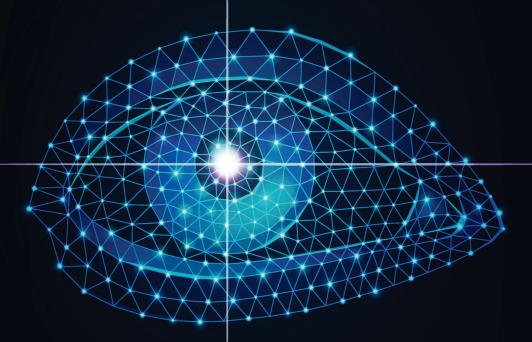


Bangalore Chamber of Industry and Commerce Volume 6 | December 2022







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Product Design - Digital Twin Mr. Rabindra Sah Chief Engineer Tata Technologies of the second of them. Then the second of the second of them. Then the second of the second of

igital Twin in product design primarily refers to the digital design of product and developing its Digital MockUp using engineering software. Product includes system, sub-system and components. This product includes assembly, sub-assembly and parts from multi-disciplinary domains like mechanical, electrical, electronics, civil, architecture and many others across the industries.

Industry uses their best practices for efficient design including feature based, parametric modeling, geometric constraints, template-based design, geometric dimensioning, tolerance and many more. This is applicable for any enterprise level manufacture like OEM (Original Equipment Manufacturer), Small and medium enterprises, Start-ups & Tiers.

It also includes developing Knowledge-based engineering (KBE) application. In this, an application is created to automate design of product based on knowledge built using Design Manuals, Engineering Method, Material Specifications, Engineering Standard and Experience of Engineer

Nowadays, CAE (Computer-Aided Engineering) led Product Design is followed as integrated approach and methodology on Single and collaborative engineering software Platform. It enables faster completion of design iterations and then validation using CAE. CAE uses software tools to improve performance, optimization and validation of product design. Primary CAE analysis is carried on 3-stages: pre-Processing, solver and post-processing. Nowadays, CAE software uses Artificial Intelligence (AI) to design and iterate faster to finalize design

There are various types of analysis carried like – Linear Static Analysis, Non-linear, Fatigue, Modal, Dynamic Analysis, Optimisation, Stiffness Analysis, Service Level analysis, Durability, Multi-body dynamics, Computational fluid dynamics, Crash & others

Above aspects contributes to building Digital Twin in Product design. We may also call Digital twin of Product Design and Product validation independently based on context of usages and need. Adding more and more, functionality and features, makes higher level of Digital Twin in product design.

Digital Twin leads to Physical product developing.







Circular Economy is the Way Forward for Human Race

Prof. Seeram Ramakrishna

Director of Center for Nanotechnology and Sustainability, National University of Singapore

Human race is thriving on planet Earth, only known abode in the vast universe! The United Nations (UN) indicated that the total human population reached 8 billion on 15 November 2022, and slated to reach 10 billion by mid-century. It is insightful to note that the human population was two billion about a hundred years ago; 300 million in 1 A.D; and the modern Homo sapiens appeared about 50,000 B.C.

Another side to the same coin i.e. thriving human beings are degrading the Earth's nature. As per the UN Convention to Combat Desertification up to forty percent of the Earth's land area is degraded by deforestation and erosion. Earth's nature is declining at unprecedented rate, and threatening the sustainability of human race. Nature provides essential services such as pollination for crops, water, food, energy, and carbon sequestration. Organization for Economic Cooperation and Development (OECD) estimates that the nature services are worth up to \$140 trillion which is much more than the \$ 96 trillion world economy or global gross domestic product. Hence, humans must not take the nature for granted and make transformative efforts to regenerate and sustain it for themselves and future generations.

Earth's nature is a circular system. It operates like a circular economy wherein everything becomes a source for something else. It maintains equilibrium among the non-human systems via reusing | repurposing |regeneration. In order to satisfy own needs and demands, humans devised linear economy approach wherein resources from the nature are taken, manufactured, used, and discarded. Since the industrial revolution in 1765, humans vigorously pursued linear economy so as to benefit in terms of productivity, time-efficiency, cost, aesthetics, and convenience. Speediness of linear economy is prized over the slow processes of nature. Growing consumerism worldwide is gratified with the linear economy. Damaging effects of linear economy on Earth's nature is becoming increasingly evident. They include accumulation of pollution and solid waste, erosion of land, biodiversity loss, resources depletion and associated cost increases, contamination of food chain and water, and adverse effects on human health. Only way forward for the human race is to emulate nature and pursue circular economy, which is an economic system that uses a systemic approach to maintain a circular flow of resources, by regenerating, retaining or adding to their value, while contributing to sustainable development. In other words, the circular economy is tighter-loop systems which target towards zero waste and pollution throughout material | product life cycles. This can be understood from the example of ubiquitous electrical and electronic products without which the thriving digital products and services underpin our modern living cease to exist. Circular economy approach for this sector reduces the need for extracting virgin raw materials from the nature. Singapore introduced Extended Producers Responsibility (EPR) in 2021 under the Resource Sustainability Act. Makers and suppliers of laptops, personal computers and smart phones are required to collect 20 percent of the weight of devices they supply to the market for recycling. Higher target 60% is set for large appliances such as TVs, refrigerators, and display systems. Circular economy approach also involves reducing, repairing, remanufacturing, repurposing, new business models and durability, which help to reduce the overall carbon foot print. Diverse economic sectors such as textiles, plastics, cement, steel, aluminium, food, agriculture, energy, infrastructure, buildings and decoration, transportation, trade, finance, sports, recreation, entertainment, cosmetics, healthcare, and culture could leverage the benefits of circular economy approach. Circular economy approach can be practiced by an individual, family, community, society, institution, organization, economic sector, region, and country. OECD, World Economic Forum, World Bank, and Ellen McArthur Foundation (https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview) forecast economic growth opportunities and millions of new jobs.

Awareness leads to new mental frameworks and models. Better leadership practices at the personal level as well as organizational (family | group | community | society | institution) levels, emerge when a person's mental frameworks and models are updated, refined, and well-considered. Circular economy is a new mental framework, and should be embraced for the progress as well as survival of human race on planet Earth! In nut shell, a good stewardship involves circular economy mindset in all endeavors at all times.







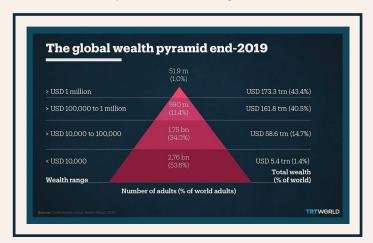
Distributed economy and sustainable way forward

Mr. Nanjunda Palecanda

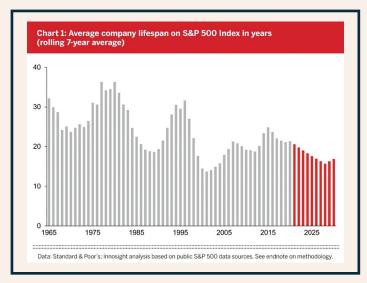
Founder and CEO, Nija Venture Impcats

Since the beginning of the 1600, World saw the fledging of the Globalised economy from Slavery to consolidation of native lands to grow alien crops to massacre of local culture, knowledge, arts, artisans, faith, languages. This saw the evolution of weapons of mass destructions from one to many simultaneously to the destructions of cities or communities triggered by an action form thousands of miles away. Humanity, controlled by few individuals in the name of faith to Godmen to Kings to elected representatives – that kept majority away from any knowledge which was an entitlement of the few in the power earlier – found voice in Digital devices from what they can know, to read to publish to sharing anything with anyone.

Since then, visible Power structures have changed. Nation – States administration have changed. Politics has changed. Many currencies have come and many disappeared too. Borders have changed, expanded or merged and redrawn to create new Nations. World faced Wars, Famines, Tsunamis, Financial Meltdowns and even global Power centres changed in these four and half centuries. Modern world saw the highest migrations and perhaps it's understandable considering the population has grown over 15 times since 1600 to now. While Less than 1% of the world Own and control 43% of the World's wealth, bottom 50% of the population owns 1.4 % of the World's wealth. We have learnt to segregate the world as full & flawed democracies & hybrid and authoritarian regimes.



World recognised 86 individuals for their contribution to economics with Nobel since its inception. 40% of fortune 500 companies don't exist beyond 10 years. Among these companies except those coming from China and some of the Middle Eastern Countries, where in the government can take away all the wealth from the Individuals and companies in a flash, have so much wealth that can still dwarf some of the most developed countries' (not just the developing countries) economies. Despite all the changes the world has undergone and population explosion and strain on the planet and so much of Technology advancements in every possible sector, wealth and value remains with far few companies and individuals across the globe. What is sustaining the inequality of this magnitude despite all the changes?



Much of the World population has been governed in Socialism and this has contributed to more poverty in those countries. One third of the world population for major part of last century was under communism and sustained arm race and millions of people being killed in the process and much of the killing was of their own Nationalities. China did manage to pull good population above poverty but at what cost? Last decade across the globe world saw a revival of Nationalism. Some major countries have leaned towards becoming Authoritarian or semi authoritarian and the majority of their population have accepted them and have even encouraged in large numbers. All these political changes have impacted in demonstrating Nationalising of large enterprises or corporations, or their wealth in these authoritarian countries, but the value has not really reflected in the wealth creation of its citizens.



Article 02





Last few years of talking about Distributed Economy had only amounted to education of many but adoption still had to wait for the pandemic. It was 2020, which set the world to stop and rethink. All the negatives of demonetisation in India seemed to have setup a foundation for the explosion of Digital economy. While, all the Pyramid economy models were the first to start taking the advantage of Digital economy, they obviously kept away from the 'Distributed Economy'. So, What is Distributed Economy?



There are a few definitions, if one chooses to Google, and here is how we would like to define it: An economy where in every individual and or Enterprise who contributes to wealth creation (Sustainably), not only get a share of the wealth created through their contribution but also gets to enjoy the collective value generated out of that effort.

Many confuse it to be same as a co-operative model. Perhaps, it is being human, we tend to relate anything to our past experience or knowledge. This perhaps is the closest but again, this has sustained livelihood of the contributing individuals and entities but not really in getting them to enjoy the collective value of the effort entirely. Some even assume it to be Circular economy. While, Circular economy is an evolution of Industrial economy driven by the concept of Productivity, which invokes the innovative abilities of the individuals measured on productivity to minimalism, reuse and reduce waste. This is essential for the large corporations and people from developed nations, who approach the world and its resources with a sense of abundance and entitlement. But, this can be a great start for large corporations to get started in their journey towards Distributed economy.



Various Business models have been in practice particularly since the dawn of the Digital economy. Digital economy began with the first phase of Digital Computer application in late 1930's it took almost 4 decades for them to start getting into homes in the second phase. In the third phase came the Internet era that almost got much of the world connected. It is the fourth phase that saw the transactions in multitudes happening on phones and smart devices, which is now. While this opens up a huge opportunity for Businesses to engage in various Business models, Ventures did come up with inspiring models and so much so that much of the new wealthy and powerful in the world owe it to their unique models working with in the fourth phase of the Digital economy era. But, so much for the models the

Businesses have managed to create incredible wealth while all of the value has been realised by the few founders and the investors only.

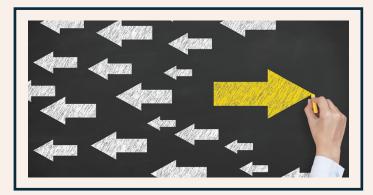


Uber had reached a high of \$82 billion in valuation and the highest a Uber driver ever made is little less \$24 an hour, which will not cross \$60K in a year without considering the extra hours. The platform based business models delivering convenience to consumers, and customer access to Businesses, on an asset light model sustained livelihood for many but all the value has been exclusively for the

founders and Investors. Businesses like Amazon, Google, Facebook have gone on to capture the consumers data while facilitating the Brands to use those data for a fee to sell their products and services. The value they have created out of the users data and influence they have been able to generate based on that is far greater than the most powerful armies across the world. Even, when Businesses who have taken all the risk and investments such as Hotel owners, have been able to create huge value for Businesses like OYO at around \$9 billion.



Many of the Technology ventures started Employee Stock Options and obviously its effective on going IPO. But this was a big step and at least it did provide an opportunity for the Founders to share the value with its employees though not all of the stake holders. This largely remains a practice among the Technology companies only so far. But this demands going Public and then, much of the value is realised by the investor community rather than all the stake holders responsible in creating the Value. Going Public has lot more complexities, and even though there are SME exchanges, fundamentally the decision to go Public is not really about sharing the collective value with all the stake holders but just about getting more access capital and also about realising value for many of the early investors and share holders.



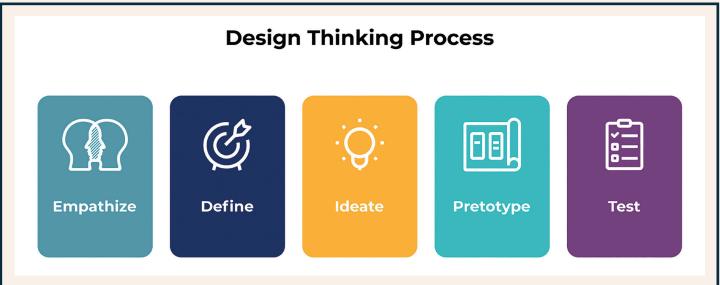
Here is our opportunity to change this all. Create opportunity for individuals and businesses to work to sustain their livelihood, create wealth and generate value, huge value and also get the share of the collective value each one has contributed to in building. A truly distributed economy, not just in theory but in practice. Not just in goodwill but also in deed. This is to invite every Individual and Enterprise who wants to be part of the Distribute economy model, which is about creating wealth for each of us and sharing the collective value among all of us. Every good effort starts with good intent, every collective effort ensures wealth creation and every wealth creates better value and every value is better realised collectively.





Design Thinking: Is it totally New tool?

Mr. Prakash GChief Operating Officer, ACE Designers Ltd



Now days we find plenty of skill training and advertisement about various topics and each one service provider is aggressively marketing and following it up with any potential customer (student). I did search out many topics and one such topic which interested me was Design Thinking. So, I further explored it and searched many blogs and website. The options are plenty and you only need to have patience to go through all. Nevertheless, I stopped searching and hooked on to one of self-paced learning program from Udemy while I parallelly worked on other programs.

In one such program I spent nearly 5 hours to go through all the modules and in the other I spend about 4 hrs. to understand the details. Both I studied as if I did not know anything about design thinking. After going through and investing 10 hours of time and few hundred Rupees, I understood that it is one such tool for problem solving with people / Human centric approach. The user is at the center of entire problem solving throughout the process .

Some methods advocate 5 steps and while other indicates 7 steps

Understanding customer needs			Design Solution			Impact
Step 1 Business hypothesis	Step 2 Customer Perspectives	Step 3 Design Challenge	Step 4 Ideation	Step 5 Prototyping	Step 6 Testing	Step 7 Impact delivery
Step 1 Empathize		Step 2 Define the Problem	Step 3 Ideation	Step 4 Prototyping	Step 5 Testing	

While each steps have a detailed procedure on how to carry out the activity to arrive at meaningful conclusion, there is one thing common which I notice is that each step requires more than one person which means it is a teamwork. The composition of team is crucial in the success of the DT (design thinking Project).

Understanding the Customer needs and pain points will almost bring you closer to defining the problem which may consists of the following steps.

Establish the need to solving the problem.

2 Define the success of solving the problem

Above steps will also support in arriving at the business hypothesis, various customer perspectives and the design challenges.





While learning these techniques, I find lot of similarities with other globally accepted problem-solving tools such as 7 steps of QCC, A3 problem solving methodology, DMAIC. (QA3D)







Interestingly DT and other methods can complement each other. For example, DT step 1 of empathizing to understand the customer needs requires that one needs to actually go to the Gemba or the real place where customer is facing difficulty or has needs or problem to be solved. This will help is defining the problem more clearly and also magnitude of current condition. The DT tool of using empathy map may come in handy for defining the problem. The difference is that globally accepted tools demand that all qualitative problem be converted into more quantitative ways so that the impact of solving can be assessed at the end of the project.

DT uses extensive research methodologies to collect the user needs, pain points so that the problem is understood without any ambiguity. Some of the quotes which supplements this: "A problem well defined is half solved "and " If do not verbalize the what you intend to convey , you are most likely to end up doing opposite of it ".

In the entire process of DT, the most commonly used tool is 5W and 1H (Why, when, what, where for whom and How) as a reiterative process to confirm to the direction of solution.

Another similarity I find that in A3 problem solving tool, it always starts with ultimate goal which is generally linked to or part of vision and mission which in DT step is considered under the business hypothesis such as Revenue, Customers, Innovation, Margins, Employees, Social Responsibility.

The global Problem-solving tools (QA3D) can borrow the ideation method of using transformation tool and brain writing tool to generate maximum ideas and later arrive at the most effective one for developing prototyping.

I must admit that prototyping step is the most unique step which is not explicitly mentioned in QA3D but generally it is practice that the solution is tested initially in a pilot or model area / process and checked for its effectiveness before full scale implementation.

Finally, the last step of Impact delivery can be compared to the step of checking the effectiveness of the full-scale implementation of the action

taken and solution provided, taking reflections, and making suitable recommendation for next round of improvement.

Overall, I found most problem-solving steps of DT and QA3D are very similar in nature with ultimate objective of delivering value to customer and the business. While the global practices QA3D are focused on system, Process, Products, People, the DT on the other hand tries to work around the human centric problem solving.

With above explanation can we safely conclude that Design thinking applied to business

A3 Problem solving for organization

QCC 7 steps for organization.

DMAIC applied to organization



Here I have tried to explain the similarities and uniqueness of each of the problem-solving tools. I hope the reader and learner will find it useful and will relate to their own problem-solving environment.

Readers views and comments are welcome.

Mr. Prakash G,

Chief Operating Officer, ACE Designers Ltd

Note: Views and contents of the article are that of the author only and not of the organization represented by him.





Fallacies, False Thinking and Business Failures

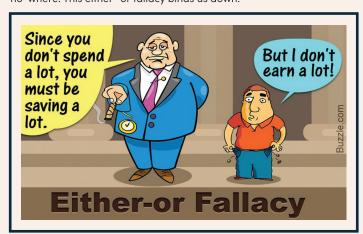
Dr. Krishna Kumar N G

Ph.D Business Coach, Mentor and Trainer

We can define fallacies as fake or deceptive arguments. They have nothing to prove but create a false thought. Sometimes they unfortunately have good persuasive powers although they are superficial and are a false narrative. We should be able to identify and unmask such arguments which may inadvertently lead to unwanted acrimonies. Let's see at few of the fallacies and understand how they effect our business.

Either - Or - Fallacy

We sometimes get caught in this fallacy. We are not clear what our business should stand for. For example we declare our business as either to be the best in class product manufacturers or be a best in class marketing company. By pursuing this argument we miss out on organisational development and get on a slow growth road leading to no-where. This either- or fallacy binds us down.

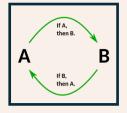


Hasty Generalisation

We tend to make some decisions and or create false images based on insufficient data. We then proceed to take actions on this argument. This may lead to wrong results and embarrassing situations. We see large number of people attending a political rally but this does not mean that the people attending the rally like that leader or will vote for him in the elections. Similarly in our organisations we sometimes tend to think that guys who come out of Govt Schools are not bright. Sometime they may surprise you with innovative ideas. We fall for the trap of hasty generalisation fallacy.



Circular Reasoning Fallacy

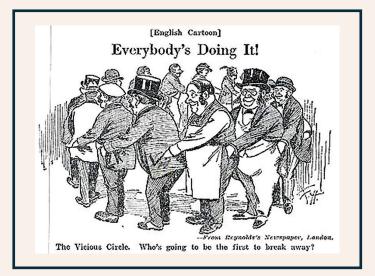


We regularly fall prey to this fallacy. Knowingly or unknowingly. We believe that for a quality product we have to pay a higher price. We also believe that because the price is higher the quality should be high. We tend to push this circular reasoning on to the customers. Some how this does not make sense anymore. Why should this concept hold at all. An alternative competing product / service will come up and

suddenly shatter your business because they are giving a high-quality product at a competitive price and hence if A, then B or If B then A does not hold any water. You don't know what to do. Let's consider that you are forced to reduce the price then the customer perception may change and they may think that you have reduced the quality and so they will reduce buying your product or service.

Band Wagon Fallacy

This is also known as social proof false thinking. We tend to follow what many others are doing for no specific reason. She is doing, he is doing so why not I. Some time back we had a situation where in the tomato and onions growing farmers were making more money so many more farmers jumped into growing onions and tomatoes. The subsequent season the prices fell down badly and all these farmers faced tremendous loss. Similarly, many people jumped into the real estate business while few succeeded many others lost. Engineering colleges were making money so hundreds of more engineering colleges started. We know their fate now no need to elaborate. As a business person and entrepreneur, you should be careful before jumping into a new or different business. Don't follow the band wagon.



Ad Hominem Fallacy

Also known as abusive fallacy. Instead of arguing about the subject, we divert the argument towards the personality of the person. We make it a personal attack. He is dark coloured we can't trust his arguments. He comes from south so his knowledge levels will be low. Now such statements make no sense. But in the business context we tend to think that a junior or subordinate can't be a good manager because she is of colour or because he studied in a government school. In a meeting if a person raises a point of discussion instead



of understanding the point, we like to shut him down talking about his personality rather than talking about the point raised. How many times have we not fallen for this fallacy?





Sunk Cost Fallacy

This is an omnipresent fallacy. We inadvertently invest in something which turns out to be a money draining investment with no positive results. We invest more in the hope that the positive expected result will come out. We pour good money after bad decisions. Smart business owners quickly leave and shut down the bad decision money loss investment and move on to something more viable. These two pictures given here convey more than the words can. Psychologically we pursue the wrong decision with hope of a promised reward which is not in sight. Better to get out early when we smell that thing is not working rather than spending more money, time and effort on it. Why do some of us still follow the sunk cost fallacy? We believe that quitters are not winners. Better to quit fast before you lose all. Bosses feel that if they quit and admit the mistake then the people will think lowly about the boss. They live in a false hope of sense. So, be careful about the sunk cost fallacy. Don't deceive yourself.





False Thinking

Social Loafing – A thinking that the teams deliver much more positive results. Teams do deliver more than the individual but as a team the total out put is not equal to the individual's output times the number of team members. Few will work hard while few others will hide behind them and show off. There's dispersion of responsibility and risk shifting takes place. Not all members in a tug of war pull the rope with equal strength will you agree to this? What's your experience?





Plenty of research has gone in by many well-known professors and psychologists on fallacies and false thinking. There's no specific or general reason that can be attributed to say why business people can't avoid them and operate their businesses much better. For some unknown reasons they tend get into these traps resulting in business failures. Some of you may be able to relate to few of these fallacies and the false thinking and ponder where you would have faulted or would have avoided the traps.

If you have any feedbacks please let me know.



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