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HOW TO BUILD HYPERLOCAL ENVIRONMENTAL ACTION INTO GREATER REGIONAL AND GLOBAL MOMENTUM

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Abstract

To collectively achieve the United Nations Sustainable Development Goals (SDGs) by the 2030 deadline, cities and citizens need a better way to catalyze sustainable development at local and regional levels. We have found that hyperlocal environmental action can be compounded to have greater regional and global impact by modeling concepts from biomimicry. This approach, when applied with the SDGs framework and coupled with the sharing of solutions across a network of frontline communities, has proven successful for us to advance sustainability across the public, private, and independent sectors of society. Over the last 11 years, IDEAS For Us has utilized mutualism, decentralization, viral replication, and diversity to guide our internal processes, external interactions, and strategic planning. This has led to the expansion of our action projects from one college dorm room to 155 universities and communities in 30 countries, and growing. Biomimicy has afforded us the ability to increase our organizational capacity and equitably create solutions that address our most pressing social, environmental, and economic challenges. We believe that this is an important and replicable model that can help the environmental and sustainability movements catalyze local environmental action to build capacity for regional and global resilience.

Introduction

Biomimicry is the imitation of the models, systems, and elements of nature for the purpose of solving complex human problems (Vincent, 2006). The evolutionary process has shaped highly optimized and organized structures that can be modeled, mimicked, modified, and implemented into to a diverse cadre of applications; solutions to our most pressing issues facing humanity. Aerospace engineering (Rashidi, et al., 2019), manufacturing (Byrne, et al., 2018), ecodesign (Johansson, 2002; Lienhard, et al., 2011), and medicine (Zhang, 2012) are examples of a growing number of disciplines that have successfully utilized elements of biomimicry to their advantage. Due to the vast applicability of biological and ecological models (Frunzo, et al., 2019), we inquired if they could be applied to the design and implementation of grassroots environmental campaigns and action projects as a way to improve our effectiveness in driving positive impact in our community. Because many local initiatives fail to create a lasting impact (Baldridge and Burnham, 1975) due to a lack of technical skill or resources (Tucker and Edmondson, 2003), we set out to intentionally design a nonprofit organization that utilized specific survival and replication strategies common among a diverse group of organisms.

For instance, defined models such as the three forms of symbiotic relationships among species (Pound, 1893), provides a clear framework for biomimicry. In nature there are many behavioral, reproductive, and survival methods that appear frequently across a range of species, in many different habitats and ecosystems (Althoff and Segraves, 2016). Behavioral and physical adaptations that enable competitive fitness contribute to the success or demise of species. Evolutionarily driven models have covergently and diververgently appeared, disappeared, or persisted because they foster the likelihood of organisms to thrive or survive environmental and ecological stressors. We have observed organizations to be fundamentally similar and in this study, we sought to intentionally address the need for greater climate action (Masson-Delmotte, et al., 2018) by creating an organization that utilized biomimicry to model the survival strategies of organisms.

Over the last 40 years, the loss of 58% of the world's global wildlife (Grooten and Almond, 2016), the collapse of numerous regional and local ecosystems (Youzhi, et al., 2019), the loss of 76% of freshwater aquatic wildlife (WWF, ZSHL 2014), and an unprecedented rate of global warming at risk of exceeding 2.5 degrees celsius (Raftery et al., 2017) exacerbated by fossil fuels combusted into atmospheric carbon dioxide levels of 415 ppm (Ghasemifard et al., 2019), is alarming at unprecedented levels. Because the majority of the global population now lives in cities (Raftery et al., 2013), fed and powered by long multinational supply chains, the effects of global climate change and the further collapse of the biosphere will result in the migration, starvation, or death of billions of people (Mello and Friaca, 2019).

The United Nations has responded to this threat by collectively creating and implementing the SDGs. However, many cities are on trend to fall short of reaching these goals (The Sustainable Development Goals Report, 2019) and even with the massive philanthropic projections of 356 Billion USD in contributions to SDG action by 2030, a funding gap of 2.5 Trillion USD will impede SDG achievement (World Bank, 2015). This leaves great uncertainty for the survival of life on Earth. And therefore, there is a need for strategies that maximize financial resources while increasing the propensity for measurable achievements towards SDG action.

Our response to the world's most pressing environmental and social challenges has been to create IDEAS For Us (IDEAS), a non-profit organization and UN-accredited NGO working to solve environmental and social challenges on campuses and communities around the World. We focused on building a grassroots movement that worked to educate, engage and empower people of all ages to incubate new and innovative ideas, fund local action, and scale proven solutions to communities facing similar challenges. Since the inception of IDEAS in 2008, the movement continues to grow into an international network of IDEAS branches, youth leaders, and industry professionals actively creating sustainability solutions to the energy, water, food, waste, and ecological challenges facing their communities, and sharing those successes across our network of partners, volunteers, and followers around the World.

Biomimicry has provided a unique opportunity to thematically consider and select key traits that could enhance the functionality and performance of our organization; essentially turn an organization into a living organism. Because dozens, if not hundreds, of successful examples of winning designs and strategies are observed in nature (Vincent, 2006), there is a considerable challenge in determining which models are best to incorporate.

We addressed this issue through the selection of four traits that help organisms survive n low resource, high competition ecosystems where the fundamental niche has not yet reached the capacity of the potential niche. This has allowed us to create the multi-level engagement needed, from grassroots initiatives on through local policy change, in order to properly advance regional sustainable development. For the purpose of this study, the successful development of ideas, funding of local action projects, and scaling of environmental and social solutions to similar communities were each identified as the three most important key performance indicators over the 11 year study period.

Materials

The materials needed to execute our methodology were heavily influenced by the variables of time and money. Each are rare resources needed to achieve the desired goals set forth in the SDGs and therefore our initial requirements for infrastructure were designed to be minimal. This resourcefulness enabled our model to become a valuable resource for emerging countries in Europe, Africa, Asia, and the Americas, especially where resources are scarce, unpredictable, or infrequent. Additionally, the implementation of biomimicry based models that favor diversity and inclusion, coupled with low resource replication strategies, further refined our expansion strategy. Requirements for our methodology include a settled citizenship, capable of using computers and accessing the internet, a reliable cellular and internet connection, a minimum of five dedicated individuals to serve as the organizing team (with 10 hours per week minimum to allocate towards action items), and ideally existing relationships with academic institutions and local businesses. Additionally, foundational documents (constitution, budgets, charter branch documents, organizing toolkits) and a meeting space to accommodate the public and organizing team gatherings are additional resources required to implement the minimal requirements for this model.

Methods

Four elements from biomimicry were chosen as survival principles to guide IDEAS as an organization.These elements were favored for their frequency of appearance in taxa. Each of the four chosen biomimicry factors served as a structural framework for organizational activities not unlike the traits and survival strategies that determine the biological niche of organisms. The frequent appearance of our selected traits in nature, provided us with an indicator for adaptability and adaptable models that are needed to achieve the diversity and scope of the SDGs. We favored (1) a decentralized organizational structure, (2) a viral replication strategy, and (3) symbiotic mutualism to create valuable partnerships that (4) expands the diversity of citizens, students, businesses, elected officials, and fellow NGOs engaged with environmental action and sustainability.

I. Decentralization: A model for organizational structure

IDEAS started with the goal to facilitate environmental action on college campuses by educating, engaging, and empowering students, faculty, staff, administration, and a vast professional alumni network to advance a cleaner, healthier, and more sustainable campus. We utilized the legal structure of a USA 501c3 nonprofit corporation to build IDEAS and facilitate the expansion and replication of action projects among universities by creating a decentralized network of branches. The decentralized branch model that structured IDEAS was implemented through the leadership of local campus and/or community branch leaders and their connection to IDEAS Staff and Board of Directors. Branch leaders and branch volunteers were provided with mentorship and IDEAS maintained the assure that action projects met our standards of quality control and scientific scrutiny. Each branch held their own meetings, elections for leadership, and participated in or led their own fundraising efforts. In many cases, the presence of IDEAS branches on campuses led to them becoming established Registered Student Organizations (RSO), which further afforded them resources to utilize when organizing for action.

This IDEAS network became the collective network of connections among students at various universities. All participants were unpaid volunteers for the first five years. On the fifth year, the branch model expanded out of schools, colleges, and universities to reach citizens at the community level. This manifestation was given the name the IDEAS Hive and maintained the decentralized branch model by creating localized organizing teams to manage meeting and project logistics. We also utilized a forum style model we called a “Think & Do Tank” that showcased localized sustainability experts to educate the attendees and drive engagement with human-centered design thinking activities. These activities were designed in a manner that provided the public an opportunity to take ownership in the creation of local action projects that would advance the SDGs.

II. Virality: A model replication strategy

Viruses make use of existing cellular machinery to replicate themselves. This method of reproduction allows viruses to spread, mutate, and diversify at a higher rate and frequency than cellular life. Viral reproduction also requires no resources beyond the host. Our methodology used this viral replication strategy to establish, spread, and diversify IDEAS branches through schools. This provided a ‘host’ to utilize complimentary meeting space, a source of volunteers, and annual resources to foster the success of each because we utilized the existing resources inherent to academia.

At the community level, this viral replication strategy affords itself to rapidly establishing points of engagement throughout the public, private, and independent sectors of a community. When the towns and villages we engaged with established hubs of environmental activity, we vertically leveraged our partners, partner networks, industry collectives, academic networks, and regional think-tanks to compound our efforts across the hierarchy of decision makers. We created multi-organization committees and working groups to share resources and technical skill sets in order to accomplish the desired action or advocacy goals. Opportunities that afforded us access to local government and regional decision makers were prioritized through partnerships and value add propositions unique to IDEAS.

III. Mutualism: A model for symbiotic partnerships

We designed IDEAS to function as a symbiotic organism that utilizes mutualism as a survival strategy. We chose this strategy to relieve the resource intensive pressure of competing with similar organizations. This afforded us the ability to further focus on our viral replication methods and decentralized branch strategy as a means of scaling impact on the SDGs. Interactions with peers was approached with partnership for the goals in mind and this allowed us to create spheres of influence at each layer of civic engagement. For our purposes, we categorized and stratified our involvement through six layers of interaction - hyperlocal, community, regional, state/province, national, and global.

IV. Diversity: A model for niche expansion

Because our activities precluded the SDGs by seven years and there was a need to simplify the scope of sustainability into subsections, we established thematic categories called “The Five Pillars of Sustainability”. This structure afforded us the ability to focus the diverse nuances of IDEAS action projects across our network in a matter that streamlines the sharing of

best practices and data. All IDEAS action projects were assigned a primary theme represented by one of the five pillars. We choose to use energy, water, food, waste, and ecology as our thematic categories due to their simplicity and overlap when applied to real world applications.

This pillar based framework was also applied to the refinement of IDEAS action projects on campuses and in communities by exploring the cross connections between them. For instance, IDEAS Branches and IDEAS Hive were afforded the opportunity to host workshops and action days on energy, water, food, waste, or ecology projects throughout the year and their leadership and organizing teams could vary the topics each month from pillar to pillar. Other options were to examine combinations of pillars (i.e. food and waste, energy and water, or ecology and waste). This adaptability and variability was intentional as a means of keeping audiences engaged and emphasis on one of the five pillar topics could extend quarterly or biannually based on community or campus needs.

The pillar framework was used as the primary means of niche expansion. Cross sector nexuses between pillars were identified and explored as potential environmental and social solutions to pressing community issues. For instance, by exploring the nexus between food and energy and then energy and food, the Orlando community identified the distance a plate of food travels to reach your plate when provided by the transportation network of the modern industrial agricultural system to be a variable in need of solving for the community. When combined, the concern for lower carbon emissions the opportunity to innovate local urban agriculture by converting front lawns to gardens and using bicycles to transport farmers and their produce, emerged as a new urban agricultural model. We named this model Fleet Farming.

Results

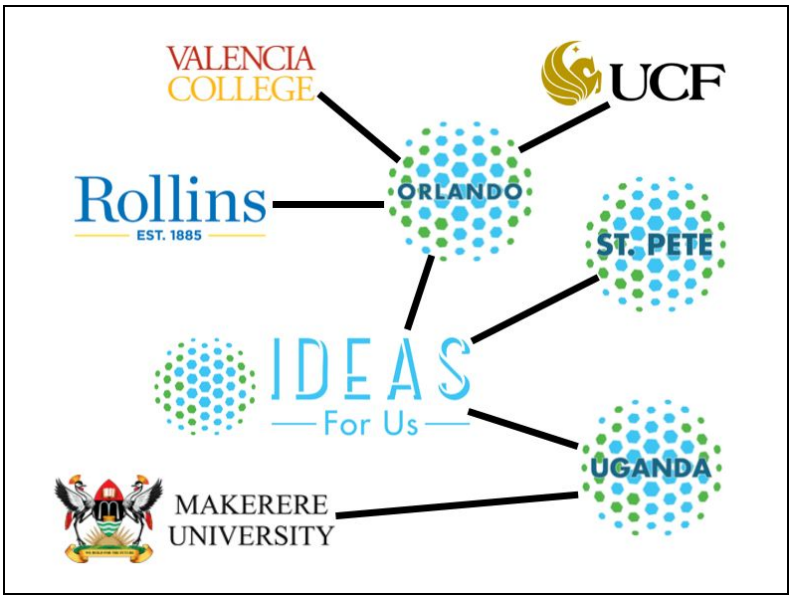

Figure 1 - Decentralized Organization Creates Hub and Spoke Model. IDEAS creates a decentralized hub and spoke model for IDEAS Branches, located in schools, colleges, and universities to tackle on campus action and the IDEAS Hive, which is held in communities. IDEAS Branches collaborate at the IDEAS Hive to skillshare but are autonomous to pursue their own student-led goals.

Figure 2 - Layers of Vertical Integration. IDEAS build partnerships with a diverse group of organizations working at various scopes in civil society. By creating a vertically integrated strategy, we are able to provide the communication and collaboration needed to advance sustainability from the grassroots level of hyperlocal on up to multinational organizations.

Figure 3 - Map of Projects and Pillars. IDEAS maintains an online web tool (**https://ideasforus.org/impact/**) to track the location and focus of action projects. We have taken action in 30 different countries around the world with thousands of volunteers. The webtool enables us to grow data sets and connect volunteers across our network working on similar issues to share best practices.

Discussion

IDEAS Branches and IDEAS Hives

I. Decentralized Organizational Structure

A decentralized organizational structure offers a wide range of benefits over conventional centralized networks. The branch model provides a structure for resources like technical support and project funding to disseminate. Through the various communication channels of the IDEAS branch network, best practices can be noted and shared through the use of social media, email, and other technologies. Mentorship and resources from staff provided consistency and stability for the volunteer led branches, especially those in remote locations. This tie between IDEAS branches and the greater organization enabled the desired level of quality control oversight needed to administer action projects, while promoting the autonomous nature of volunteer led local hubs to work as an advantage when addressing local issues through an environmental, economic, and social perspective. We used a hub and spoke model to maintain quality oversight of IDEAS Branches but allowed each node in the decentralized

structure to set their own goals (*Fig. 1).* All ideas projects and initiatives make a direct effort to have a positive economic, environmental, and social impact.

The adaptive benefits afforded by a decentralized organizational structure are many. Adaptability, cultural equity, and lower dependency on managerial oversight are all afforded by a decentralized framework. This element of biomimicry preserves the sovereignty of a community's right to choose their priorities while promoting branch autonomy. Each have been identified as important variables to foster the emergence and growth of community empowerment.

II. Viral Replication Strategy

By choosing a viral replication strategy, IDEAS was able to make use of the existing college, university, and community infrastructure to rapidly increase the attention on environmental issues. The first seven years of IDEAS action projects were funded, conceptualized, and organized in a manner that stretched what little resources we had to build a network of partnerships throughout the public, private, and independent sectors. Connections were strategically strengthened with partners to leverage their skillsets and build group capacity by applying our unique methods of organizing for action to their goals. The intentional creation of this multi sector approach for our activities made IDEAS a hub for collaboration beyond the campus and out into the community.

The fortuitous appearance and global adoption of social media provided an unprecedented opportunity to spread our message and recruit new members to take action in the five pillars of sustainability. Positive, empowering messaging was combined with a platform of dissemination that was free to little cost, international, and translation ready. We leveraged all available communication channels of our partners to expand the frequency and consistency of opportunities citizens had to participate in environmental action.

As IDEAS branches became established across the colleges and universities in a particular community, the IDEAS Hive could be deployed as a means of creating a collaborative environment across campuses for regional outcomes. Once the IDEAS Hive was established, the need to engage with local government increased.

IDEAS became engaged with local government by organizing environmental action projects that addressed local sustainability and resilience goals in the City of Orlando. Cities were not built to address climate change and there is a considerable need to address sustainability from a regional perspective. In addition to being disrupted by technology, urbanization, and climate change, cities are under considerable stress to meet the needs of their citizens. Hunger, poverty, transportation, livability, and quality of life issues all need to be addressed through the lens of sustainable development.

In Orlando, Florida, where IDEAS was founded and remains headquartered, sustainability and resilience are of particular concern to local government. Each week, 1,500 residents move to the Orlando region, with 60-70% remaining in the Orlando city limits. Additionally, Orlando must meet the demands of over 75 million visitors annually visiting the region. Because of the challenges faced by 21st Century cities, a community action plan was implemented to address energy, food, buildings, and other priorities by elected leaders.

Because energy efficiency and renewable energy is a direct way to lower climate emissions and slow climate change, the need for sustainability-focused leadership at the city level evolved into what would become the City Energy Project. This partnership with NRDC was funded by the Doris Duke Foundation, the Energy Foundation, Kresge Foundation, and Bloomberg Philanthropies to foster the sustainable transformation of 10 cities though the installment of a dedicated sustainability staff member focused on providing technical assistance to the City's leadership to accelerate new policies and programs that aimed to drastically reduce energy use in buildings through the city; currently making up ¾ of GHG emissions in Orlando. Through its success, the program has now expanded to 20 cities through 2019.

Because the City Energy Project is a three year commitment from participating cities, the value of sustainability staff could be demonstrated before taking the risk with taxpayer dollars. In Orlando, the success of this program led to the permanent hiring of a Director of Sustainability and Resilience, plus an additional Sustainability Project Manager, and the passage of policy and ordinances to advance the ultimate mission, including a Building Energy & Water Efficiency Strategy (BEWES), enabled PACE financing, and a 100% Renewable Commitment for all city power to be fossil fuel free by 2050.

The vertical movement of experienced IDEAS leaders higher into decision-making positions throughout public, private, and independent sectors, is a key strategy we will adopt for future initiatives because it further strengthens our replication strategy into the public sector.

III. Symbiotic Mutualism

Symbiotic relationships allow organisms to access niches within ecosystems that would be otherwise inaccessible to them without such a survival strategy. Mutualism reduces competition between organisms living in the same habitats and we made use of this element of biomimicry to build sincere partnerships with peers and participants across varying layers of interaction (Fig 2). This approach turned potential competitors and benevolent peers into opportunities for partnership and collaboration. It also helped us to prioritize community engagement because we viewed individuals and organizations as deserving of sincere involvement. Therefore, we extended the concept of mutualism to how we create external partnerships and how we view our internal participants in IDEAS branches and IDEAS Hives.

At the hyperlocal level, relationships with universities and colleges have afforded IDEAS valuable connections to students, technical expertise, and resources for environmental action. An example of this is our relationship with the University of Central Florida, Valencia College, Seminole State College, and Rollins College located in Central Florida. These academic institutions served as hubs for students to meet and discuss sustainability issues using the IDEAS branch model and resources to advance their own sustainability priorities determined by students, facility, and administration members. IDEAS has also been fortunate to have numerous academics engaged with us through the mutualistic partnerships formed with campuses around the world. This affords us a connection to a network of experts that further legitimizes our efforts and informs our best practices for sustainable development.

We additionally, implemented mutualism to see an opportunity match between IDEAS and the Orlando City Soccer Foundation (OCSF). The OCSF has a specific mission and seeks to empower organizations to achieve their goals in disadvantaged communities. IDEAS has a

series of environmental programs that met the OCSF's needs and that partnership provides a mutualistic symbiosis to achieve our shared goals. Because of this we have added additional staff, accomplishing OSCF goals in the community, and across schools, community centers, aftercare programs, daycare programs, and public spaces.

The Solutions Fund and IDEAS Eco Enterprises

IV. Diverse Niche Expansion

The use of the Five Pillars of Sustainability framework allowed IDEAS to expand the diversity of opportunities for businesses, elected officials, and everyday citizens to get active with sustainability and environmental action. By creating variances within similar thematic focuses we engaged our audience in a comprehensive overview of sustainability topics. Through repeat engagement, the diversity of discussions and actions peaked and maintained the interests of our IDEAS Branches and IDEAS Hive participants over the last 11 years. This has led to our diverse cadre of action projects in all Five Pillars of Sustainability ***(***Fig 3***).***

As the nexus between pillars continues to be expanded upon, we saw an opportunity to create additional revenue streams and microgranting programs. Action projects created in the IDEAS Hive or by IDEAS branches could be provided with resources from a Solutions Fund, and successful pilot programs could be further invested in as eco-solutions. These eco-solutions would be incubated to create a holistic program that creates an economic, environmental, and social benefit wherever they operate. This cross pillar examination not only expands the potential niche for environmental education, action, and innovation on campuses and in communities, but it also holds potential as an important tool for job creation.

As an initiative created in the IDEAS Hive and then proliferated by the Solutions Fund, the Fleet Farming program has evolved into a resilient model for job creation through urban farming and edible landscaping activities. This derived model, which encapsulates economic, social, and environmental impacts to generate revenue and create jobs are identified as IDEAS Eco Enterprises.

Summary

The lives of billions of people depend on our collective ability to transform the 21st Century through sustainable development. It is therefore important to investigate novel means of catalyzing community engagement and empowerment around the SDGs, especially for citizens and cities. Sustainable development is a powerful tool for building resiliency but if we are going to achieve the SDGs, better models to organize for action are needed. Our use of biomimicry provides a logical framework to develop organizations that function like the adaptable organisms they model. Because IDEAS utilized four key elements from biomimicry, we have been able to build hyperlocal environmental action into greater regional and global momentum. Our decentralized organizational structure, viral replication, mutualism, and niche expansion strategies have afforded us the ability to stratify ourselves rapidly across sectors using resources conservatively. We believe the further implementation of biomimicry to grassroots initiatives would be beneficial across the many sectors working to collectively achieve the SDGs.

Conclusion

The use of biomimicry has helped IDEAS to catalyze environmental action on campuses and communities around the world. After refining our approach to educating, engaging, and empowering cities and citizens through this 11 year study, it has become apparent that our unique methodology of the IDEAS Hive to turn ideas into actionable projects, the Solutions Fund to fund pilot programs, and refining those ideas into revenue-generating programs called IDEAS Eco Enterprises, should be further replicated as a model SDG project for cities.

As the next evolution of IDEAS, we have launched the '*SDG Cities Project*'. This approach will assist cities with emulating our organizing model to ignite awareness and engagement on local implementation of the SDGs. The SDG Cities Project will help cities around the U.S. to build capacity around the SDG's, including partnership development with academia, associations, nonprofits, etc.; public event planning to elevate the SDGs with local partners; and organizing using the model of IDEAS Hive to educate, engage, and empower the community to take action on the issues we're facing at a neighborhood to city or county level. In addition, IDEAS can provide technical assistance and support around marketing and communications, program development, and mentorship throughout the term of the project to ensure the program is established for long-term success. This becomes the next evolution of IDEAS, which follows another biological principal, biomagnification.

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