

# INNOVATION AS A SCIENCE

*In search for an answer, one would grope his way through a dark labyrinth - he may either find something useful, or hurt himself when bumping into a wall. Another would take a small flashlight along to guide him on his way. And that would shine brighter and brighter, turning into an enormous light source, which would leave not a spot unlighted or unexplained. I am asking you, "WHERE IS YOUR FLASHLIGHT?"*

**Dmitri I. Mendeleev**

## INTRODUCTION: Why Innovation?

Innovation is the hottest buzzword in the business world, and for a good reason. After all, innovation creates a new value proposition, which is responsible for the customers' purchasing decision that, in turn, leads to either success or failure of an enterprise.

Moreover, if history is any guide for us, innovations that offer unique and meaningful Value Proposition to the marketplace (the "Right" Innovations) enable their creators' growth and prosperity even during tough economic times (Fig.1)

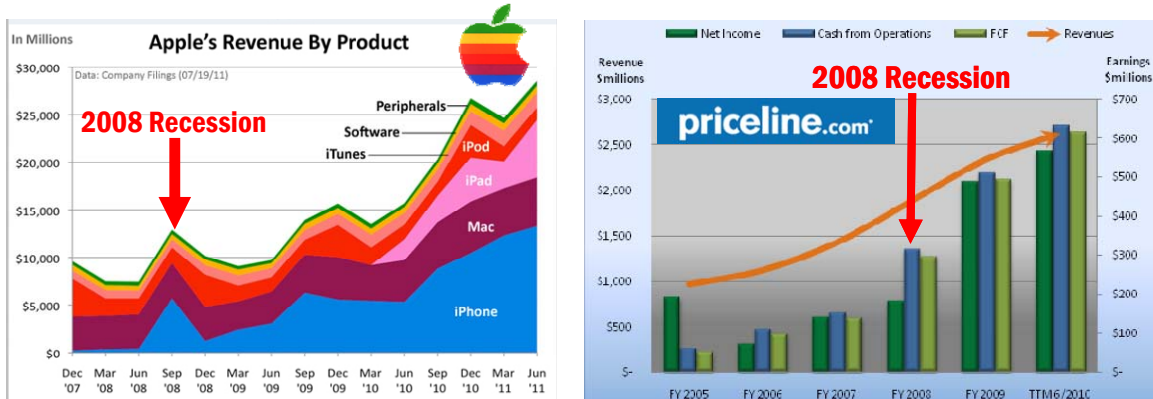


Figure 1. Sales revenue charts for Apple and Priceline.com

## PART 1: The Innovation Challenge

It seems that the prescription for success is simple (even primitive): innovate and enjoy the fruits of your labor! However, statistics does not support the notion of simplicity. Moreover, not only is innovation complex, but also it is extremely risky. For example, according to a study by Harvard and Deloitte, the probability of an innovation project to create a profitable new market offering are below 25 percent (Figure 2) while the likelihood of an innovation to generate financial growth

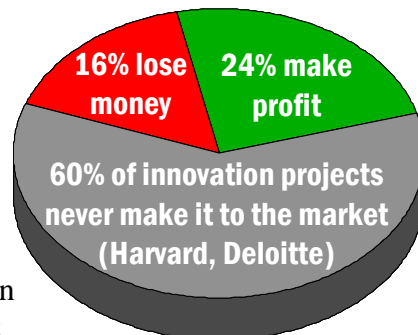


Figure 2. The probability of an innovation project to create

are below 1 percent, according to a study by Frost & Sullivan. For comparison, the odds of winning in a roulette game in a casino (while betting on a color) are significantly higher (48 percent), but the players still lose in the long run, as the odds are stuck against them. It comes as no surprise that with chances of winning being very low, companies are very cautious because forcing innovation and failing continuously will lead to waste of the precious resources and, as a consequence, to their premature demise.

## PART 2: Science as the Only Plausible Solution to the Innovation Challenge

It is only natural to assume that the challenge of risk reduction associated with innovation is not new, and many tried to address it. Indeed, there are literally hundreds of processes, methodologies, and techniques (e.g. brainstorming, synectics, chains of associations, morphological analysis, etc.) pursuing the goal of improving the process of creating innovations. The overwhelming majority of them are based on the fact that creative ideas happen in the brain, which is why they are designed to boost the brain activities.

However, despite the global efforts, lack of understanding of how the brain truly creates ideas has failed to achieve better results. Moreover, the market data indicates that the situation even deteriorated further with the globalization of competition. For example, (<http://knowledge.wharton.upenn.edu/article.cfm?articleid=2523>) in 2000s the lifespan of market leadership (S&P 500) decreased to 15 years vs. 75 years in 1937. All of this allows us to conclude that the attempts pursuing management of serendipity are futile, and that we must look for a fundamentally different approach if we seek radically different results.

Not only is an alternative approach possible, but also it has been well known; it is called science. With the advent of a scientific theory in any field, the risk of a failure always drops, which breeds success. As an example, as reported by the St. Jude hospital, the Figure 3 shows the progress in the rate of non-recurrence of “liquid” cancers (lymphoma, leukemia, etc.) in young children in 5 years after initial treatment: from 9% in 1960s to 71% on 1980s with the latest numbers (not shown on this chart) exceeding 90 percent.

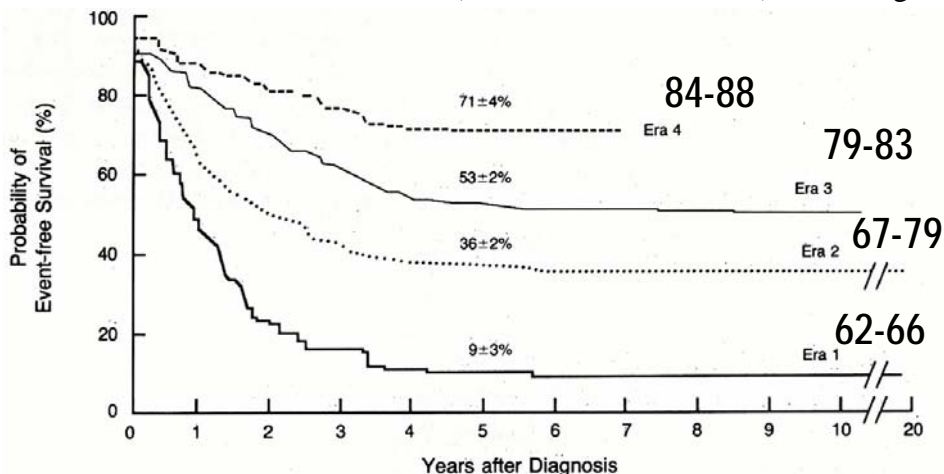


Figure 3. Progress in “liquid” cancer treatment due to the science advancement

With innovation being just another activity (no better/worse than treating cancer, or navigating ships, or building communication networks, etc.), we can confidently conclude that the emergence of a scientific theory will significantly reduce the risk of failure and drastically increase the success rate as well as improve other Key Performance Indicators.

### PART 3: The General Theory of Innovation (GTI)

With the above considerations in mind, in 1988, the author embarked on building a scientific theory of innovation, which resulted in what is now known as the General Theory of Innovation (GTI). Instead of studying how the innovators' minds produced winning ideas (it is extremely subjective), the GTI foundation was an analysis of how products and services evolved (an objective process) and how the Value Proposition changed (again, objective) as a result of introducing innovations in their respective fields. The analysis revealed what made company's market offerings succeed or fail in the course of time. In addition, the analysis identified time-tested universal (across the industries' boundaries) "principles and formulae" that enable the creation of game-changing unique innovations virtually on demand.

Moreover, the analysis indisputably showed that despite all the seeming dissimilarities, the process of evolution of man-made systems is not random; it has underlying logic and a predominant direction. When new offerings move along this direction ("evolutionary obedience"), they have much greater chance to succeed than those that do not. Basing one's decision-making on this knowledge of this predominant evolutionary direction is important for achieving better results. Moreover, knowing this logic enables reliable forecasting of the future evolution of products and services, which in turn, enables creation of superior offerings resulting in competitive advantage and growth.

Let us consider one of the GTI "evolutionary principles" that has a high probability of generating advantage and subsequent growth. It is called "The Transition to Multi-Functionality." Its essence is in absorbing ("stealing") functionality of other systems, which creates an increase in Value Proposition resulting in the competitive advantage for the "multi-functional" systems (and producers) and disadvantage for others.

The principle can be easily illustrated when considering the emergence of the "Smartphone", which absorbed the functionality of calculator, alarm clock, watch, camera, video camera, PDA, portable game consoles, MP3 player, book, voice recorder, GPS device, pager, stopwatch, and the list grows daily. Because of increased functionality, the Value Proposition grew immensely, which led to growth of the Smartphone producers such as Motorola, Nokia, and Erickson.

Examples of other systems that succeeded while utilizing the "Multi-functionality" Principles abound. They include such products as a printer (copy/fax/scan), knives (with tools), gaming consoles (with movies on demand), price tags (with built-in security); airplane seat cushion (also serving as flotation devices); automotive seats (with safety,

security, and other features), rear view mirrors (with navigation, time and other info), light fixtures (with integrated fan), and many others.

How can one leverage this knowledge to come up with future game-changing innovations? For instance, if you are a TV manufacturer, you can surely increase the Value Proposition of your products by including functions currently executed by other devices. A TV set can incorporate the functions of a game console, computer, wireless router, and many others eventually becoming "the house CPU," controlling other peripherals such as refrigerator, furnace, AC, security, watering system and many other home-related essential functions. While many companies can benefit, Sony is perfectly positioned to execute these changes, as it is present in many of the market segments and has the required expertise. As for the consumers, they will benefit by buying just one system instead of many, which assures the producing entity's advantage/growth.

I would like to preempt potential questions and point out that not any combination will succeed. For example, a mechanistic combination of any functions should not be practiced, as it is not a good idea. However, GTI, as a theory, has the rules on how to combine the functions to increase the evolutionary chances of success, but their detailed discussion is impossible here due to the format of a short article. Besides, GTI has many applications, processes, tools and rules/formulae. I sincerely hope that the thoughtful reader understands these limitations and will rather enjoy the proposed approach novelty and the fact that it possesses the instrumental power.

Finally, yet importantly, as with any scientific theory, GTI can be (and has been many times) effectively and efficiently taught. This standard feature for any scientific theory makes adoption of GTI, its broad range of applications, processes and tools a low-risk proposition for those innovation practitioners who strive to improve their skills and arsenal. I firmly believe that mastering the General Theory of Innovation and its set of tools will enable innovators worldwide to succeed in building their Sustainable Innovation capability, thereby bringing a unique and valuable contribution to their respective organizations' long-term survival and prosperity.

### **Key "Take-Away" Points**

- Innovation is the primary means of creating and sustaining growth.
- Innovation is very risky because we do not control the process of coming up with unique and meaningful concepts. The probability of an innovation to create growth is below 1 percent. As long as the probability is not improved, growth cessation (and eventual demise) is unavoidable.
- The only plausible way to drastically improve the reliability of any process is by applying science.
- With the emergence of the General Theory of Innovation (GTI), the only prescriptive scientific theory of innovation, the odds of growth creation can be shifted to favor those firms that apply it, especially comparing the odds with the uninformed rivals.