architecture is a blueprint of an organization, which helps it to carry out its strategy more quickly and effectively. How *do* the concepts of sustainability and Business Architecture relate to each other? Is there even a relationship between them?

Sustainability can and ideally should touch every part of an organization. (See examples in Figure 5 below.) It should become embedded into the culture and ingrained into the thinking and decision-making process of people at all levels. For example, before an organization designs a new product, some additional considerations could include:

- Can the materials used be obtained in a sustainable manner (e.g. wood from a sustainably managed forest) and/or from recycled sources? Are the materials safe and non-toxic?
- Will the product be made by people who are treated fairly, work in healthy conditions and earn a fair wage?
- What is the carbon footprint of the product throughout its lifecycle and how can it be reduced?
- What will happen to the product at the end of its useful life? Can it be taken back and reused? If not, can it be designed in a way that it can be easily and completely disassembled for recycling?
- How can the wastes captured during production of the product be reused within the process or by others?

FIGURE 5:   EXAMPLES OF SUSTAINABILITY CONSIDERATIONS ACROSS THE VALUE CHAIN
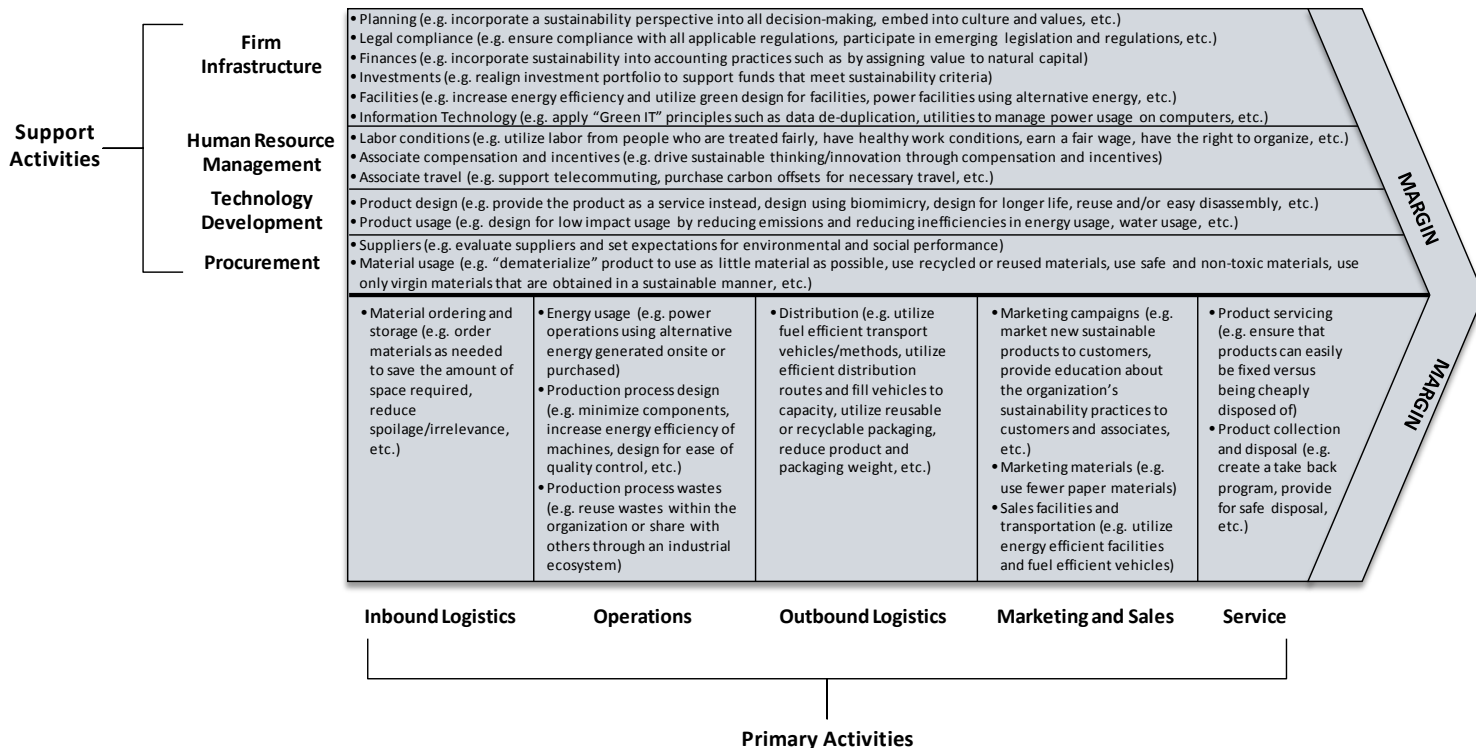
Like any other major business transformation (e.g. availability of the internet), the concept of sustainability should be driven from the top and go through an organization's strategic planning process. The end result should be a sustainability strategy which is:

- Comprehensive, encompassing and integrated across all organizational functions and departments
- Aligned with the organization's culture
- Aligned with the business vision, mission, objectives and strategy (although sustainability can influence them, causing them to change as it has for some companies like Interface, Inc.)

The sustainability strategy should be encompassed within the business strategy, although sometimes they initially exist separately for organizations that are new to sustainability. Developing a sustainability strategy may take time and focus, and may require help from external experts. The high level process from strategy development through execution is shown below in Figure 6.

FIGURE 6: STRATEGY DEVELOPMENT THROUGH EXECUTION
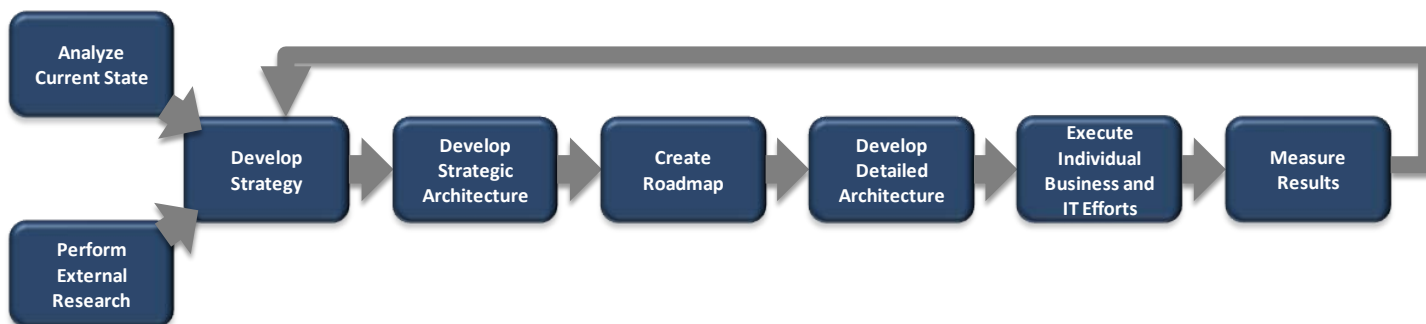
It is common for large organizations to execute various sustainability initiatives (e.g. implementing a "green" product, offering paperless options to customers, increasing the energy efficiency of a facility, etc.), but not have a comprehensive view of what is being done. This can lead to redundant efforts (e.g. two departments creating similar employee education programs) and competing efforts (e.g. one department is increasing paper mailings, while at the same time another is promoting paperless options and how "green" the organization is to the same customer base). In addition, it may prevent the organization from capitalizing on all of the good that it is doing, for marketing or annual reporting purposes. This is why a comprehensive strategy, driven from the top, must be defined. In cases such as these, after the sustainability strategy has been developed, the current initiatives should be reevaluated for alignment and actions taken accordingly.

If the concept of sustainability first manifests itself within an organization through strategy, then its relationship to Business Architecture is clear. As mentioned earlier, Business Architecture exists between strategy and execution. Thus, Business Architecture implements a sustainability strategy within an organization; it informs the strategy and translates it for execution. Believe it or not, there are

some organizations which invest significant time and money to develop a sustainability strategy, but because of their inability to execute or execute well, abandon it entirely. Business Architecture ensures that this very important strategy does not sit on the shelf. According to Couper et al. from EcoSTEPS:

> *"Research and case studies on the implementation of strategy make a very clear point: while most senior executives are happy with the quality of the strategies they develop, they are much less happy with the implementation of the strategy and the delivery of the expected benefits. Put differently, a great strategy poorly delivered is not as effective as a good strategy well delivered. The research also points out that the capability to implement strategy well can itself be a strategic advantage."*[5]

Organizations that have a Business Architecture can implement a sustainability strategy well and achieve competitive advantage more quickly than those which do not. These organizations already understand their current state, can make more informed business decisions and can carry out the strategy in a coordinated way.

Using Business Architecture to Develop and Implement a Sustainability Strategy

If Business Architecture is so beneficial to sustainability strategy development and implementation, how *does* it actually enable these activities? How can the techniques, frameworks and thought processes used in the Business Architecture discipline help an organization to develop and implement a more sustainable strategy?

Efficiently developing and implementing a sustainability strategy requires the following:

1. Reliable external research and sustainability knowledge
2. Education on sustainability concepts
3. Solid understanding of the current state within and across departments
4. Clear definition of the strategy and understanding of its impacts
5. A way to plan and orchestrate the strategy across departments
6. Detailed definition and specifications to implement the required business and IT changes
7. A mechanism for continuously improving and refining the strategy

A description of how Business Architecture assists with each of these points is described below.

Reliable External Research and Sustainability Knowledge

Developing a strategy, especially for a concept like sustainability that has emerged fairly recently, requires external research about the science and its predicted impacts, industry and competitor responses, societal expectations, consumer behaviors, actions being taken by government at all levels, and available technologies and solutions. This research needs to be reliable, up to date and applicable to the organization. Otherwise, the large amount of available data could be overwhelming. In addition to research, the organization needs people that can provide reliable knowledge about sustainability concepts, feasible solutions and how to apply them. This knowledge may come from within the organization, from external sustainability consultants or other external vendors that provide various types of solutions (e.g. energy audit services, technology, machinery, software, etc.).

Business Architecture frameworks may be used to organize and analyze large volumes of external research, and provide the context for where it applies within the organization. Business Architecture may also be used to bring external experts and vendors up to speed quickly on what the organization does, thereby saving time and money.
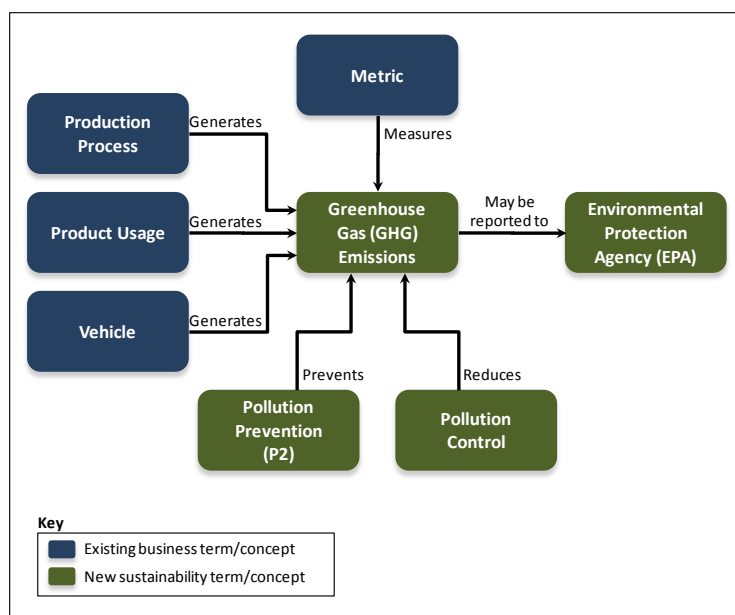
Education on Sustainability Concepts

It is difficult and ineffective to develop strategy for a topic that participants do not fundamentally understand. Currently, there are many more people who do not understand sustainability concepts than those who do. The topic is relatively new and is obfuscated by non-standard terminology, varying claims of what is "green" and differing opinions. Thus it is incredibly important that those who will be developing the sustainability strategy are educated on what sustainability really means, and share a common vocabulary. For example, at Interface Inc., there were five different languages within the organization that merged into one based upon the concept of sustainability.   These terms were then published in a glossary to be used by all associates. Many organizations such as Interface Inc. and IKEA use frameworks like The Natural Step to educate people on sustainability.

Sustainability education is usually provided first to business leaders and others participating in strategy development. However, it should eventually be provided to every person in an organization, though potentially at different levels of depth, via different delivery mechanisms, and with different types of application depending upon the role. The entire organization must be educated in order for people to comprehend the sustainability strategy, carry it out on a daily basis and continually improve upon it. Sustainability must become completely embedded into the culture until it becomes just the way people think and act.

Business Architecture can support this education process first by helping an organization to define and communicate a common language around sustainability. Business Architecture techniques provide:

- The rigor to facilitate conversations on new sustainability terms to ensure that they are clearly and consistently defined, as well as accepted across multiple departments
- A way to compare new sustainability terms to existing business terms, and modify the existing ones if needed (existing business terms would typically already be defined in an enterprise and/or department-level glossary)
- A mechanism to publish new sustainability terms (assuming that one or more standard glossaries are already established within the organization)
- A way to define and visualize the relationships between new sustainability terms and existing business terms (see sample artifact in Figure 7 below)

FIGURE 7:   SAMPLE BUSINESS TERM MODEL SHOWING GREENHOUSE GAS EMISSIONS AND ITS KEY RELATIONSHIPS

Business Architects can also support the education process by helping to disseminate the concept and embed it into culture. As a result, they should be trained on sustainability at the beginning of the process. Architects may potentially be located in (or work with) every department, and based upon the nature of their job, they interact with a large number of people. They can formally or informally educate others on sustainability (and later the sustainability strategy itself) and keep it top of mind when facilitating conversations about the business.

Solid Understanding of the Current State Within and Across Departments

To achieve sustainability, or any transformational change, people require two very important things. First, they need to understand what the current state is, and in this case what its impact is to the

environment and society (e.g. the amount of waste produced by an organization and its resulting impact to groundwater, air quality, human health, etc.). Second, they need a clearly defined vision of a sustainable future state and to see how people, the organization, society and even the environment act differently. These are two areas in which Business Architecture can be the most helpful; this section and the following one will discuss how.

A solid understanding of current state is critical to sustainability strategy development. Leaders may be able to determine where to go (sustainability future state), but without understanding where the organization actually is (current state), it will be hard to figure out how to get there, or what the impact will be of doing so. Many organizations do not have a documented and detailed understanding of who they are and how their business operates (or they may *think* they know, but they don't really know). These organizations lose significant time by having to first understand the current state, or worse, they don't take time to define it up front and later execute their strategy ineffectively. Both of these scenarios make it difficult for an organization to react quickly, be agile or achieve competitive advantage.

As discussed earlier, Business Architecture provides a mechanism to uncover and formally document what the organization does (its "blueprint"). This documentation should be kept up to date as the organization evolves. It creates organizational memory and a common "mental model" from which all people can think within and communicate. Business Architecture components are typically created at different levels of detail to be used by different people (e.g. executives, managers, analysts, etc.) and for different purposes (e.g. decision-making, incremental improvement, knowledge transfer, etc.). For example, at the very highest level, business process may be documented at an enterprise level for an organization's core processes performed across departments (e.g. a sales process). On the other hand, at the very lowest level, business process may be documented at a workflow level capturing the detailed interactions and handoffs performed by just a few roles within one department.

The examples below in Table 1 describe how an organization that has documented the current state using various Business Architecture components can use them within the sustainability strategy development process.

TABLE 1:   BENEFITS OF CURRENT STATE BUSINESS ARCHITECTURE DOCUMENTATION TO THE SUSTAINABILITY STRATEGY DEVELOPMENT PROCESS

An organization that has documented…	…can more quickly and effectively…
Enterprise Business Processes (represented in Value Stream models)	• Depict where current sustainability activities are occurring within the organization's core processes • Assess the impact of the sustainability strategy on the organization's core processes
Detailed Business Processes and Workflows	• Measure the environmental and social impact of processes and products/services (i.e. since all processes are documented, environmental/social metrics such as carbon footprint, water footprint, material usage, etc., just need to applied to each step) • Perform a Life Cycle Analysis (LCA) for products and services

An organization that has documented…	…can more quickly and effectively…
Enterprise Business Capabilities (represented in a Business Capability Model)	• Depict where current sustainability activities are occurring within the organization's business capabilities • Assess the impact of the sustainability strategy on the organization's business capabilities
Detailed Business Capabilities (or "Business Requirements")	• Measure the environmental and social impact of each relevant detailed business capability (i.e. since all detailed capabilities are documented, environmental/social metrics such as carbon footprint, water footprint, material usage, etc. just need to applied to each one)
Business Context	• Understand the range of possible opportunities and challenges (e.g. an international company that has all locations and interactions documented, can more quickly identify opportunities such as new markets or challenges such as different environmental legislation or water shortages in developing countries)
Organizational Units and Roles	• Develop a dashboard for managing stakeholders (i.e. all key internal and external roles and their interactions with the organization are already known)
Business Rules	• Assess the impact of new internal (e.g. new procedures or decision-making criteria) or external (e.g. legislative) changes (which typically manifest themselves as documented business rules)
Business Terminology and Concepts	• Define and communicate a new common language around sustainability (see previous section)
Business Data Elements	• Assess the impact of capturing and reporting on additional sustainability metrics (i.e. because business data elements which capture existing metrics are already known, and in addition if Business Architecture is aligned with Data Architecture and Application Architecture, then possible sources of data for new metrics may already be known)

Clear Definition of the Strategy and Understanding of Its Impacts

Although a sustainability strategy is typically developed by business leaders and other designated participants within the organization, Business Architecture can play an important role to help refine it. Senior Business Architects can help leaders to think through and articulate the strategy, as well as to inform them about the organizational impact.

By nature and by training, Business Architects think holistically, ask tough questions and are able to translate complex ideas into pictures. As a sustainability strategy begins to form, it may be useful to engage a Senior Business Architect(s) in a few checkpoints to allow him or her to provide feedback and ask questions. This may help leaders to identify gaps and opportunities to increase clarity. After the strategy is fully defined, the Business Architect can then help to translate the ideas into a picture(s) that will help others in the organization to understand and visualize it.

 Using the organization's Business Architecture artifacts, Business Architects can help leaders to perform "what-if" scenarios to test the organizational impact of various strategies. For example, if an organization has developed an enterprise Business Capability Model and related other key information to each individual capability (e.g. other business strategies, impacted departments, supporting IT

applications, etc.), then the overall impact can be determined by analyzing the capabilities which a potential strategy will touch, as shown below in Figure 8.

FIGURE 8:   STEPS TO ANALYZE STRATEGY IMPACT USING AN ENTERPRISE BUSINESS CAPABILITY MODEL
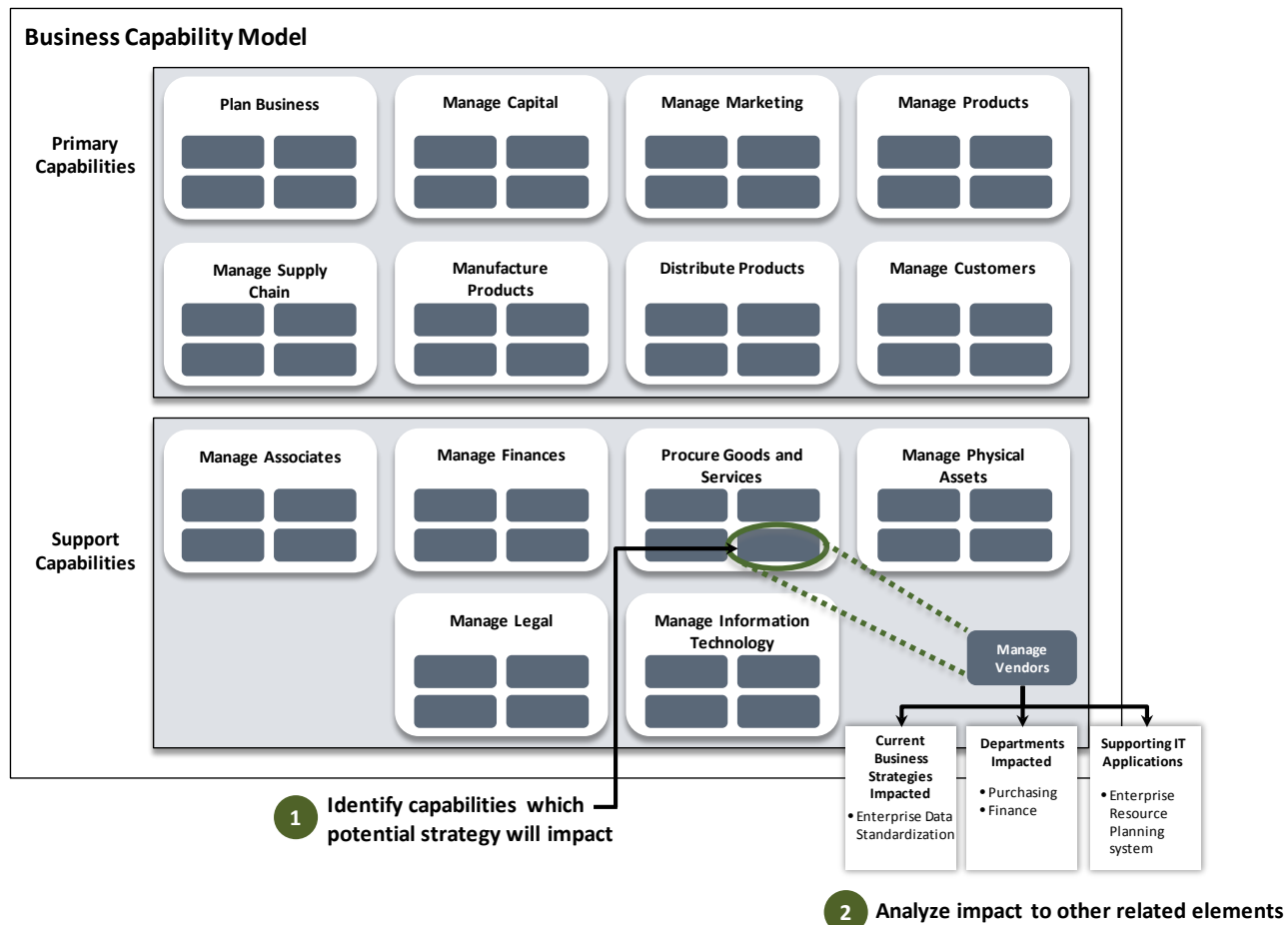
A Plan to Orchestrate the Strategy Across Departments

Whether an organization's sustainability strategy is aggressive and transformational (e.g. Interface, Inc.'s vision to become the first "restorative company") or a less extreme change, it is usually implemented in pieces over time. It can be overwhelming to decide where to start and how to make high level strategy ideas and goals a reality. Many people revert to their comfort zone and just try to implement the pieces which apply to them personally or their department. This is where Business Architecture comes in to help "translate" the sustainability strategy for execution in a coordinated way across departments, using a three step process.

The first step is to use Business Architecture to identify the (high level) gaps between the current state and the future state specified by the sustainability strategy. For example, a Business Capability Model depicting where current sustainability activities are occurring within an organization can be compared to the future state Business Capability Model, as shown below in the sample model for a coffee roaster/distributor in Figure 9.

FIGURE 9: COMPARISON OF CURRENT AND FUTURE STATE BUSINESS CAPABILITY MODELS TO IDENTIFY GAPS

Current State Business Capability Model for a Coffee Roaster/Distributor

Primary Capabilities

Plan Business | Manage Capital | Manage Marketing | Manage Products

Manage Supply Chain | Manufacture Products | Distribute Products | Manage Customers

Billing and other correspondence is currently provided to customers electronically

Support Capabilities

Manage Associates | Manage Finances | Procure Goods and Services | Manage Physical Assets

- Many facilities are currently Energy Star certified
- Many fuel efficient vehicles are used within the fleet

Manage Legal | Manage Information Technology

Future State Business Capability Model for a Coffee Roaster/Distributor

Design coffee packaging out of more sustainable materials

- Market new sustainability product features and accomplishments to customers
- Participate in cause marketing related to rain forest destruction

- Revise vision and strategy to reflect sustainability values
- Formally incorporate sustainability as a factor in all decision-making

Plan Business | Manage Capital | Manage Marketing | Manage Products

Continue providing billing and other correspondence to customers electronically

- Purchase coffee only from organic, fair trade growers
- Teach coffee growers best practices to ensure supply

Manage Supply Chain | Manufacture Products | Distribute Products | Manage Customers

- Explore LEED certification for new facilities
- Expand entire fleet to use fuel efficient vehicles

- Educate employees on sustainability principles
- Reward employees for meeting sustainability goals and creating new sustainability innovations

Manage Associates | Manage Finances | Procure Goods and Services | Manage Physical Assets

- Evaluate vendors and acquire goods and services only from those who meet defined sustainability standards
- Utilize recycled or sustainable goods wherever possible

Manage Carbon | Manage Legal | Manage Information Technology

Apply Green IT principles to software development and hardware

Create new capabilities within the organization for the measurement, management and reporting of carbon dioxide and other greenhouse gas emissions

Proactively participate in evolving environmental legislation (within applicable countries) regarding emissions and land usage

Key
- Capability with current sustainability activity occurring
- Capability with future sustainability activity planned to occur

Once these gaps have been identified, the second step is to architect solutions for them grouped by logical topic. These solutions may be organizational (e.g. new departments, roles, responsibilities, etc.), business/operational (e.g. new processes, policies, procedures, etc.) or IT (e.g. new hardware, new software, etc.). They may also take advantage of some of the methodologies, frameworks and approaches which are emerging to help business and society become more sustainable (e.g. The Natural Step framework, Environmental Management Systems, Industrial Ecology, Pollution Prevention, Cleaner Production, LEED, etc.), as well as technologies and products (e.g. wind turbines, fuel-efficient vehicles, etc). This step is usually performed by Senior Business and IT Architects, working closely with business and IT subject matter experts across departments, and reporting to the leaders who are sponsoring the work. In addition, some organizations assign a "sustainability steward" to each department. In these cases, Business Architects should also work with the stewards to ensure that the architecture appropriately reflects the sustainability strategy.

The order for architecting the topics should be driven by the strategic priorities. One key output from the second step is the creation of a "Target Architecture," which is a picture of what will be implemented in the future from both a business and IT perspective. Since people are involved from all impacted departments, redundancy of processes, data or IT applications is not created, unlike what would result if each department tried to implement the strategy on their own in isolation. Coordinated processes and shared applications and services can be developed, which save time, cost and even environmental impact (e.g. less energy required for servers which are supporting redundant applications).
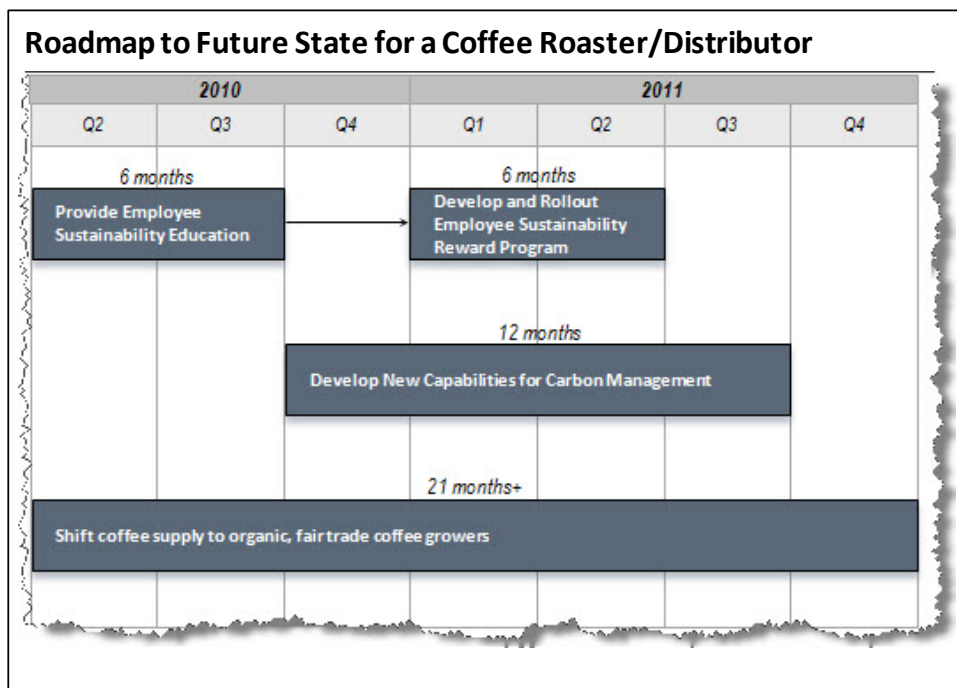
Once the Target Architecture has been defined and approved by leaders, the final step is to break it into logical pieces for execution. These pieces are then placed onto a roadmap to show how they will be implemented over time. The order and timing for each piece depends upon its priority and dependencies on other work. By this point, any sustainability efforts that were occurring in the organization previously (if applicable), should be compared to the sustainability strategy to determine if they should be continued as planned, stopped or built upon (e.g. if an organization currently has efforts to provide customers with a paperless option for billing, potentially this could be expanded to allow them to select a paperless option for correspondence from all departments or product lines).

Photo by Michael Melford (National Geographic)

A partial example of a roadmap is shown below in Figure 10 for the coffee roaster/distributor discussed earlier.

FIGURE 10: PARTIAL ROADMAP DEPICTING LOGICAL PIECES OF WORK FOR EXECUTION

Roadmap to Future State for a Coffee Roaster/Distributor

2010			2011			
Q2	Q3	Q4	Q1	Q2	Q3	Q4

6 months — Provide Employee Sustainability Education

6 months — Develop and Rollout Employee Sustainability Reward Program

12 months — Develop New Capabilities for Carbon Management

21 months+ — Shift coffee supply to organic, fair trade coffee growers

Detailed Definition and Specifications to Implement the Required Business and IT Changes

After a roadmap has been developed, Business Architecture, working in close collaboration with IT Architecture, is used to define each logical piece in more detail so that it can be consumed by people that will actually develop and implement the business and IT solutions. The architecture artifacts developed at this point typically include high level solution design and more detailed versions of the Business Architecture components (e.g. detailed business processes and workflows, business requirements, business rules, etc.). The work may transition from Senior Business and IT Architects to more junior or departmentally-focused Business and IT Architects. In addition, the work may shift to focus on just one department instead of crossing multiple, although it depends upon the piece of work being executed.

An organization that uses Business Architecture can more easily translate a sustainability strategy into the details required for implementation because:

- The roles, processes and artifacts used to define and consume implementation details have already been established; sustainability concepts are just new content flowing through them (e.g. business and IT already have an established way to work together)
- Time is not wasted rediscovering or documenting what happens in the current state; the current state blueprint can just be added to or changed
- Integration with current efforts can be understood at a detailed level (e.g. by analyzing sets of business requirements for in-flight, related efforts to determine which new requirements need to be added, or which existing requirements need to be modified or removed)
- Current business and IT issues are known (e.g. management may believe that offering customers a paperless option for correspondence across all departments/product lines simply requires a new data field to be added to a database and any corresponding IT applications; however, the actual architecture may reflect that this is much more difficult because the departments/product lines have completely disparate processes and IT applications)

### A Mechanism for Continuously Improving and Refining the Strategy

Continuous improvement, the never-ending quest to increase the quality of products, services or processes, is a critical element to achieving sustainability as it is nearly impossible to accomplish overnight; it is a vision to work towards. Organizations should put metrics in place to measure:

- "Maintenance" of business operations (e.g. adherence to operating procedures)
- Progress in moving from the current state to the future state established by the sustainability strategy
- The level of environmental and social impact across the organization for all applicable aspects (e.g. greenhouse gas emissions, water usage, energy usage, etc.)

 Business Architecture frameworks provide a starting point to help people identify where metrics are needed and ensure that there are no gaps. For example, an organization's business capabilities or business processes (either at the process level or the individual process activity/task level) could be analyzed to identify where metrics apply and even which are the most important. Documenting these metrics and their alignment to the frameworks, especially when done at an enterprise level, establishes a common set of metrics that should be used to measure performance, no matter which department or solution is executing. Without Business Architecture, departments tend to create and manage their own metrics, of which there may be redundancy or completely different and conflicting ideas for the same capability or process.

An example of metrics that may be aligned to a business capability for Manage Vehicles is shown below in Figure 11.

FIGURE 11: METRIC EXAMPLES FOR THE MANAGE VEHICLES BUSINESS CAPABILITY
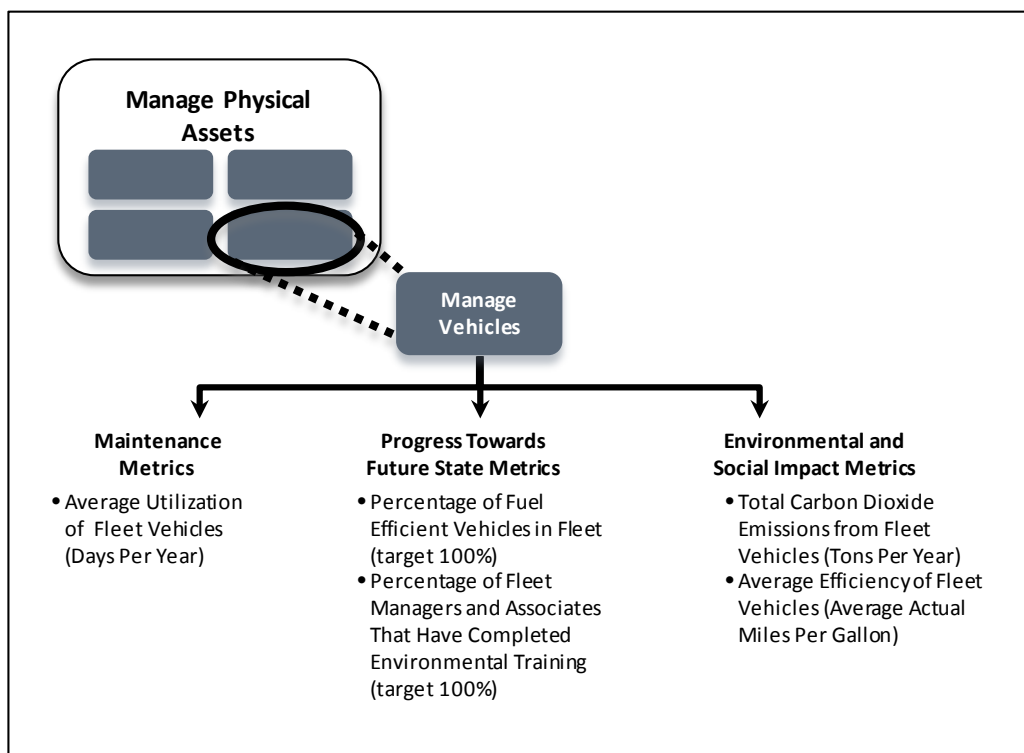
Analyzing metric results and applying other Business Architecture techniques can illuminate where continuous improvement efforts should be focused to help an organization move further towards becoming sustainable. For example, business process modeling is a great way to identify inefficiencies within the organization. The exact process modeling approach (e.g. Six Sigma, Lean, etc.), notation (e.g. Business Process Modeling Notation) or tools (e.g. Business Process Management Systems) used by an organization is not important, though some are especially conducive for methodically reducing waste, and monitoring and improving a process. What is more important, at least as a first step, is that an organization *does* include sustainability as a factor when analyzing their processes. Two important "lenses" could be used to review a business process from a sustainability perspective: reduction of waste and dependency upon resources. For example, if a company is applying a Lean approach and is striving to reduce the "Seven Forms of Waste," environmental and social impacts will likely be reduced at the same time, as described in Table 2. Remember that in many cases, striving to become more sustainable will provide time savings, cost savings and ensure business security as well.

TABLE 2: REDUCTION OF WASTES (DEFINED IN LEAN) AND CORRESPONDING REDUCTION OF SUSTAINABILITY IMPACTS

| *Reducing this form of waste (as defined in Lean)…*	*…may also reduce these environmental/social impacts…*
Transport (Movement of product or materials between transformational operations is waste.)	• Materials (e.g. conveyer belts are not needed) • Material waste (e.g. from discarding materials or goods damaged during transport) • Facility space (e.g. extra space is not required for conveyer belts or other mechanisms for movement) • Energy usage (e.g. less space needs to be lighted, heated and cooled)
Waiting (Waiting or idle time in all forms is waste, whether it is due to shortages, unbalanced work load, etc.)	• Energy usage (e.g. space needs to be lighted, heated and cooled for less time if production time is reduced; machines also need to run for less time)
Overproduction (Producing more than the customer requires is waste. It causes other wastes such as inventory cost, labor, consumption of raw materials, etc.)	• Materials (e.g. fewer goods are created, only those which are needed) • Material waste (e.g. from discarding unused goods) • Facility space (e.g. less space is required to store inventory) • Energy usage (e.g. less space needs to be lighted, heated and cooled for storing excess inventory) • Production process waste/emissions (e.g. less air, water or solid waste/emissions need to be treated and disposed) • Fuel usage (e.g. fewer goods need to be transported from storage facilities)
Defect (Any process, product or service that fails to meet specifications is waste. Any processing that does not transform the product is considered non-value-added as it does not meet the criteria of being done right the first time.")	• Materials (e.g. new materials are not required to reproduce the product) • Material waste (e.g. from discarding defective products) • Energy usage (e.g. energy is not required to run machines again to reproduce the product) • Production process waste/emissions (e.g. less air, water or solid waste/emissions need to be treated and disposed from running processes again to reproduce the product) • Fuel usage (e.g. fewer defective goods need to be shipped back from customers and then reshipped to them)
Inventory (Inventory anywhere in the value stream is non-value-added, even if it is needed.)	• Materials (e.g. fewer goods are created, only those which are needed) • Material waste (e.g. from discarding goods which may become damaged, spoiled or obsolete during storage) • Facility space (e.g. less space is required to store inventory) • Energy usage (e.g. less space needs to be lighted, heated and cooled for storing excess inventory) • Fuel usage (e.g. fewer goods need to be transported from storage facilities)
Motion (Any movement of people's bodies that does not add value to the process is waste including walking, bending, lifting, etc. It also includes any adjustments or alignments made before a product can be transformed.)	• Injuries (e.g. because people have to perform less repetitive and strenuous activities) • Facility space (e.g. extra space is not required because layout is more efficient) • Energy usage (e.g. less space needs to be lighted, heated and cooled)
Extra Processing (Any processing that does not add value to a product or is the result of inadequate technology, sensitive materials or quality prevention is waste.)	• Materials (e.g. less protective packaging is required) • Material waste (e.g. from discarding protective packaging) • Energy usage (e.g. energy is not required to run machines for non-value-added activities) • Production process waste/emissions (e.g. less air, water or solid waste/emissions need to be treated and disposed from running processes for non-value-added activities)

Business Architecture improvement activities typically include a large audience, which generates a broader set of innovative ideas and increases involvement and buy-in for sustainability efforts across the organization. Some organizations also gather new ideas or improvements through special interest group meetings, discussion boards and various other methods (e.g. a general e-mail box). Business Architecture can be used to help explore, validate, prioritize and understand the impact of these ideas.

Finally, as strategy ideas play out during execution, Business Architecture can be used to gather feedback and evaluate how well they are working in practice, and then inform decision-makers so that the sustainability strategy can be refined as needed.

Evolving an Organization's Business Architecture for Sustainability

Based upon the information presented previously, the question of "Does an organization's Business Architecture change as it becomes more sustainable over time?" has been addressed. The answer is yes, quite possibly an organization's Business Architecture (and IT Architecture) could change as it becomes more sustainable over time. However, the way in which the architecture will change, and to what extent will be dictated by the sustainability strategy. Figure 12 below shows some possible ways in which a Business Architecture may be changed.

FIGURE 12:   POSSIBLE CHANGES TO A BUSINESS ARCHITECTURE RESULTING FROM INCREASED SUSTAINABILITY
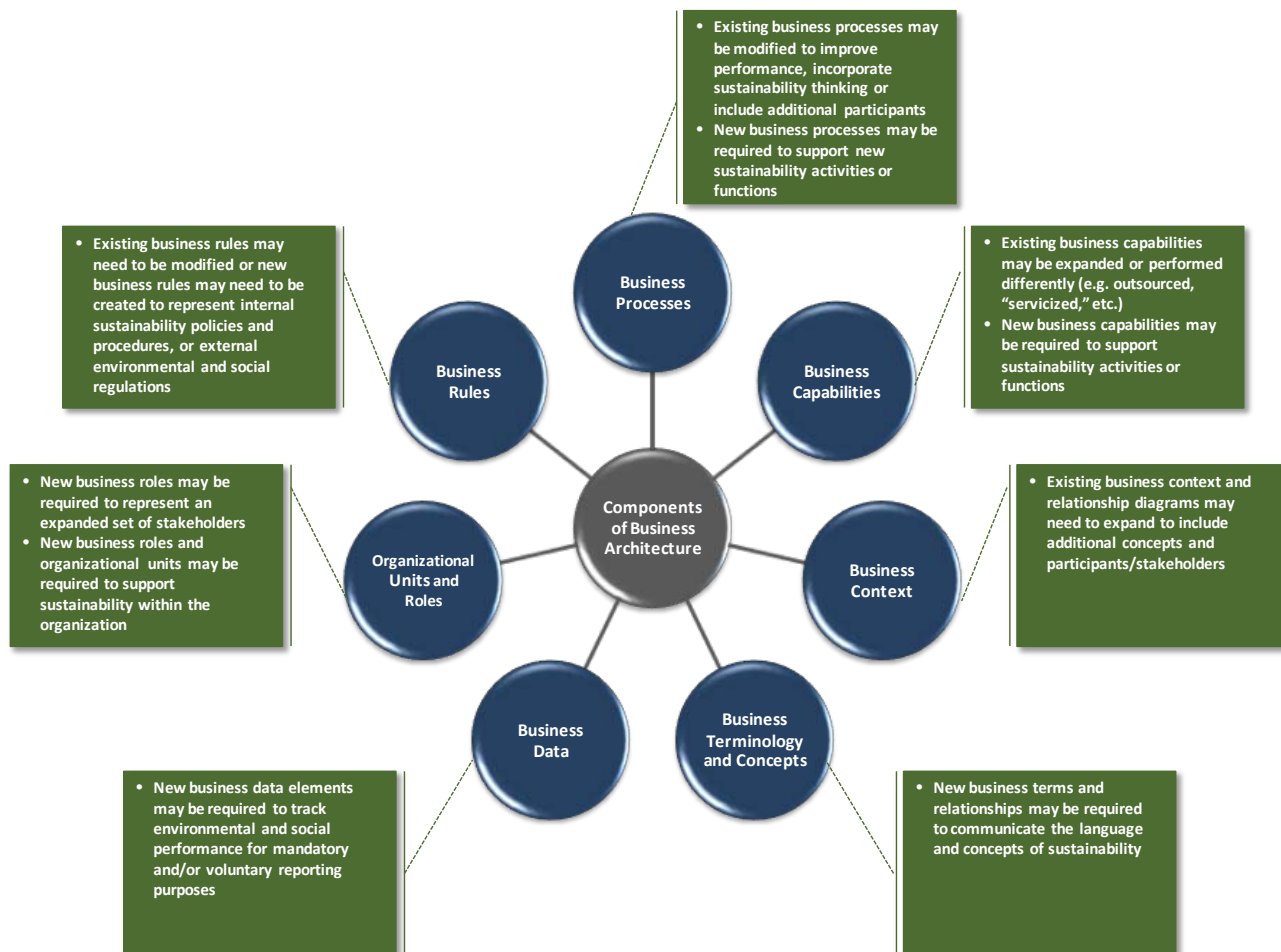
Practicing Business Architecture in a More Sustainable Way

Our final question to address is "does the concept of sustainability change the way that the Business Architecture discipline is practiced?"

Like any other business activity, striving to perform it in the most sustainable way should become embedded in how people think and make decisions. Thus, Business Architects should be conscious of the way they work and try to reduce their environmental impact. They can do things such as reducing paper usage (e.g. by circulating documents electronically), energy usage (e.g. by turning off lights and other electrical devices when not in use) and transportation (e.g. by holding conference calls or video conferences instead of face-to-face meetings) with minimal effort or impact to the end result. These are just a few examples of good practices that anyone can perform; other specific actions should be driven by the organization's sustainability strategy.

Of the topics discussed in this paper, the practice of Business Architecture creates a fairly small environmental impact in comparison to some other organizational functions. While Business Architects should do their part to help out and serve as a role model for others, the more important focus for Business Architecture is how it can be used to enable the entire organization to become more sustainable.

Conclusion

Whether you agree with the science or not, the topic of sustainability is a very real business issue and may be thought of as a "market transition" which will affect virtually all sectors of the economy to varying degrees. Sustainable organizations do not just improve the state of the environment and society, but also obtain competitive advantage, innovate, save cost, save time, create new markets, retain employees, meet compliance requirements and ensure long-term business viability.

The concept of sustainability and Business Architecture relate in three different ways. (See Figure 13.) First, and most importantly, <u>Business Architecture implements a sustainability strategy within an organization; it informs the strategy and translates it for execution</u>. Organizations that have a Business Architecture can implement a sustainability strategy and achieve competitive advantage more quickly than those who do not. These organizations already understand their current state, can make more informed business decisions and can carry out the strategy in a coordinated way. Business Architecture helps to develop and implement a sustainability strategy by assisting with the following:

1. Reliable external research and sustainability knowledge
2. Education on sustainability concepts
3. Solid understanding of the current state within and across departments
4. Clear definition of the strategy and understanding of its impacts
5. A way to plan and orchestrate the strategy across departments
6. Detailed definition and specifications to implement the required business and IT changes
7. A mechanism for continuously improving and refining the strategy

Second, <u>an organization's Business Architecture does change as it becomes more sustainable over time</u>. However, the extent to which the Business Architecture will change is dictated by each organization's sustainability strategy. Finally, <u>the concept of sustainability does change the way that the Business Architecture discipline is practiced</u>. Like performing any other business activity, Business Architects should be conscious of the way they work and try to reduce their environmental impact, especially to set an example for others.

FIGURE 13: SUMMARY OF THE THREE WAYS IN WHICH BUSINESS ARCHITECTURE AND SUSTAINABILITY RELATE
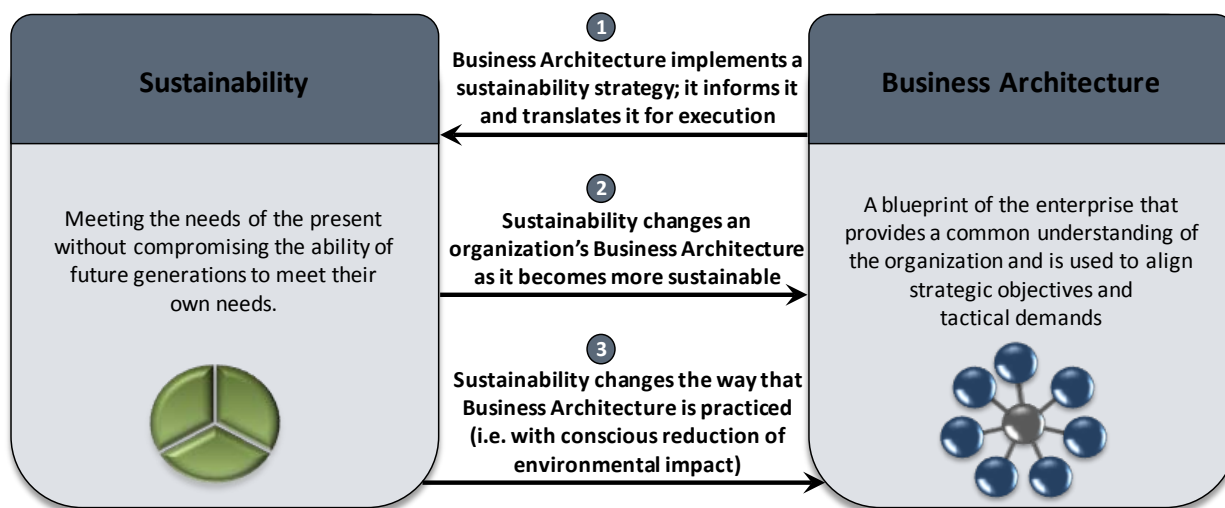
So, where should you go from here? Table 3 describes some possible next steps that you may consider taking, depending upon your role and whether or not your organization currently has a Business Architecture.

TABLE 3: RECOMMENDED NEXT STEPS FOR BUSINESS LEADERS AND BUSINESS ARCHITECTS

If you are a…	*… you may consider…*
Business Leader who: • Already has a Business Architecture <u>and</u> • A formal sustainability strategy <u>or</u> the organization is executing some sustainability-related efforts	• Formalizing your sustainability-related efforts into a cohesive strategy (if you don't have one) • Contacting the Business Architect Managers/Business Architects within your organization to discuss how they can start engaging in the sustainability strategy development and implementation process described throughout this paper
Business Leader who: • Does not have a Business Architecture <u>but</u> • Has a formal sustainability strategy	• Educating yourself further on what Business Architecture is, the benefits it provides, and how other organizations are implementing it • Seeking out potential owners for a Business Architecture discipline within your organization (e.g. in areas where business analysis or IT architecture are currently performed) and talking about how to begin putting it into place, possibly using some sustainability efforts as pilots (even if external Business Architecture consultants are needed to start); a Business Architecture practice can take time to put into place, but even initial steps can be helpful to the business

| *If you are a…*	*… you may consider…*
Business Architect or **Business Architecture Manager** who works in an organization that: • Already has a Business Architecture <u>and</u> • A formal sustainability strategy <u>or</u> the organization is executing some sustainability-related efforts	• Contacting the executive(s) or other "owners" of the sustainability strategy to learn about the current state of the efforts • Using the sustainability strategy development and implementation process described throughout this paper to summarize or "sell" your "services" so that the strategy owners can understand the benefits that Business Architecture can provide; creating some examples applicable to your organization may also help others to better see the benefits • Encouraging potential executive(s) or owners of a sustainability strategy to formalize sustainability-related efforts into a cohesive strategy (if your organization doesn't have one)
Business Architect or **Business Architecture Manager** who works in an organization that: • Already has a Business Architecture <u>but</u> • Has no/minimal awareness of sustainability	• Educating yourself further on what sustainability is, the benefits it provides, and how other organizations are implementing it • Seeking out respected, influential people within the organization that have an interest in the topic of sustainability and then educating them on the sustainability strategy development and implementation process described throughout this paper as well as how Business Architecture can help • Selecting a sustainability pilot effort(s) which is enabled by Business Architecture • Seeking out an executive(s) to eventually own and develop a formal, cohesive sustainability strategy

Business Architects are great resources to leverage throughout sustainability strategy development, implementation and refinement. They possess a rare combination of skills in that they are creative/innovative, persuasive, respected, big picture thinkers, strategic, good communicators and have a good grasp of technology.[6] If you work in an organization that has Business Architects, involve them early in the process. They can not only architect, model and facilitate, but also bring a holistic and objective perspective to any problem or discussion. They may also serve as leaders, role models and change agents to help your organization make one of the most important transformations of our time.

"Business is the only mechanism on the planet today powerful enough to produce the changes necessary to reverse global environmental and social degradation."

– Paul Hawken
Environmentalist, Entrepreneur and Author;
Co-Founder of Smith & Hawken Retail Stores
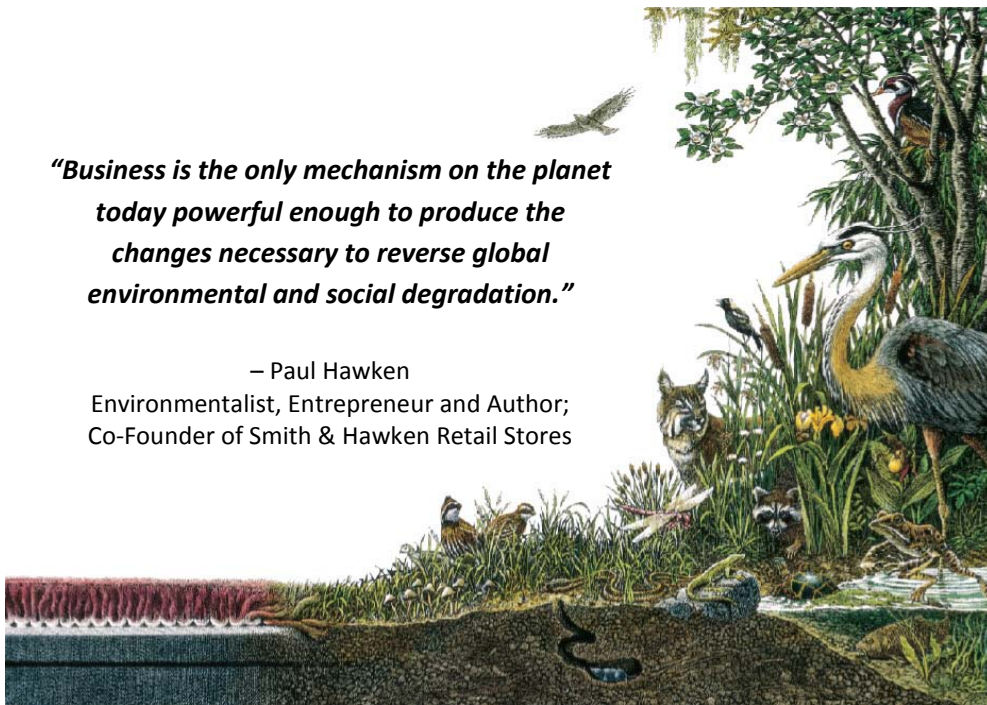
Graphic from 1997 Interface, Inc. Sustainability Report

References

1. Sustainability business issues in brief were summarized by Couper, Brent; Crawford, Julian; Young, Carole, EcoSTEPS, Australia, "Strategic Sustainability Consulting," article within Consulting for Business Sustainability, edited by Chris Galea, Greenleaf Publishing Limited, 2009, page 67.
2. Robért, Dr. Karl-Henrik, "The Natural Step, A Framework for Achieving Sustainability in Our Organizations," Pegasus Communications, Inc., March 1997, pages 8-9.
3. "Sustainability Report," Interface, Inc., 1997, page 13.
4. Stapleton, Philip J.; Glover, Margaret A.; Davis, S. Petie, "Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations", Second Edition, NSF International, 2001, pages 20 and 23.
5. Couper, Brent; Crawford, Julian; Young, Carole; EcoSTEPS, Australia, "Strategic Sustainability Consulting," article within Consulting for Business Sustainability, edited by Chris Galea, Greenleaf Publishing Limited, 2009, pages 80-81.
6. Adapted from the Seven Required Attributes of a Great Business Architect by Suddreth, Greg, "Defining a Great Business Architect," Cutter IT Journal, Vol. 21, No. 3, March 2008, pages 27-28.

About the Author

Whynde Melaragno works as a Senior Manager for Strategic Technology Architects (www.stagrp.com), a Chicago-based consulting firm. She works in a hands-on Senior Business Architect role helping clients develop Business Architecture to address enterprise challenges, as well as build the internal frameworks, organizational structure and skills needed to support their own practices. As a part of this work, she applies her holistic Business Architecture perspective to helping address the challenges of climate change and sustainability. She is also responsible for defining and managing the Business Architecture practices and techniques used at client sites, as well as managing a comprehensive training curriculum.

Whynde was formerly an Executive Board Member of the Business Architects Association, an international organization based in Chicago, Illinois, and is currently a member of the OMG Sustainability Special Interest Group which is developing standard metrics to measure organizational sustainability. She also has expertise in the disciplines of Business Analysis, Project Management, Business Intelligence/Data Warehousing and Training. Whynde holds a Bachelors Degree in Biology and Chemistry and a Masters Degree in Environmental Management and Sustainability.

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