

Effective Leadership using System Dynamics and the Matrix of Change

Abstract

The business environment has become more demanding. This has increased the pressure on leaders already struggling with a changing world. The purpose of effective leadership is to increase value and the productivity of teams. Leadership models have been proposed in various aspects to make leaders more effective. However, there are no explicit guidelines for how to effectively manage leadership in different scenarios. As a result, many organizations have faced challenges dealing with ineffective leadership which ultimately has negative impact on overall business performance such as Hewlett Packard and Research In Motion. We have performed interviews and research to create a framework of leadership, that based on the current state and the desired future state, is able to recommend a dominant style of leadership. This is modeled through the matrix of change and system dynamics. The matrix of change helps in understanding the current and future states, their stability, and the transition between them. On the other hand, the essential leadership attributes and dynamics are implemented into the system dynamics model based on the transformational leadership perspective. Preliminary results are being validated using interviews with leaders/experts across different regions, cultures, and seniority levels.

Keywords

Leadership, Causal Loops, System Dynamics, Matrix of Change, Virtual Simulation

1. Introduction

All businesses strive for sustainability; they yearn to move on from one generation to the next, continually being successful and staying at the top. It is an understood objective for corporations to want to live forever, but very few actually fulfill this objective. Today, the average lifespan of a company listed in the S&P 500 index of leading US companies is 15 years (Gittleston 2012).

Sustainability is dependent on a number of factors; organizations must know how to continually evolve and adapt themselves to meet the needs and requirements of new generations and a changing customer base. Technology is also continually changing, and organizations must be prepared to implement and utilize these new technologies whenever necessary. A company like Kodak whose business was dependent on the production of camera film has filed for bankruptcy due to the overwhelming boom of digital photography (Spector, Mattioli, & Brickley, 2012). Telephone landlines are becoming obsolete with the rapid expansion of cellular phones and the development of Voice-Over IP technology. Even standard walk-in retail stores are quickly losing business because of the wide selection of online retailers.

But it takes more than just adapting to make a business last forever; organizations must have an excellent strategy in line putting them on the right path and ensuring their success. These strategies are developed by the organizations' leaders; and they are only as good as what the leader can envision for the business.

It is the company's leader that carries the burden of making the toughest decisions. He or she is considered the face of their company and their impact on the business is unparalleled.

Leadership is an entity of extreme value, yet lacks any true state of being. Throughout the years, many experts, all across the world and at different universities, have attempted to build on a solid explanation of what true leadership is. Merriam-Webster Dictionary defines leadership as follows:

- 1: the office or position of a Leader
 - 2: capacity to lead
 - 3: the act or an instance of leading
 - 4: Leaders<the party *leadership*>
- ("Leadership" 2010)

As accurate as that definition may seem, it really does not tell us much. How does a leader efficiently guide their business towards the path of success?

There are some leaders that are considered to have single handedly put their company out of business, and others which are praised because they implemented a vision that saw their organization rise to the top. Some companies are purely identified by their leaders, both the ones still running them and the ones who have left them; when one thinks of Virgin Enterprise they think of Sir Richard Branson, Apple – Steve Jobs, News Corporation – Rupert Murdoch, Microsoft – Bill Gates, Oracle – Larry Ellison. The names of these leaders are so identifiable because the companies they run have become household names.

People line up by the thousands outside of Apple stores because Steve Jobs had a vision for such innovative products that fit so well into people's lives, and regardless of the fact that he was known to have ruled Apple with an iron fist, (Martin 2012), he is still considered by many to be the greatest CEO's of the last 20 years, if not the greatest CEO of all time. (Groth & Bhasin 2011)

Apple used to introduce many innovative devices to the market and remained a dominant company in different industries, such as the music and entertainment industry, the PC industry, the Smartphone industry and the tablet industry. However, as more and more competitors join the market, Apple is no longer the dominant company. Take tablets as an example, San Francisco Chronicle reported recently that tablet sales, led by Apple's iPad, will increase beyond 282.7 million in the next four years, which is over twice the current sales. According to tech research firm IDC (Rapaport and News 2012), since the first iPad tablet was introduced by Apple in 2010, tablets have enjoyed increasing popularity. In the meantime, the competition is getting intense with the expansion of Samsung, HP, Google, and many other companies. How should Apple react in order to remain competitive while experiencing the transition of leadership? And the fact that Apple has yet to renew its license with Google brings with it a number of other problems. When iOS 6 was introduced, on the new iPad with Retina display it came with the Apple maps service instead of the widely popular Google maps (Why did Apple drop Google's maps on the iPhone and iPad? 2012). Does it reveal something deeper regarding Apple's development strategy for the future?

By outsourcing its maps services, Apple is not only changing its supply chain strategy, but is also transferring its key capabilities to remain competitive amongst the other companies in the future. We developed a causal loop diagram to determine the supply chain's impact on the development of those key capabilities in order for Apple to remain competitive against Google.

When Apple outsourced its maps services to Google it provided Google the opportunity to capture the iPad users' geographical information, social behavior, and other user-related items. As a result this increased Google's knowledge and capability on user information management, including the user information database and data mining capabilities.

With this newfound knowledge and those capabilities, Google could use the information to better customize Android-apps and to improve the Android operating system as whole, specifically targeting Apple customers, which, in turn, has a positive impact on Android's growth and performance.

On the opposite end of the spectrum, by using Google Maps, Apple has given itself fewer opportunities to capture user information which then results in a loss of knowledge and user information, and in turn, slows down the customization process which weakens the performance of Apple's operating system. Lastly, Apple's customer popularity may begin to shrink, pushing Apple towards the same deadly fate faced by IBM when they started to outsource their microprocessor components to Intel (Fine 1998).

Based on its new strategy, Apple started to change the link between process and supply chain, putting more of an emphasis on app development, and specifically focusing on the development of Apple's own map service. Through this decision, Apple may have a newly integrated supply chain system to support the development of those new processes. This insures an improvement of Apple's competency on those key capabilities and allows them to maintain sustainable success in the future.

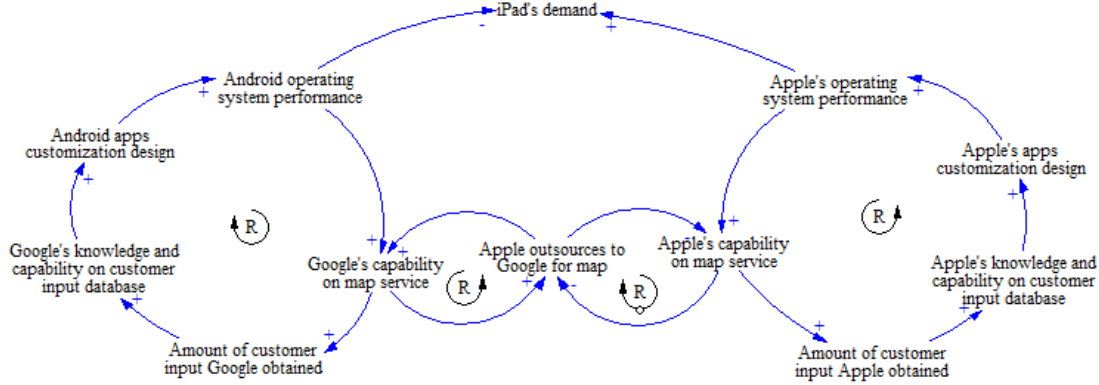


Figure 1: Apple's supply chain causal loop

The organizations that have the best practices of strategy or best experts cannot guarantee the success of the business. Their leaders are very important factors for their success. The Institute for Defense Analyses has proposed a report on Transforming DoD Management based on the system approach. This report states that to measure readiness of defense transportation systems in large scale monitoring equipment, training the personnel and improving manpower of the transportation division is useful to understand the system; however, it is not inadequate to define the readiness of a system. The report has emphasized that the leaders are essentially the main factors for accomplishing the mission. Leaders should have the capability to manage the personnel and material allocation to the right places at the right time (Reed 2006).

In many best practice scenarios, the leaders are usually dealing with complex systems which influence many of the relationships between both internal and external factors. The attribution of leaders indicates success for businesses. Some good examples of transformational leaders are Jack Welch, former CEO of General Electric and Carlos Ghosn, CEO of Renault-Nissan Company. Carlos Ghosn has transformed Nissan's organizational structure. He was assigned to be the Chief of Operation after Nissan was acquired by Renault in 1999. He was faced with a number of challenges due to declining revenue, conflict in organizational culture and the change for the employees. His proactive leadership style is an indication of all his attempts to make major changes. His effective methods included organizing, planning, listening, reassuring, motivating and following up. Ghosn initiated transformations by creating a high need for change and addressing the problems within the vertical layers of management by providing opportunities for all employees to share ideas and problems. Since, Japanese culture is very unique, Ghosn had to be very respectful in balancing his leadership style with the diversity of their culture. Ghosn was able to influence and motivate employees in order to minimize resistance of change in the management structure, rather than use formal authority. The reorganization based on the learning organization was established by changing individuals and allowing them to think in the sense of an organized team. He increased trust and built relationships by promoting teamwork and communicating effectively. Finally, he was able to successfully transform Nissan and the business continues to grow even today (Millikin and Fu 2003).

The purpose of this paper is to represent the application of a unique framework. We utilize several methodologies such as the Matrix of Change to understand the current and desired states. This mapping will help understand the type of transition. This transition matrix is part to the input to a system dynamics model that will provide insides of the dominant leadership style. System dynamics provides a high-level of leadership framework according to transformational leadership theories. The background of system dynamics and the leadership framework are discussed in the following sections. Essentially, our framework can help leaders think more systematically and improve their management and leadership style.

2. Background

2.1. System Dynamics Modeling

System dynamics (SD) was established by Jay W. Forrester at MIT in the late 1950s. It is an approach for simulating and modeling complex physical and social systems and experimenting with the models to generate feasible policies or scenarios for management (Tan, et al. 2010). Damle (Damle 2003) has described system

dynamics as a policy-based methodology that evaluates the consequences of policy changes on a system. It represents the “cause” and “effect” relationship between variables and captures all variables within complex systems. The changes in variables provide various alternatives across different scenarios and the best alternative is selected according to the goals. The benefit of system dynamics is to provide high level visibility and a better understanding of the complexity and dynamics of systems. Thus, system dynamics is a tool used to evaluate the changes in policy for decision-makers to make right decision with the right policy at the right time (Sterman 2000).

The system dynamics structure consists of two main components: 1. causal loop diagrams and 2. stocks and flows. First, the causal loop diagram is a qualitative dynamics model which articulates the interrelationships between variables and further describes the system behavior. The set of linkages captures all variables within the system. The cause and effect relationships are integrated into a feedback loop which represents the dynamics of the system. The advantages of the causal loop diagram are mapping the hypotheses and the causes of the dynamic relationships. The causal loop diagram will also provide a general insight into the problems within complex systems at the time of fundamental change (Winch 2001). Sharma et al. (Sharma, Sahay and Sachan 2004) has explained two types of feedback loops a positive loop and a negative loop. The positive loop is indicated as self-reinforcing which tends to increase output. Whereas, the negative loop is explained as self-correcting and opposes changes in the system. These loops define processes that tend to be balanced, self-limiting and processing.

Second, the stock and flows are quantitative simulation models which illustrate the relationships within the system and provide results according to different scenario approaches (Fredericks, Deegan and Carman 2008). Stocks represent the accumulated values due to differences between inflow and outflow rates. For example, the stock of a population is an accumulated value due to the difference between the rate of births (inflow) and the rate of deaths (outflow). Stocks are also affected by delays in the system which can be a government policy of one family with one child for example. The mathematical notation of stock and flows is illustrated in Equation (1) (Sterman 2000):

$$\text{Stock (t)} = \text{Stock (t}_0\text{)} + \int_{t_0}^t [\text{Inflow (t)} - \text{Outflow(t)}] \cdot dt \quad (1)$$

Sharma et al. (Sharma, Sahay and Sachan 2004) has explained the six steps in system dynamics modeling as:

1. Defining problems and goals
2. Building causal loop diagram
3. Formulating the structure of the model into stock and flow.
4. Collecting initial data needed
5. Validating the model using appropriate criteria
6. Testing in different scenarios to identify the best solution according to goal.

System dynamics behaviors are typically categorized into four types:

- First is exponential growth behavior which is a positive feedback or a self-reinforcing loop. The basic concept is to accelerate growth; however, the growth may not literally follow the pattern. For example, an increase in interest rates leads to increases in the principle.
- Second is a goal-seeking behavior where the system initiates from above or below a certain goal level and accelerates toward the goal over time. When a single negative element, such as corrective action, affects the system, the behavior rises to a desired state and then continues to balance the system and follow the trend.
- Third is an oscillation behavior which is affected by negative feedback loops and delays. The state of the system continuously overshoots its goal or state of equilibrium, followed by a reversal, and then continues to overshoot again, and so on. The overshooting increases due to a presence of significant time delays in the negative loop. Finally, it goes into an S-shaped growth pattern which is initiated from the exponential growth and followed by goal-seeking behavior. This behavior articulates both positive and negative feedback loops within the complex system. (Sharma, D., Sahay, B. S., and Sachan, A., 2004; Chu, X., 2006)

2.2. Leadership Framework

Leadership is the ability to influence and interact with others moving them towards the direction of a common goal. Typically, the process of leadership is apparent with leaders and followers in particular situations. The role of leaders is influencing others and balancing three social system functions: 1) power, 2) tension and 3) ideas generation amongst a team or organizational level. These three functions lead to the success of business in a

specific situation. The ability of effective leaders depends on their personality, experience, expertise, and knowledge that significantly impacts personal influence, team opinions, impression management, and the relationship between leader and follower. In addition, communication mechanism between leader and follower is also an important factor. To enhance effective communication skills, leaders should be aware, clear, sincere, quiet, cautious, and open to seeking counsel. Finally, effective leaders should deeply understand the situation, guide and empower followers, use appropriate formal authority, and provide opportunity for others to generate ideas.

Leadership models have been presented within several different aspects in recent decades and the research surrounding it has transformed to focus on visionary, transformational and charismatic leadership approaches.

In 1985, Bass explained that the characteristics of transformational leadership consist of:

- Increasing follower awareness and acceptance of the organization's goal.
- Supporting the followers in achieving their personal vision and matching it to the needs of the organization or team.
- Motivating their higher-order needs

Transformational leadership should also consider recognition, reward, responsiveness, shared vision, enhanced commitment and trust to enable organizational learning instructor. (Bennis, W., and Nanus, B., 1985; Boal, K., and Hooijberg, R., 2001; Schein, E. H., 1992)

Hunt (Hunt 1999) defined leadership as an interpersonal persuading attribute built around communication and utilizing a follower's sensations. The new leadership theory provides better visibility of leadership problems. Marion & Uhl-Bien (Marion and Uhl-Bien 2001) implemented the complexity theory into the practice of leadership in order to address and understand leaders in complex systems. They found that leaders should consider emergent and interactive dynamics as leadership attributes. The complex adaptive system (CAS) theory can illustrate six attributes of complex leaders. First, leaders tend to come in contact with organizational procedures more than their local exhibition. Second, leaders form transformational circumstances or the need for innovation more than generating innovation itself. Third, leaders provide opportunities to network instead of establishing controlled work environment. They have more empathy for people than control over them. Fourth, leaders encourage people to work as a team. Fifth, leaders are part of dynamic more than being the dynamic itself. Finally, leaders can identify their connection and external connections. They can utilize the right people for the right task. Leadership can be referred to as the internal capacity of a human community to establish its own future. Business is necessary to define a flawless vision of the future, it is necessary to ensure that all employees understand the vision. Meanwhile, business should be able to improve the ability to achieve one's goal. As a result, a leader is a designer who forms an organization and a pilot who provides guidance so that the organization can reach its goal (Senge, et al. 1999).

Gueldenberg (Gueldenberg 2000) has explained that leadership is designed to generate organizational learning. Management control is also a key component of practical leadership. The author has proposed the basics of the reinforced dynamics leadership causal loop which consists of four domains:

- Viability
- Learning capability
- Structural plasticity
- Ability to self-generate

The leadership causal loop diagram is illustrated in Figure 1. Viability has a positive relationship with the capacity of self-generation where the higher degree of self-generation increases the system's viability; in addition, the superiority of the system's viability enhances the learning organization.

The business has the capability to build its own future by improving and developing itself both internally and externally. In addition, the business learns to adapt according to the environment and to threats from its competitors. Finally, the learning organization improves its structural plasticity which is the flexibility and its capacity for the adjustment of its business' structure and strategy in regards to both short term and long term circumstances.

Although these dynamics represent the exponential behaviors; in reality leadership should consider both of negative and positive relationships. As a result, the author has proposed the leadership framework which is based on system dynamics and consists of the management loop and the management control loop (Figure 2). The management loop represents the reinforcing behavior which contains business growth, setting direction, building resources and creating infrastructures. These elements have a positive relationship which means that if one of the variables increases, the other variables also increase in the same direction. However, the management control loop reflects the balancing loop which consists of the limited business growth factors including: internal resources, infrastructure and policy constraints which compensate for selective perception and limit the developmental dynamics.

The internal resources, infrastructure and policy constraints are referred to as essential domains to sustain the consistency and coordination of the organization. Compensating for selective perception, on the other hand, is defined as a communication mechanism and information between leaders and the entire organization.

Lastly, the limit on the developing dynamics consists of content and time which can be defined as goal seeking behavior. Thus, management control is directly the responsibility of the leaders, and it is up to them to facilitate the development process and to share their vision for empowering people in order to move towards the goal. Furthermore, leaders should establish direction -how to get there- and generate resources and infrastructure through balancing impulse. Finally, leaders must communicate effectively and encourage people to adapt to environmental change.

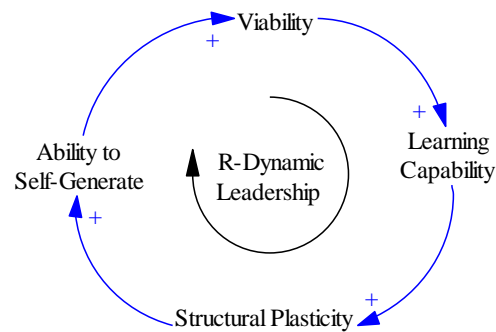


Figure 1: Dynamic Leadership Causal Loop Diagram -Adapted from Gueldenberg (Gueldenberg 2000)

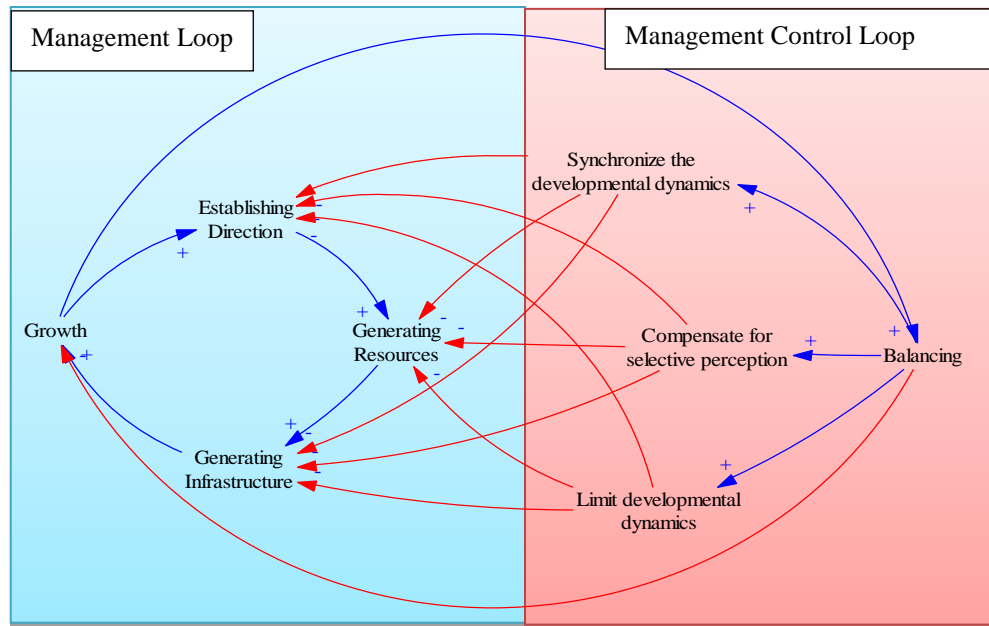


Figure 2: The Balanced Leadership Cycle-Adapted from Gueldenberg (Gueldenberg 2000)

We build our framework based on the literature, our observations and experiences, and the analysis of case studies. In addition, we include experts from different cultural backgrounds and levels of authority to validate our investigations.

2.3. Matrix of Change

The Matrix of Change is a joint research project that was developed by the Center for Coordination Science and the Center for eBusiness at the Massachusetts Institute of Technology. This project was initially funded by Intel and British Telecom and it is considered by many to be an excellent support tool for monitoring and understanding change management. It is aided by custom designed software that is made available at no cost to the user on MIT's website. (Brynjolfsson, E., Renshaw, A., and Alstyne, M., 1997; Sloan School of Management, Massachusetts Institute of Technology)

The Matrix of Change works by identifying complementary and interfering work practices and provides a snapshot of where an organization currently stands and where it can be once certain changes are implemented. It follows a four step process which can be utilized in various change management scenarios such as turnkey outsourcing, healthcare development, and in our situation, leadership change.

The four step process of the Matrix of Change is outlined as:

1. Providing a systematic means to judge the most important business practices.
2. Highlighting interactions amongst those practices and potential transition difficulties.
3. Encouraging stakeholder feedback on proposed changes.
4. Using process interactions to provide guidelines on the pace, sequence, feasibility, and location of change.

There are three matrices and stakeholder evaluations that make up the Matrix of Change, these three matrices represent:

1. The current collection of organizational practices.
2. The desired collection of organizational practices.
3. A transitional state that bridges the two.

The primary benefit of the Matrix of Change is its ability to allow decision makers to step back and look at the big picture housing their organization and encouraging stakeholders to voice their opinions. Through this tool

stakeholders can look at the importance of certain decisions within, as well as, outside of their scope, and allow for a better understanding of what areas can see a compromise for the greater good of the organization (Matrix of Change n.d.).

In our framework, the Matrix of Change is utilized to study how an organization can choose the right leader for them based on a number of different character trait as mentioned earlier. On the left side of the Matrix of Change we list traits of a leader which we consider to be inadequate we also look at how these various traits interact with each other and we identify whether they complement one another, interfere with each other, or have no significant impact. The listed traits are also ranked as a means to prioritize their importance. This could be considered the current state of an organization and the reason for it wanting to change. This is the first step of developing the Matrix of Change; listing the existing practices (Figure).

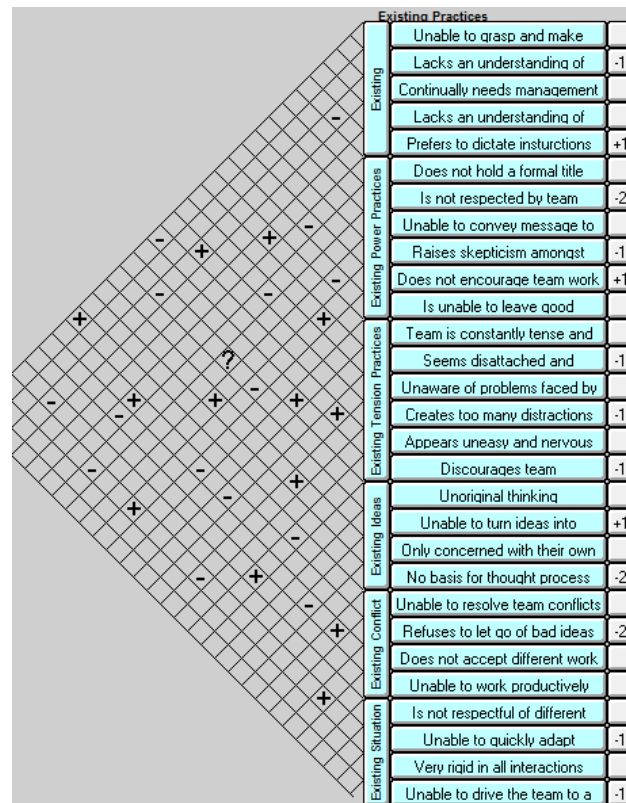


Figure 4: Characterization of current state of a company/department

Next they are ranked and their interactions are identified.

On the upper right hand side is a list of traits one would consider belong to a competent leader, and in our scenario they are the desired traits. As with the current state, the desired traits are ranked and their interactions are identified which is shown in Figure .

The Target practices are also identified and represent where we want to be after the change.

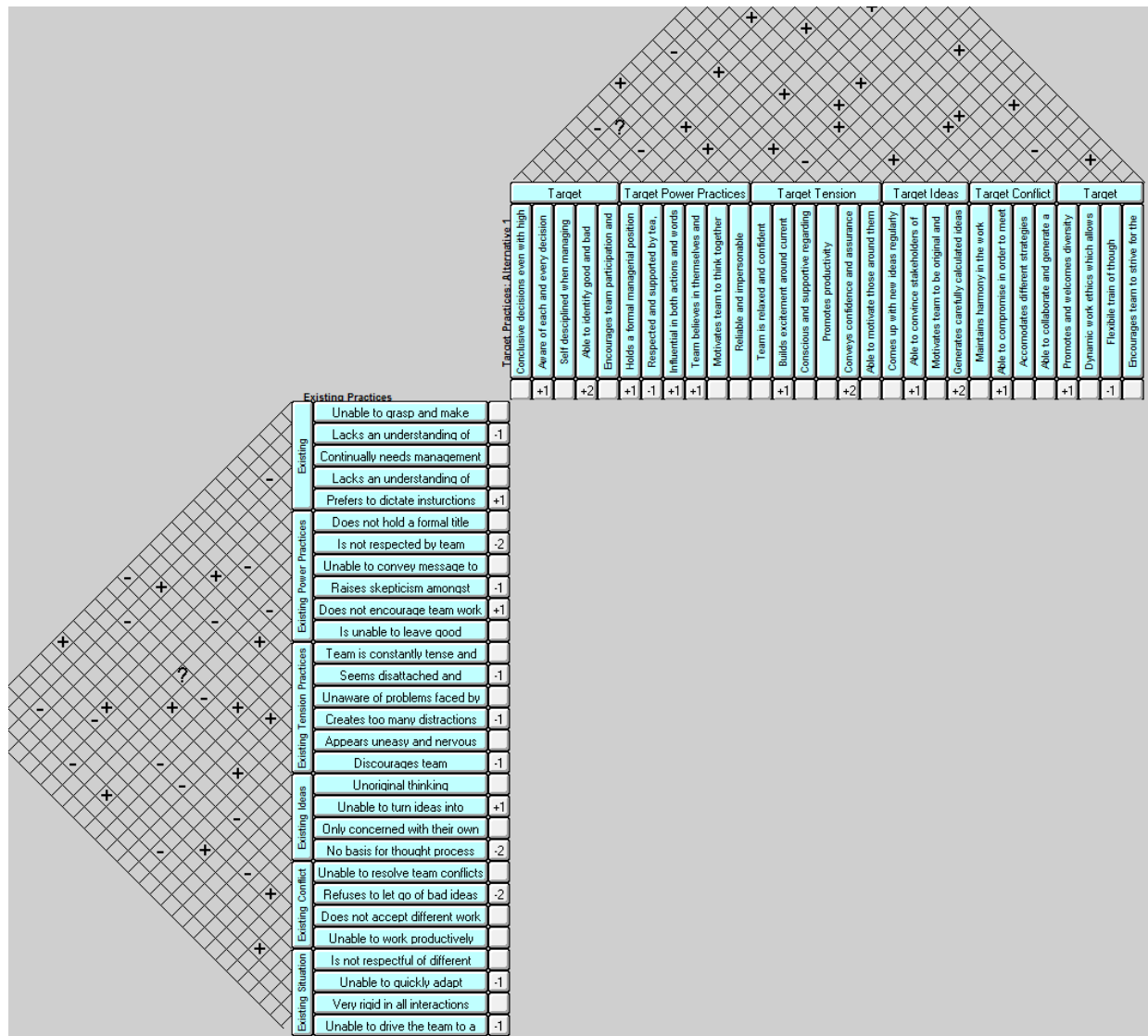


Figure 5: Characterization of desired state of a company/department

The Target practices are also ranked and their interactions are identified.

In the center is another important factor of the Matrix of Change and that is the transition study. As can be seen, every existing trait is linked to its equivalent target trait and a positive or negative sign is applied as a connotation showing whether the existing trait interferes or complements the desired trait (Figure).

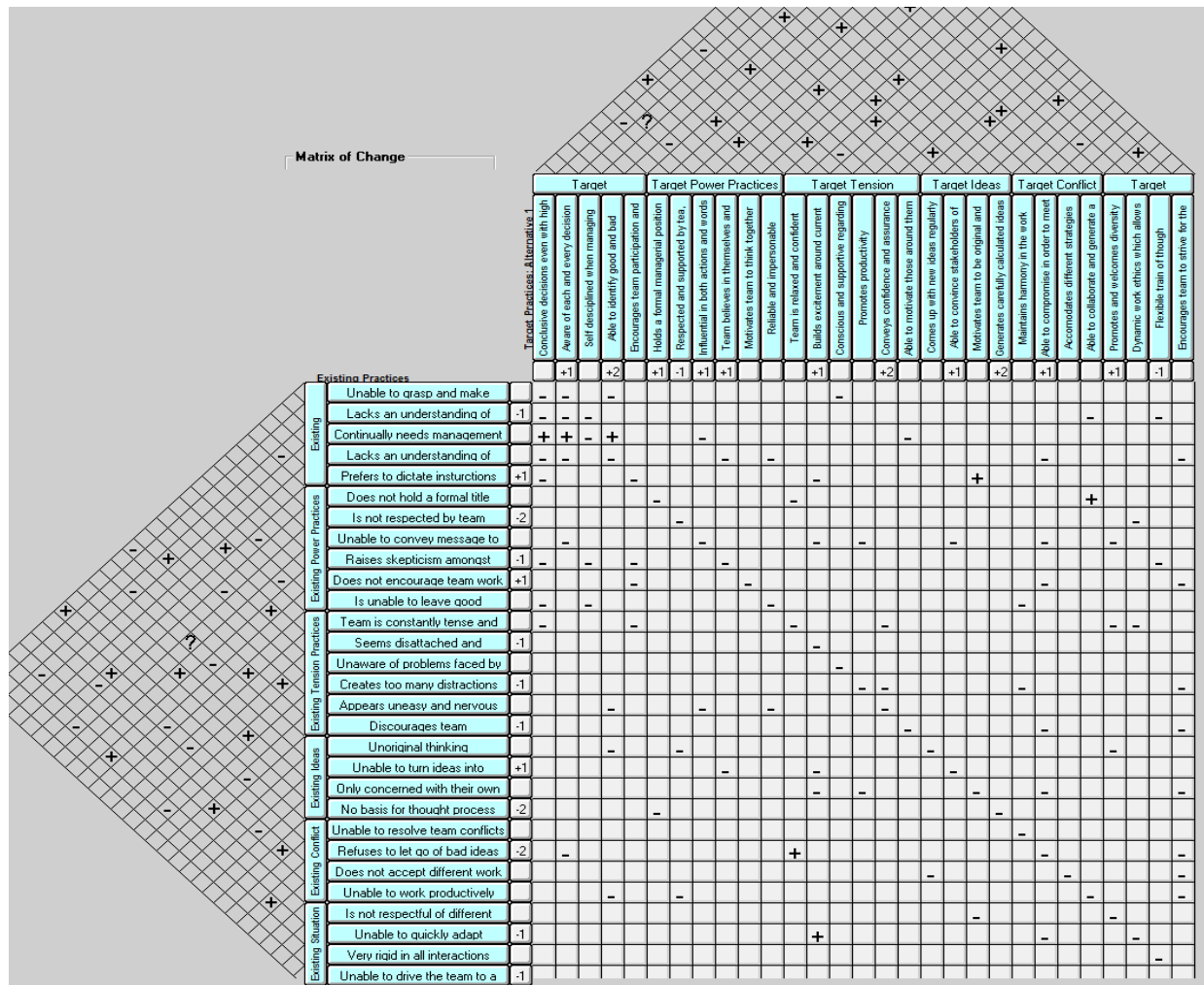


Figure 6: Transition matrix indicating the difficulty of going from current to future

Finally all existing practices are then compared to the target practices. When the matrix shows a high number of negative sign (as is the case in our design) this implies that the transition from the existing traits to the desired traits will not be an easy one and stakeholder discussion and debates become highly encouraged as a means to reach a compromise for the change to occur [18-19]. This can also re-evaluate our objectives and performed iterations to obtain a more feasible one.

3. Case Studies

3.1 Yahoo's new beginning

Porter's Five Competitive Forces

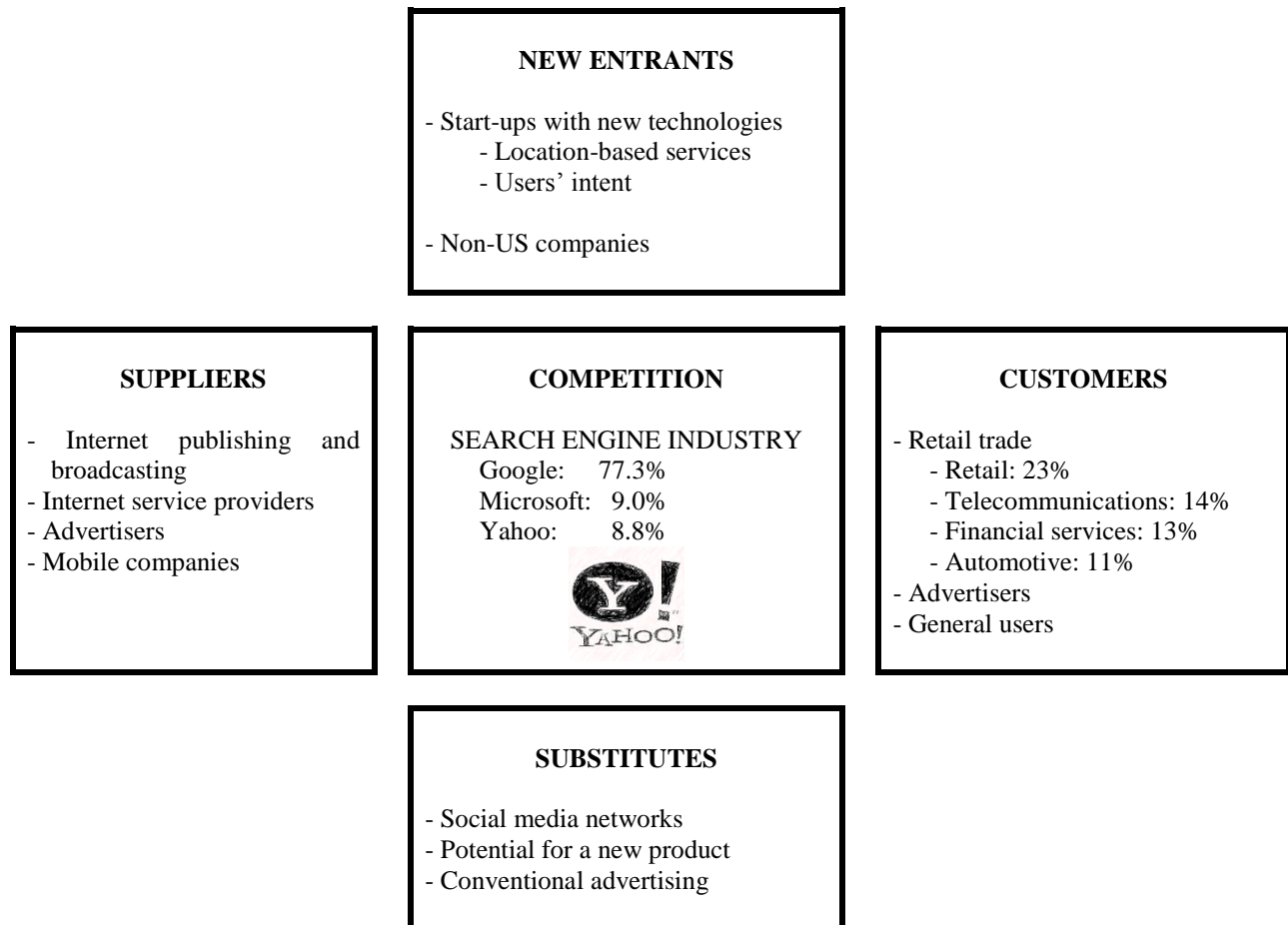


Figure 7: Porter's Five Competitive Forces as applied to Yahoo

Barriers to entry are high and steady. New entrants, generally start-ups with new technologies around the world, will require access to skilled human resources, as well as substantial computing resources and sophisticated software algorithms (capital and time requirement, economies of scale). The dominance and strong branding of incumbents characterize the industry.

However, opportunities exist for those that have a narrow focus on the new applications of search technology or on developing new technologies that enhance existing functionality (location-based services, users' intent). Industry giants usually acquire these new entrants.

Competition is high and the trend is increasing. Concentration has increased steadily, primarily driven by Google's growth and the decline of smaller search engines (Ask.com and AOL). The market share of the search engine industry is distributed in the following way: Google (77.3%), Microsoft (9.0%), and Yahoo (8.8%).

The competitive factors for both users and advertisers levels are described in the table below:

Users	Advertisers
Relevant search results	Size of user base
Aesthetics	Cost per click charged
Speed of service	Number of affiliated websites
Branding	
Free services, software or online storage	

Figure 8: Yahoo's competitive factors

The globalization in this industry is medium and the trend is increasing. All US companies have 50% of revenue from outside the US, whereas non-US companies are entering the US market. By the other hand, the level of regulation is light but it is expected to increase.

'Substitutes' is medium and the trend is increasing. Increased external competition from social media networks will challenge the industry over the next five years. The integration of search engines and social networks seems inevitable to enhanced users' search experiences. Some examples of this new "social search" are Google+ with its search engine and Microsoft with Facebook.

Bargaining power of customers is high. The availability of several alternatives with no costs for the customers and undifferentiated services give customers more bargaining power.

Bargaining power of suppliers is medium. Numerous suppliers, programmers, advertisers can work with different customers at the same time. However, the preference to do business with the giants of the industry (Google or Microsoft) affects the bargaining power of suppliers negatively.

SWOT Analysis

STRENGTHS	WEAKNESSES
A well-recognized brand around the world	Inconsistency in developing its own technology in the search engine
Strong focus on distribution	
- Distributes its content across several screens	Weak performance compared to peers / stagnant revenues
- Remains one of the most visited sites	
- Alliances with leading players	Inability to defend its market position in the search marketplace
- Established distribution partnerships	
Increased multi-platform offerings and social network integration	Unstable period: 5 – 7 CEOs within 5 years
- Cater to multiple audience	
- Exploit the emerging trends of social networking effectively	Partnership with Microsoft
	- Microsoft surpass Yahoo as the second giant in the industry
Capital available to invest aggressively	- Lost or deterioration of Yahoo's search engine capabilities
A highly skilled workforce	
	Strained relationships with Asian Partners shows poor leadership from the board and lack of diplomacy
OPPORTUNITIES	THREATS
Shift of consumers to mobile devices	Strong competition in the online display ad marketing from several sources

Online advertisement market is one of the fastest growing segments	- Facebook is more cost effective for advertisers
- Sustainable growth	- Sustainable competitive advantages are not assured
- Estimated growth 31% in 2014	- Google and Microsoft have launched several initiatives to capture share in these markets.
Display advertising and mobile ad spend will be strong emerging drivers	- Applications like Siri for iPhone have introduced the users to a reality without search engines
- Display ad 2012-2014 growth: 47%	- Non-US companies entering the US market
- Mobile ad 2012-2014 growth: 85.4%	
Rapid Technology and process change	Increased dependence on advertising revenues exposes Yahoo to business cycles
	- Unpredictable and variable, more vulnerable and higher risks
	Online fraud is becoming a serious issue

Figure 9: Yahoo's SWOT Analysis

Internal Analysis

Yahoo! is a well-recognized brand worldwide. Its products, services, and content enable the company to attract, retain, and engage users, advertisers, publishers, and developers. Yahoo! is positioning its products and services to be at the center of the world's digital daily habits. In addition, the company provides communications tools to connect the world, as well as User-Generated Content products. Many of its properties are also available in mobile-optimized versions for display on mobile phones and tablet devices, or available as native applications for iOS, Android and Windows phones.

As one of the Web's largest publishers and the owner of leading properties across multiple content categories, Yahoo! provides contextually-relevant content and experiences where advertisers can connect with users effectively. It also brings quality publishers together like AT&T, Verizon, Rogers, Monster, and Comcast. Agreements with Microsoft and AOL allow ad networks operated by them to offer each other's premium non-guaranteed online display inventory to their respective advertising customers.

Yahoo! continually launches, improves, and scales products and features to meet evolving user, advertiser, publisher, and developer needs. Most of the software products and features are developed internally. Yahoo!'s employees and culture are fundamental to the company's success, and attracting the best people to Yahoo! is critical. It includes a broad array of engineering talent that spans the breadth of our technology infrastructure, primarily located in California, India, and China.

Finally, Yahoo! has the capital available for further growth. In September 2012, Alibaba Group Holding Limited repurchased 523 million of ordinary shares of Alibaba Group owned by Yahoo!, resulting in a pre-tax gain of approximately \$4.6 billion for Yahoo!.

By the other hand, Yahoo! main weaknesses are its inability to defend its market position in the search marketplace and an unstable management during the last five years. The development of Yahoo!'s search engine technology can be described as inconsistent, hampering the enhancement of its own search engine capabilities. At the beginning, Yahoo! began to use Google's search technologies to fully exploit the Internet booming. By 2004, it changed back to its own search technologies. The further effort to compete with Google in the search market with the Panama project in 2006 did not give the expected results and Google maintained its superiority. Then, the Search Deal with Microsoft made Microsoft Yahoo!'s provider of search technology and advertising. This arrangement resulted that Microsoft became the #2 search engine behind Google, gaining Yahoo's market share.

Adding this to the unstable period in the executive board, where there has been around five to seven CEOs in the last five years, Yahoo! has shown a weak performance compared to the competition, reporting stagnant revenues. A last weakness is the inappropriate handling of Asian partnerships, especially with Alibaba, that has shown a poor leadership and lack of diplomacy.

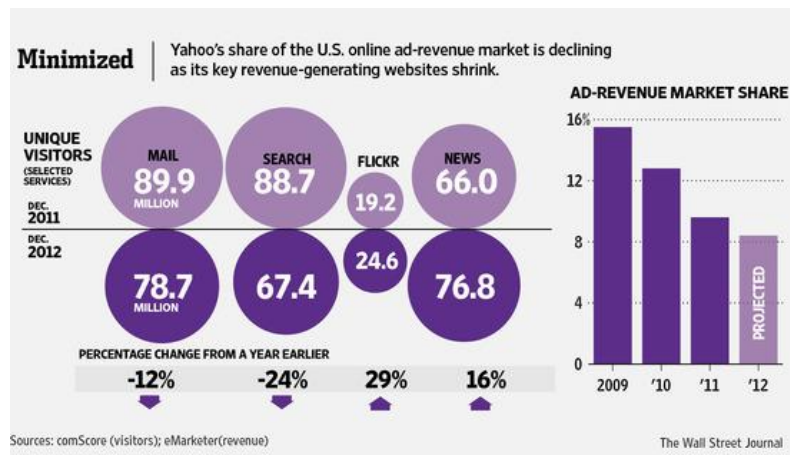


Figure 10: Yahoo's market share distribution. Adapted from *The Wall Street Journal*

External Analysis

The opportunities for Yahoo! arise from the shift of consumers to mobile devices and the fast growth pace in the online advertisement market. It is expected that the display advertising and mobile ad spend will be strong emerging drivers within this industry.

The main threats are a strong competition in the online display ad marketing from several sources (please see Five Porter's Competitive Forces) and the increased dependence on advertising revenues that exposes the company to business cycles. This would make Yahoo! more vulnerable and exposed to higher risks. Another issue that is getting importance is online fraud, where companies are going to invest in this area to ensure their credibility in the market.

The Matrix of Change

Actual State

From information provided by the Porter's Five Competitive Forces and the SWOT Analysis, the actual state of the Matrix of Change is built for Yahoo!. The Actual State has four main areas: Operations & Leadership, Human Resources, Growth Capacity, and Innovation & Product Development.

In the Operations & Leadership area, the practices are:

- One of the most visited and trusted websites
- Content, communication, and community platform
- Operations mainly in the US
- Eroded confidence in the board
- Inconsistent regional strategies

Yahoo!'s Human Resources are characterized by:

- Highly talented workforce
- Low employee morale
- Work-from-home arrangements
- Employee Stock Purchase Plan

The Growth Capacity area can be described by:

- Capital available to invest in future growth
- Low market share
- Financially stable

The Innovation & Product Development practices are:

- Weak R&D in Search
- Acquisition and joint-venture approach
- Mainly a desktop platform

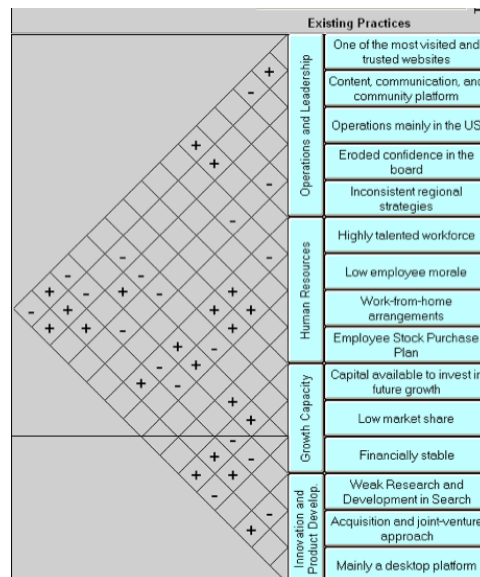


Figure 11: Yahoo's Existing practices

As can be seen in the matrix, the presence of the same amount of reinforcing and interfering interactions between the existing practices makes evident that Yahoo!'s Actual State is unstable.

Future State

The Future State has been developed mainly based on Yahoo!'s CEO interviews.

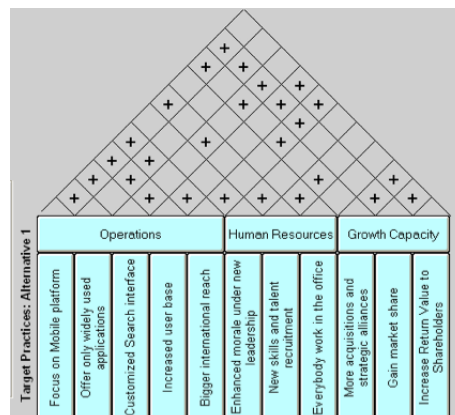


Figure 12: Yahoo's Target Practices

As can be shown in the figure, the target practices are grouped in three categories: Operations, Human Resources, and Growth Strategy.

In the operations area, the desired state is:

- Focus on Mobile platform
- Offer only widely used properties
- Customized Search Interface
- Increased User Base
- Bigger International Reach

The company's goal is to have 50% of operations focused on Mobile applications. The team is already working in fast, small teams focused on IOS and android platforms. Also, the team is now selling ad space ahead of time for their Mobile applications and searching for ways to monetize Mobile properties fast. The goal is to offer only widely used properties, their focus being every 'digital daily habit' and the teams will only give the 'go-ahead' to projects that can scale a 100 million users. Yahoo's core priority is to customize their Search Interface, by innovating at the user level, searches now will be personalized, the engine will know where you are, the context where you are doing the search and who you are communicating with. There will be improvements in the areas of voice recognition, image recognition and translation. All these efforts will help to Increase the User Base, another main goal of Yahoo and achieve Bigger International Reach, since 75% percent of Yahoo's Revenue comes from the America Region and there is great opportunity to increase Market share as they expand.

The goals for the Human Resources area are to enhance morale under the new leadership, develop new skills and recruit top talents, and put everybody to work in the office. The latter would enhance a collaborative culture and improve employees' productivity.

For the Growth Capacity area, the targeted practices are:

- More acquisitions and strategic alliances
- Gain market share
- Increase Return Value to shareholders

Yahoo aims to be a more global engine, that users touch every day; its team will be continually innovating in order to increase customer satisfaction and therefore, gain lost Market Share, increase Revenue and Increase Return value to stakeholders. Yahoo strategy will also involve making key acquisitions and alliances in order to be competitive. Partnerships are key to their future success.

The dominance of positive interactions between these target practices makes the desired state for Yahoo! stable.

Transition

The transition matrix helps determine the degree of difficulty in moving from the current state to the future state. The proportion of positive and negative signs in the transition matrix indicates how disruptive the change process will be. A transition matrix with a comparatively large number of complementary practices and few conflicting practices indicates that the change will be relatively incremental and non-disruptive. In the case of Yahoo!, the transition matrix has slightly more reinforcing than interfering interactions. This means that the transition will not be so smooth.

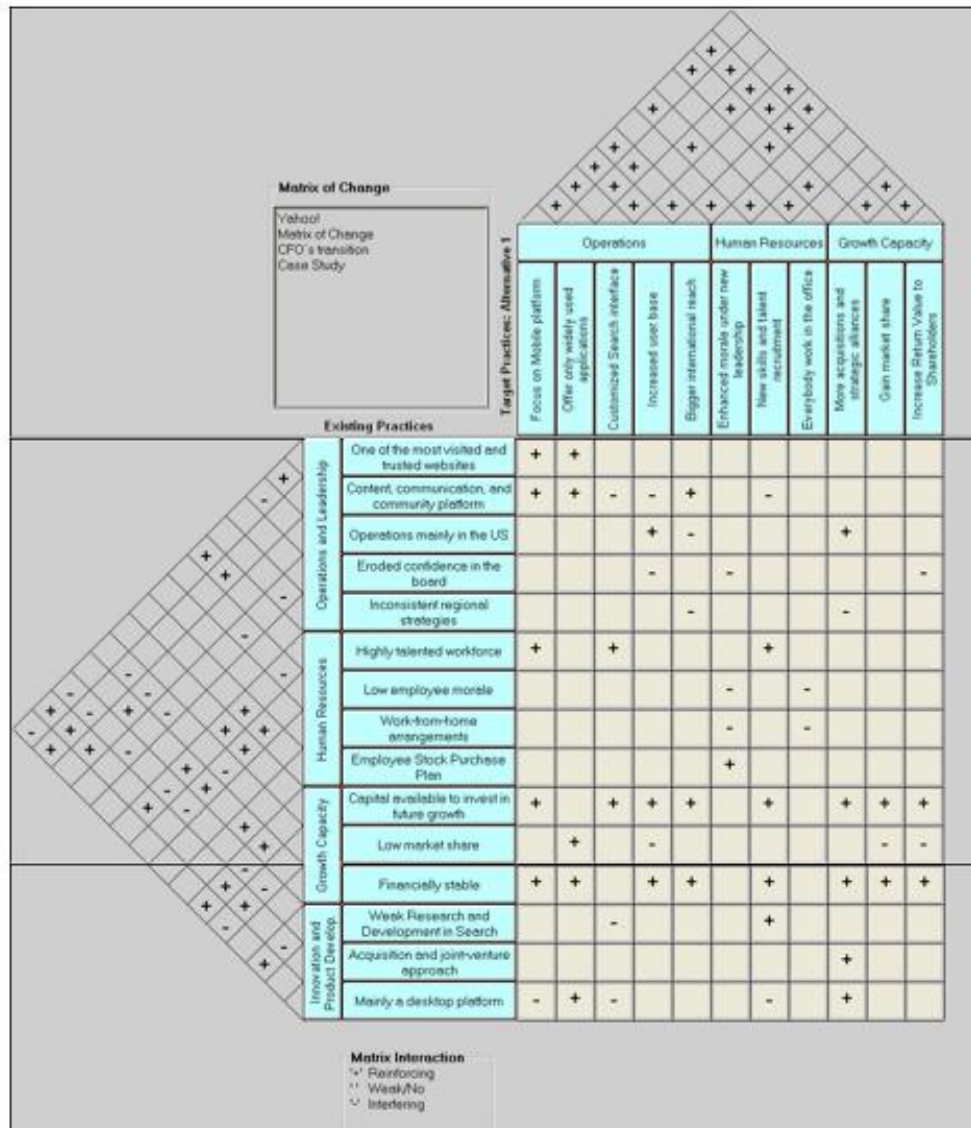


Figure 13: Yahoo's completed Matrix of Change

3.2 Virtual Leader

Virtual Leader is an intelligent-avatar based leadership environment developed by Simulearn Inc. Virtual Leader is a simulation designed to allow participants to practice their relationship building and influencing skills in a realistic gaming environment. The environment allows participants to practice and users make significant improvements in their influence and relationship building skills (Aldrich, 2003). Students can practice and learn skills such as verbal and non-verbal communications, active listening, situational awareness, teamwork and collaboration, motivation and persuasion, effective communication and decision making aligned with strategic business objectives. A very important aspect is that students can practice these skills using directive, participative, or delegative decision making. This intelligent avatar environment helps increase the incidence of behaviors such as:

- Treating others as equals
- Helping others do better
- Persuading other efforts toward cooperation

- Openly asserting and expressing ideas
- Directing the positive energy towards results



Figure 14: Scenario 1 One-To-One (www.simulearn.com)

Therefore, we use Virtual Leader as the environment to test the leadership behavior as selected by the Matrix of Change and the System Dynamics model for the particular scenario explained above. A group of users played the simulator as directive decision-makers, others as delegative decision-makers, and the third group as participative decision-makers. The results of 15 people (5 for each behavior and the score in the first scenario – with a maximum of 100) and the particular statistics are depicted in Table 2. It is important to see that the directive style was the highest score for this simple exercise validating the answers for our framework.

Decision Making Style	Mean Score	Std Deviation
Directive	91.94	3.16
Participative	84.64	3.5
Delegative	78.01	5.22

In order to compare the current state of the Virtual Leader scenario to the three different future states we utilized a 1X3 Matrix of Change where we treat the current state as a very easy going attitude in which Oli, the artificial-intelligence employee, gets his way on a number of the decisions, and takes advantage of you, the user, as you are a newly employed manager. As stated above, the three future states consist of;

- The directive style is where the manager looks past Oli's requests and sets his or her own requests as the priority.
- The participative style is where the manager opens up a communication channel with Oli and attempts to find different solutions in order to meet both of their requests.
- The delegative style is where the manager puts all decision making power in Oli's hands giving him complete freedom.

3. The reinforced financial performance loop-R3
4. The reinforced power loop-R4
5. The reinforced generating ideas loop-R5

The employee morale loop-R1 represents a reinforced behavior which can be increased by enhancing and empowering generating ideas and financial performance. Customer satisfaction is one of the important elements that can reflect leadership and organizational performance. This study shows that the customer satisfaction loop-R2 positively impacts employee morale. Employee morale has significant impact on the level of customer satisfaction. Therefore, leaders should be aware of this factor in order to improve or sustain business performance. The financial performance loop-R3 has a positive relationship with generating ideas, customer satisfaction, employee morale, knowledge, organizational initiatives and productive tension. Therefore, leaders should take into consideration these elements in order to enhance financial performance.

The power loop-R4 represents the leader's personal power which has a positive relationship with formal authority, network, employee morale, managerial confidence, knowledge, and financial performance. This loop also reflects the type of administrative leadership which defines the activities of individual leaders in managerial roles. Formal authority power and network have become key factors impacting the personal power performance and organizational initiatives. Finally, the generating ideas loop-R5 can be increased by improving employee morale, ability to motivate others, knowledge. Generating ideas positively impacts organizational initiatives, financial performance, customer satisfaction and productive tension. The generating ideas loop is one of the elements that reflect the leader's performance. In order to increase the effectiveness of leaders, they should be able to motivate or encourage employees to be innovative and generate ideas. In addition, productive tension is directly affected by empowering, situational awareness and task complexity. When organizations are faced with a high degree complex system due to rapid changes in environmental demand, leaders must have situational awareness which allows them to manage organizational strategy/crisis, plan, guide and share visions with the organization. It is also important for them to acquire resources, interact and encourage employees to collaborate and engage discussion amongst different teams. As a result, the interaction between leader-followers is a critical issue that requires leaders to be clear with direction and empower others toward the goal [9,16].

Effective leadership characteristics are represented in the reinforced management loop-R1, R2, R3, R4 and R5. This causal loop of effective leadership reflects the type of adaptive leadership which refers to leaders who can coordinate, self-manage, and adapt to changes in circumstances by engaging and interacting with others (Uhl-Bien, Marion and Mckeley 2007).

As a result, leaders are self-managed, innovative and system thinkers. They have the ability to produce productive tension, empower, and motivate people to change. They also tend to coordinate and influence people to generate ideas in order to accomplish organizational goals. The outcome of effective leadership is an increase in productivity, financial performance, customer satisfaction and overall business performance, among other things. These five reinforced management loops present exponential growth behavior. It can be interpreted that these variables have a positive impact on business performance. This model represents essential leaders' attributions and potential consequences which can support leaders to make appropriate decisions to lead their business. The implementation of this model may have short term and long term impact depending on the leader's personality, experience, and communication mechanism between them and their followers. Our causal loop was validated with different managers and companies.

A preliminary system dynamic model of effective leadership is illustrated in Figure which reflects the fundamental effective leadership attributions. The model attempts to enhance leadership performance (personal power performance) by increasing organizational initiatives (task completion rate). The task completion rate depends on the number of generating ideas, level of employee morale, productive tension, financial performance, available knowledge, task complexity, empowering level, customer satisfaction level, formal authority power level and ability to motivating others. There are two variables that have negative relationship with leadership performance including task complexity and number of assignments (projects). Furthermore, the authority power level can be both positive and negative impact on collaborating rate of employee. As a result, leaders should be able to self-manage, especially using formal authority power.

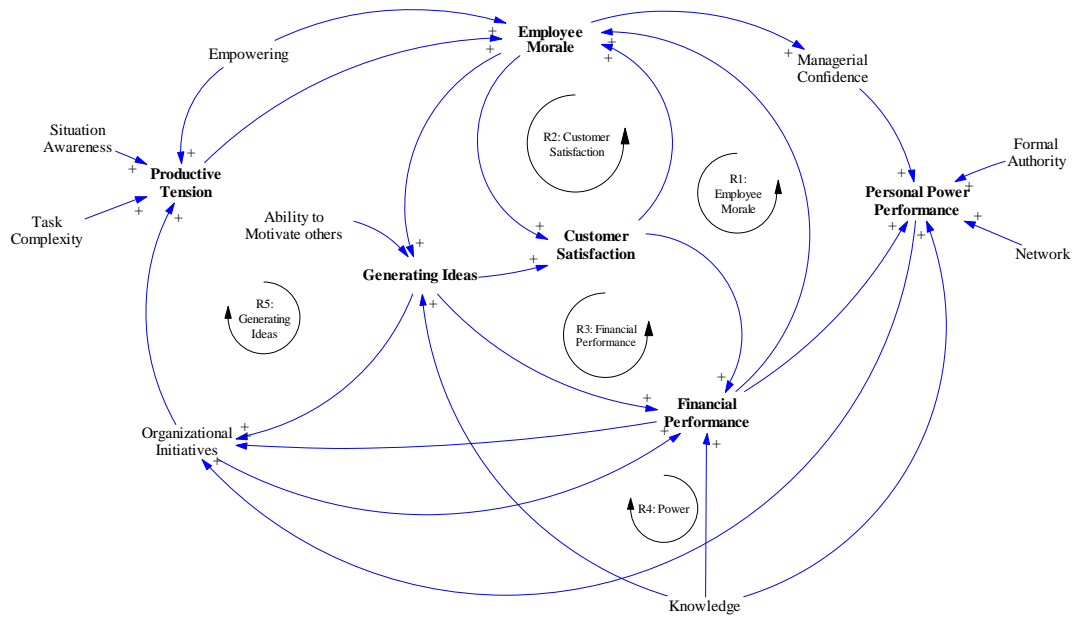


Figure 16: Causal Loop Diagram of Effective Leaders

The number of generating ideas is based on the ability to motivate others, increasing that will increase generating ideas. The employee morale level is determined by the collaboration rate which is based on authority power level, empowering level, and customer satisfaction. The productive tension level has a positive relationship with the task completion rate. The tension rate can increase by increasing the empowering factor and decreasing task complexity. Thus, personal power performance represents leadership performance which is the difference between the task assigned rate and task completion rate. The higher the task completion rate provides the higher personal power performance of leader. The interaction of the different elements and the integration of this dynamics with the MOC can help to see the important of the type of leader to be hired.

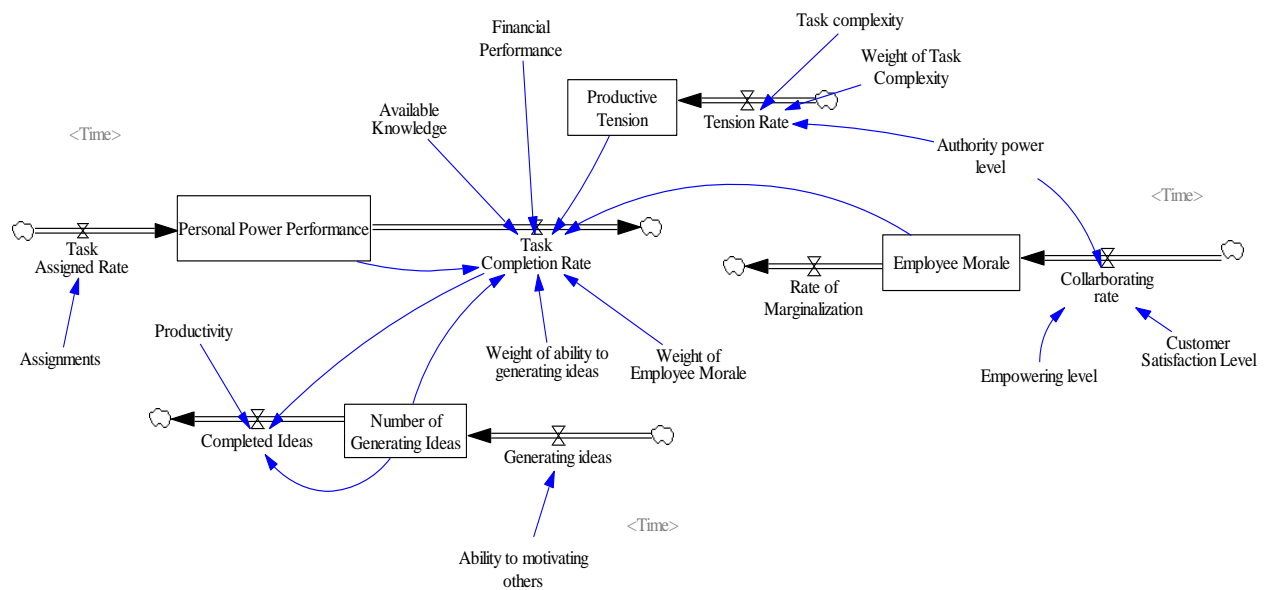
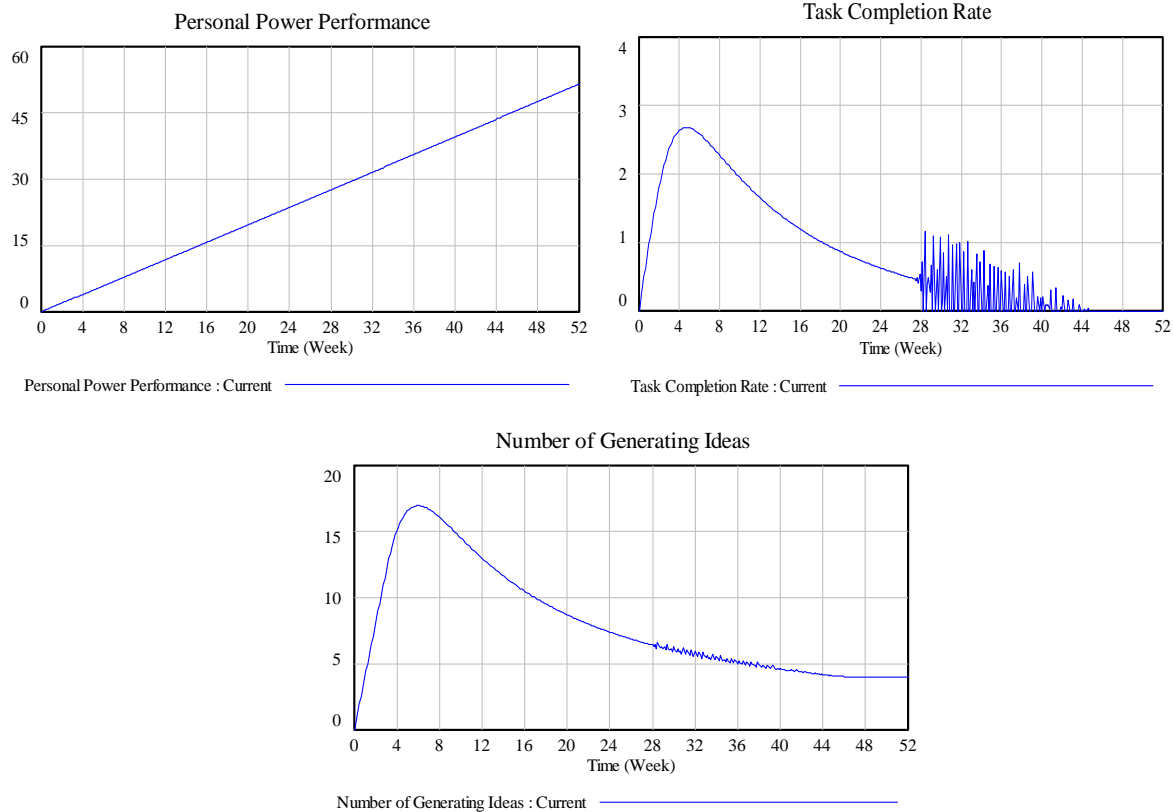


Figure 17: System Dynamics Modeling of Effective Leaders

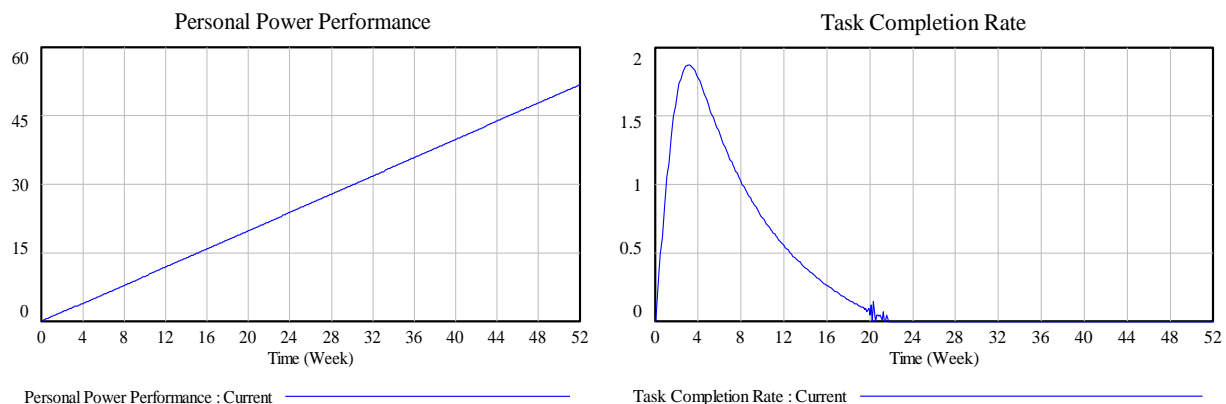
In our experiment, we set different levels of authority power to represent three leadership styles. The delegative leadership style has an authority power of level 1. The participative leadership style has an authority power of level 3. Finally, the directive leadership style has an authority power of level 5.

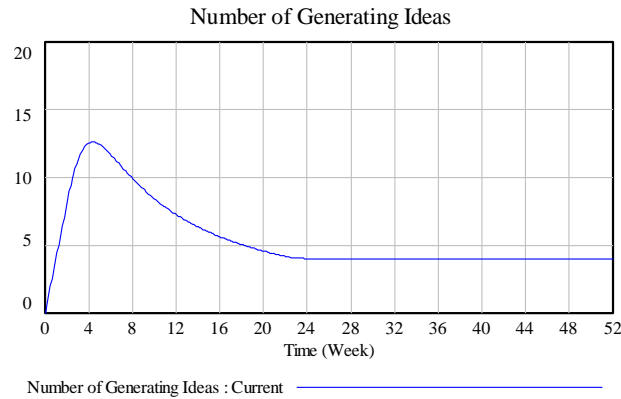
The results below show that personal power performance remains at the same level, whereas, the values of the task completion rate and the number of generating ideas have significantly changed based on the authority power. Therefore, an increase of authority power decreases the length of time to finish assignments.

Authority Power = 1

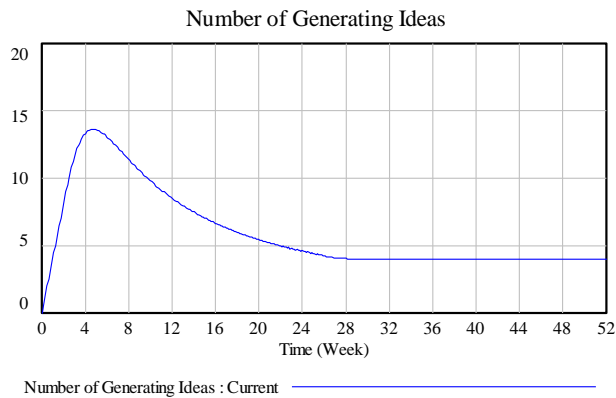
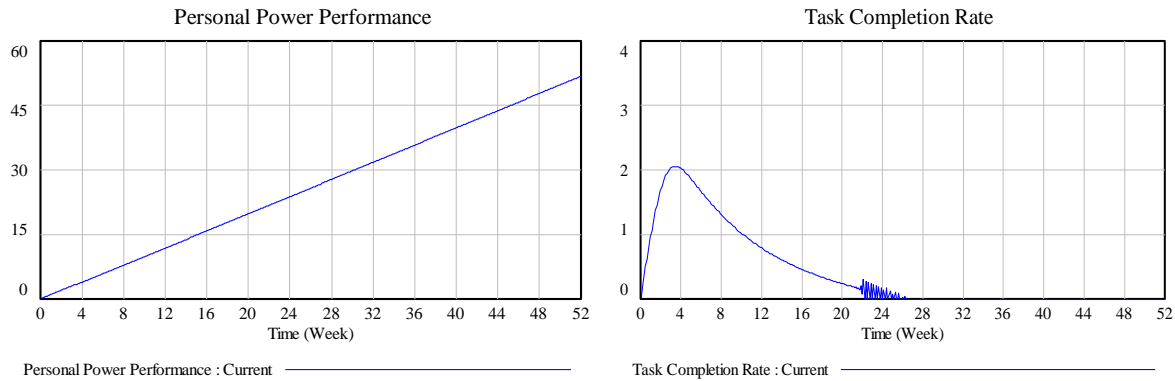


Authority Power = 3





Authority Power = 5



4. Conclusion

Implementing the matrix of change and the system dynamics approach into leadership aspects can provide many benefits. First, the matrix of change helps to increase the understanding of the current and future states, their stability, and the transition between them. Second, the system dynamics model enhances and promotes better visibility and insight to leaders or people on a management level since the model captures the essential leadership attributes. Third, the model articulates the cause and effect relationship between variables which then helps leaders or high level personnel to better understand possible unintended consequences in an organization. Finally, the model represents a holistic viewpoint of leadership. It can explain that a leader's behavior or actions significantly impact the organization from both positive and negative perspectives. The model also shows the positive factors of

leadership which can improve organizational learning, as well as performance which usually involves: situational awareness, managing organizational strategy and crisis, empowering, system thinking, empowering, knowledge, networking, motivating, and innovating. In addition, as we have found, a high degree of authority and power has a positive impact on personal power performance. As a result, the matrix of change and the system dynamics approach are excellent tools to evaluate complex system behavior.

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