

## Firm of the Future: Inspired by Soils

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### Firm of the Future

We are entering a decade of a multitude of changes which are fast paced, fundamental and far-reaching, impacting the ground rules of business for the 21<sup>st</sup> Century. These changes are caused by a variety of drivers, including digitization and technological advancements, attitudes of the new workforce (Generation Y), globalization, pressure on finite natural resources, burgeoning world population growth, a shift towards a multi-polar world, transparency and responsible business. Continuing the way we run our businesses today is not an option for those organizations that want to survive this Decade of Change – ‘adapt or die’ is the simple adage for this decade.

In the old days we operated businesses like monolithic centralised, top-down, hierarchical, machines. This organizational approach emerged out of command-and-control military structures and found success in a world with limitless access to natural resources and limited access to communication. We now realize that resources upon which our business empires are built are limited while information & communication technologies are rapidly evolving from broadcast to broadband, networks to networked, and limited to limitless.

Today’s increasingly volatile business environment calls for businesses that are resilient to rapidly changing environments, ones that seek out opportunities in an ever-changing environment – like in nature, where waste is food, where consumption is beneficial, where the focus is on optimizing rather than maximizing, where relationships are synergistic.

The **Firm of the Future** is an organization more akin to a dynamic, interdependent living organism which thrives within ever-changing business, socio-economic, and environmental ecosystems, operating harmoniously within the largest ecosystem of all – Earth. The Firm of the Future is a **Business Inspired by Nature**.

## Business Inspired by Nature

A business inspired by nature is collaborative, decentralised, and multifunctional. It's adaptive, responsive and resilient. It plays a positive role in the ecosystems within which it operates, creating conditions conducive to life and value-creation. And it's and a great place to work! A business inspired by nature has a fresh, positive, holistic perspective on the context, goals, resources, people, and networks that make up the framework for optimal value-creation.

**Context:** A business inspired by nature understands that all systems on earth, including human systems, are in a state of dynamic non-equilibrium where many of the highest impact changes are unpredictable, thus we have to be responsive to change, adaptable, and resilient.

**Goals:** A business inspired by nature strives to optimize abundance for the business, business ecosystem, community, and natural ecosystems.

**Resources:** A business inspired by nature understands that all resources are limited, and so is inherently resourceful and opportunistic, uses renewable or local and abundant resources, leverages free energy where possible, recycles energy and materials within the business and natural ecosystem, and seeks to use life-friendly, water-based chemistry and manufacturing processes where possible.

**People:** A business inspired by nature seeks to optimize individual and collective human resources by creating conditions conducive to optimal productivity, creativity, and collaboration; seeking diversity and encouraging cross-pollination; is decentralized and distributed, with embedded values. The organizational structure fits form to function and reflects multiple relationship types and diverse leadership approaches fit for purpose. It recognizes employees as holistic individuals that are integral parts of the business and natural ecosystems it serves and lives within.

**Networks:** A business inspired by nature fosters and supports synergistic relationships within a business ecosystem, allowing for healthy competition alongside collaboration, leveraging the free energy of the local environment, optimizing mutual value-creation whilst creating abundance within the environment it serves.

## A Brief Primer on Soil

In nature, soils are the interface between the mineral (rock) and biological (living) worlds and serve as the foundation for terrestrial life. We depend on soil to grow food, process waste, filter residues, recycle nutrients, and sustain the ecosystems upon which we depend. The soil can function as its own ecosystem, yet is intimately tied to above-ground life and ecosystems.

Soil, in itself, can be viewed as a living body. The sand and silt serve as the skeletal frame. The clay and humus serve as the connective tissues, tendons, and muscles. The water and dissolved solutes function as the lifeblood. The diverse microbial community within soil function as the digestive and respiratory systems. The flux of nutrients, energy, and life through the soil represents the soul. Although soil does not have a reproductive capacity (a key distinction of a living body), it does have the capacity to continuously regenerate and is constantly growing, developing and evolving.

**Sand and silt** are the skeleton of the soil because of their large particle size and inertness, which help provide form and structure. **Clay**, on the other hand, functions more like the connective tissue in the soil body because the particles are very small (similar in size to a bacterial cell), are plate-shaped, and carry a net negative charge. These small, plate-shaped clay particles have a huge amount of surface area within the soil. The surface area of a single gram of clay (a small teaspoon full) would cover an area the size of a football field! **Surface area** in the soil provides many benefits like: the soil's water holding capacity, the capacity to form stable aggregates (the nice "crumb" of soil), and the capacity to support microbial life. Improved surface area also helps the soil's ability to attract and adsorb organic compounds, a property that can be extremely valuable in the presence of invasive plant species that release toxic organic compounds, or following contamination events wherein organic compounds are absorbed in the soil.

**Organic matter** in the soil includes the remains of everything that is or was once living in the soil. Like clay, the soil's organic matter forms part of the connective tissue in the body of the soil and can have many functions. It provides long-term storage of carbon (C) from plants, the food source for soil microorganisms. Like clay, it provides water holding capacity, a negative charge and surface-area to help other compounds gain hold and aggregate, which is important for keeping the soil healthy.

**Humus** is the part of soil organic matter that give soil its rich dark colour. Humus is a by-product of microbial decomposition and is arguably the single most useful "waste" product in the world. Humus has an extremely small particle size (smaller than clay) and serve as a source of food and energy in the soil environment, also the particles are charged resulting in a capacity to hold water, and attract other charged particles (cations). Humus accumulation in soil is a good indicator of soil productivity. In natural ecosystems, humus generation is dictated by a combination of the nature of plant litter inputs, moisture, and temperature. Cool moist conditions tend to emphasize humus

accumulation while warm conditions, favouring rapid litter breakdown, result in less humus being left behind.

We tend to think of soil as inert, but the diversity of micro- and macro-organisms living in soil is stunning. The **living community** in one teaspoon of healthy soil includes 100 million bacterial cells, hundreds of meters of fungal hyphae, 10, 000 protozoans, and a similar number of algal propagules, as well as larger microarthropods, nematodes, and worms – each playing important roles in the living ecosystem of the soil. Bacteria and archaea can fix nitrogen (N) from the atmosphere, generating most of the total N in terrestrial ecosystems on Earth – fundamental to plant growth. The prokaryotes are also responsible for iron, ammonium, and sulphur oxidation as well as nitrate, iron, and sulphate reduction, processes that make nutrients available to plants from the rocks and atmosphere. Soil fungi are extremely important for decomposing plant and animal detritus. Specialized fungi called mycorrhizae form synergistic relationships with plant biota in which they greatly increase the ability of plants to access nutrients and water. Fungi are also extremely important in the formation of stable aggregates in soil. Protozoans function as detritivores and grazers in the soil, filling out the soil food web and managing bacterial populations. Hence, there are primary, secondary and tertiary consumers and contributors within soil which creates a complex and multifaceted food web with a high degree of diversity as well as multi-functional redundancy, hence providing resilience on multiple levels.

Above ground, soil lives in symbiosis with **plant life**. The plants convert solar energy to food energy that is either used within the plant or shunted into the soil as plant litter (or exudates). In the absence of this life giving transformer of solar energy, the soil would decline due to lack of energy. Likewise, the plant community could not complete life cycles without sufficient nutrients and water from the soil.

**Humans**, too, have a synergistic relationship with soil. Almost every mineral nutrient in our bodies came from soil – our skeletons are built from Calcium (Ca) and Phosphorus (P) derived from soil. Most of our sustenance originates from plants that derived almost all of their nutrients and water from the soil. Our houses are built in and on the soil. We drive on it, walk on it, play on it, die on it and are buried in it. Unlike other organisms on Earth, however, we are not keeping up our end of the synergy and so the mutualism, with its benefits, is falling apart. As a species, we abuse soil at an alarming rate, and view it simply (at our peril) as an expendable non-entity on which we grow crops. The result is degradation of soil and with it, the ability of soil to support our needs. Interestingly, the demise of all ancient civilisations of our species have coincided with the degradation of soil.

**Land management** that deprives soil of energy and the recycling of nutrients has resulted in the long term decline in soil condition. Industrialized, monoculture-based agriculture demands high productivity from the soil yet gives little back in return. The complex soil structure, the diverse living systems, the organic matter – the body and soul of the soil – are eroded leaving only the skeleton behind – not smart. Pumping the soil with fertilizers and pesticides is like trying to maintain a human body on solely white bread, vitamin pills and medicine, hence doomed to fail.

The soil can limp along that way for a while, but productivity declines, and it loses its ability to regenerate, losing its resilience leading, ultimately, to failure.

Reversing the effects of years of short-sighted, inappropriate management is not impossible, but will take patience and care. Accumulating sufficient diversity of organic matter will require several years of applying fresh and composted organic material. A diverse assemblage of soil organisms will return to the dying soil and, over time, start to flourish again bringing the soil back to its original health (like a human damaged through years of neglectful drug abuse, health can return with patience and care).

**Natural ecosystems**, more akin to diversity-based permaculture farming techniques, will need to be emulated to ensure that the health of the soil is put as a priority rather than mistreated as it is in monoculture-based farming techniques. The soul of the healthy soil is built from diverse inputs and the input of a diversity of contributors. The wisdom of this soul is greatest when provided by the greatest number of individuals.

## Business Inspired by Soil

Soil represents the accumulation of knowledge and experience passed down by centuries of organisms as simple as the amoeba and as complex as human beings. This wisdom or legacy builds on itself and creates the very soul of soil to which we are directly and indirectly connected.

Like soil, the **culture of business** can represent the accumulation of knowledge and experience, with the wisdom of culture forming the dynamic living core of the Firm of the Future. Even when people leave, their wisdom is retained in the culture, enabling the business to continuously regenerate, adapt and evolve in the most optimal way possible.

**Before industrialization**, organisations were based on people, culture and values, serving the local communities through mutually beneficial relationships focused on value-creation. Like healthy soil, businesses, communities and the employees of those businesses formed synergistic relationships, each providing and supporting the needs of the other.

**With industrialization** came a dramatic increase in capability to become more productive, with a new drive to constantly push the limits of productivity. A shift in focus started to emerge from value to profit, from optimisation to maximisation, from quality to quantity and from long-term thinking to short-term thinking. As with industrialized agriculture, this emergence initially yielded fantastic results – at least if measured in terms of productivity and profit to that organisation, rather than the value to the wider ecosystem or environment the organisation sought to serve. Similar to what happened with soil, however, industrialization started to erode the values and culture that made up the life and soul of good business. People started to be pushed to reach ever more demanding KPIs being rewarded with status and money. The results became over-riding to the behaviour or values needed to obtain such results. The uniqueness, the individuality, the creativity, the values, the humanity of employees became secondary to profit – people became recognized, valued and rewarded based on their job title and position on the organizational chart. The organisation emerged into a monoculture – silo-based, hierarchical and quantity/KPI focused.

Organisations are increasingly recognizing the pressing **need to dynamically adapt and evolve** in response to transformative times. Hence, the importance of developing a rich culture of empowered, values-based employees that provide creative nutrients, innovation, adaptation and resilience, is increasingly becoming the competitive-edge essential for survival in these volatile times. Culture provides the foundation, the nutrients, and the values that support a healthy evolving business; encouraging linkages across interdependent fast-evolving business units and business ecosystems. Culture provides resilience that ensures dynamic change does not destroy the very organisations it is transforming.

Just as our ignorance of the importance, complexity, and vibrant inner life of soil has led to its degradation, so our ignorance of the importance, complexity, and vibrant inner life of culture has led to its degradation, eroding local know-how and individual empowerment and leaching life-

supporting richness. Our **mono-cultural business models and strategies**, characterized by short-termism, atomisation of businesses into units, management via quantification, and hierarchical top-down decision-making, has resulted in high-productivity in the past, but at the costly expense of undermining the very support structure and resources upon which it depends – and which are critical for its survival in the future.

In the past, it has been assumed that the business environment could be 'managed' through risk mitigation and quantification. Mono-cultural focus on short-term shareholder return has caused ever more demanding quantitative -based management behaviours, at the expense of quality-driven, values-based leadership behaviours. As organisations strive to become more responsive and agile in a more unpredictable world, this mono-cultural hierarchical model becomes detrimental to the overall viability of the organisation. In short, just as mono-culture agriculture has degraded the resilience of our soils, so too has mono-culture business management degraded the resilience of our organisations. Our current business models, Firms of The Past, are no longer fit for purpose – they must adapt towards the Firms of The Future or die.

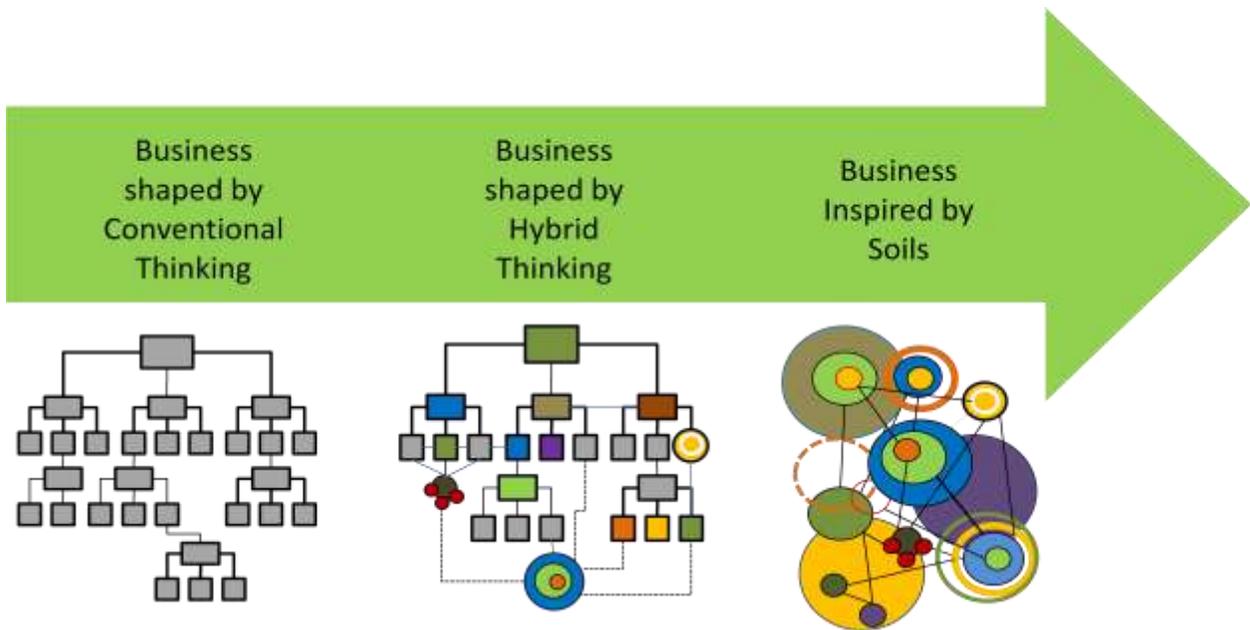
Bottom-up empowerment, local attunement, and interdependence across former silos and boundaries are the new norm. Diversity within unity is key. Diversity of strategies, approaches, forms and functions within a unity of purpose. The values and culture that drive behaviours which emulate the organisation's unity of purpose are the critical success factors for the Firm of The Future.

**Culture is the soil of the organisation.** If rich in nutrients, culture provides a healthy yield by fostering individual and synergistic creativity, local knowledge, and sustainable growth, unlocking positive virtuous cycles of value-creation and mutualism. If depleted (through artificial fertilisers or aggressive short-term, silo-focused KPIs) a spiralling circle of demise ensues. To break out of such a spiral of demise requires courage in the face of fear - courageous values-based leadership in the face of fear-based risk-mitigated management.

The monoculture of the Firm of the Past needs to be replaced by models based on **poly-culture and permaculture**, where top-down control-based management becomes the exception rather than the rule, freeing managers to become leaders that inspire change, encourage creativity, and lead by example, enriching the culture through values-based leadership. What is needed is a shift from applied management (like applied artificial fertiliser) to inspirational leadership, community-based leadership, rotating leadership, and collective intelligence based on core values that support a rich culture – diversity within unity.

This transition will take time and energy, at a time when many are fearful; tightly clinging to the trusted methods they know best in the Firms of the Past. Hybrid models, emergent stages which transition the Firm of the Past towards the Firm of the Future are useful stepping stones whilst the business and its culture once again encourage synergistic and self regenerative cultures. Ultimately, the soul of the healthy business is built from diverse inputs through a diversity of contributors giving rise to a rich culture. The wisdom of this soul is greatest when provided by the greatest diversity of individuals, each allowed to flourish in its uniqueness, held in unity through

values and sense of purpose – harmony through mutualism, the parts benefiting the whole and the whole benefiting the parts.



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Based on **Soils: Simplified** by Professor Thomas H. DeLuca Jan2011