

AI & CoE

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Abstract: Artificial Intelligence or AI is being positioned as the panacea for all organizational problems; while Centre of Excellence or CoE, which is distinctly different from Research and Development activities helps organizations in their pursuit of higher revenue and profit. In this paper, the researchers have analysed the growth and importance of each of these two concepts – AI and the CoE; and have worked towards putting them together for creating a unique combination which shall benefit the organizations and hence the economy at large. In the process, a framework is provided for companies to improve, innovate, optimize, and eventually automate their management systems while making the core-competencies of their business AI proof. It is hoped that through this framework, organizations will be able to create a substantial impact by improving existing capabilities and actively creating new strategic resources in the interest of all the stakeholders.

Key Words: Artificial Intelligence (AI); Types of AI – narrow, general and super; Centre of Excellence (CoE); Cloud Computing; Machine Learning; Deep Learning; Robots.

I. INTRODUCTION

1. The Age of AI

The idea of creating AI has become a reality in the past few decades, but the possibility of it has been contemplated by ancient Greek philosophers and inventors for centuries. (Pamela,2004)¹. The ancient Indian school of Charvaka is believed to have thought of Artificial Intelligence as far back as 1500 BC. (Shin,2019)².

2. Automation in manufacturing - Robotics

UNICEF runs several bids for the supply of medicine over a ten-year period wherein pharmaceutical companies from all over the world compete. A small family-owned company in the Swiss Alps called Rivopharm offered a price that was too low to be true; below the cost of the raw materials. Suspicious about the company, UNICEF sent one of their emissaries Dr. Hans Rosling to investigate the matter. Dr. Rosling was baffled when he was picked up in a limousine at the airport and driven to one of the finest hotels in the city. The next day while touring the facility of Rivopharm, Dr. Rosling made his suspicions clear to the manager. His interaction with the manager astounded Dr. Rosling to see a reality that was the total opposite of his prior inhibitions. In his book titled Factfulness – Dr Hans Rosling³ mentions how with the help of Robotics and effective usage of ‘playing the float’; this has been made possible.

3. Finance

These days, stock exchange floors are surprisingly quieter than they used to be earlier. According to a 2017 estimate, algorithms were responsible for 70% of the overall trading volume⁴. A 2018 report from JP Morgan⁵ suggests that traditional stock-picking only makes up 10% of the total trading volume. Analysts⁶ are now even blaming machines for the drastic changes in the stock market conditions. An article on Quartz questioning why robot-traders have not completely replaced human traders on the NYSE stock floor mentioned: "One reason to keep humans around is, indeed, showmanship"⁷. AI will also play a central role in the new and emerging market of Fintech that is poised to disrupt the Financial industry.

4. Other applications

From driverless cars, urban public transportation, and heavy-duty cargo ships to military and commercial planes and drones in the sky, AI will drive the future of transportation.⁸ In the workplace, AI has applications ranging from hiring people, acquiring and managing customers, administrative processes, analysing work habits, to even designing the project schedules and assigning individual targets. IBM is at the forefront of developments in AI, and yet in the last few years, they made some major layoffs within IBM's Watson division.⁹ Some believe that the reason for this is that IBM over-promised results on platforms such as Watson Health that did not match people's expectations.¹⁰ IBM is not hitting the breaks on its vision of AI in everything. The objective of this paper is to urge companies of all types and sizes to actively work towards an AI strategy. Furthermore, the AI strategy must be pragmatic and ambitious at the same time in order to create a long-term competitive advantage.

5. Present adoption of AI

In a McKinsey survey of 1300 CEOs in 2016, only 20% of the companies are presently using AI in a productive manner. A shocking 41% in that same survey is not certain about the benefits of AI. As discussed in the book ‘Robot-Proof’; by using AI, humans can focus on higher level tasks such as creativity, entrepreneurship, critical and systems level thinking, and cultural agility, making the routine and

¹ Machines who think – Pamela,2004.

² Blast from the past...-Shin,2019.

³ Factfulness (2018) - Dr, Rosling, Hans.

⁴ Statista (2018)

⁵ J P Morgan estimates – Cheng (2018)

⁶ Stock Market estimates – Harwell (2018)

⁷ Detrixhe,2017.

⁸ Experfy,2017 – Future of Algorithmic Trading.

⁹ Strickland,2018 – Layoffs at IBM Watson division.

¹⁰ Mearian,2018 – Overhype of IBM Watson.

repetitive tasks of everyday work life redundant.¹¹ The promise of AI is creating a work environment where people can focus on things that truly matter.

6. CoE & Management

In this section, we try to explore the relation between a CoE and the Management of an Organization. We shall also investigate how AI fits into this, and what is the connection between the Management, a CoE and AI. At the onset, it may be mentioned that a Centre of Excellence (CoE) is one of the existing working units in an Organization which leads by example and helps other units in achieving their excellence in their chosen areas. *'The main goal of a CoE is to help an Organization improve its expertise in a particular area and make the most of its resources.'*¹²This will help in overall profits of the Organization and hence benefit the Management.

7. CoE – an update

Centre of Excellence (CoE) has come a long way from its humble beginnings. CoE is now a craze among different formats and platforms of Organizations. The benefit and contribution of these CoE's are felt, acknowledged and appreciated. At the same time, it must also be mentioned that there are innumerable cases of CoE's which started with all the right essentials but soon faded into oblivion. It is observed that the missing factor was the lack of accountability as well as inability to see the bigger picture. This has been discussed at length by one of the Researcher in his thesis on the same topic. According to the assurance given by the Honourable Union Human Resource Development Minister Shri Prakash Javadekar to the esteemed Lok Sabha Members in March'2017, there is no dearth of funds for CoE activities.

8. Why CoE's failed

It has been mentioned earlier that despite making a proper attempt with all the right intentions, and even with lots of support along the way by way of Government / non-Government aids /grants; some CoE's nose-dived and faded into the oblivion. It was also briefly mentioned that it lacked accountability. The Researcher had carried out an informal discussion with some senior CoE officials of leading Organizations and what came out very clearly was that these CoE's although very effective were not enjoying the inclusiveness in the respective Organization from where it operated. The CoE's were operating "in splendid isolation" inside their Organization. The feeling of "we versus them" was quite palpable among the junior officials of the CoE. A detailed analysis reveals that most Organizations have started off with their CoE's in full earnest without the Management having outlined the 'big picture' themselves. The point is not that this was initially not thought through properly; it is more to do with the fact that the CoE was under-estimated, it's SMR's not clearly identified and linked to the Organization's SMR's. The CoE's were enjoying the status of a new project in isolation. The way forward is that

CoE must have the inclusive status in an Organization. The activities of the CoE should be linked to the Organization as a whole. The simple equation that 'if CoE grows the Organization grows' need to be established beyond doubt, and this is what will guarantee the success of the CoE as well as the Organization. This research paper proposes a super success combination if CoE is driven by AI in an Organization.

II. PROPOSED METHODOLOGY - CENTRE OF EXCELLENCE (COE) DRIVEN BY ARTIFICIAL INTELLIGENCE (AI) – THE TWO PILLARS

There are three stages of AI systems:

1. **Narrow AI** - Focuses on a single type of task and is very specific to a particular domain.
2. **General AI** - Can work in multiple domains and have cross-functional competence. Replicate certain features of human intelligence.
3. **Super AI** - Machines that are considerably smarter than humans.

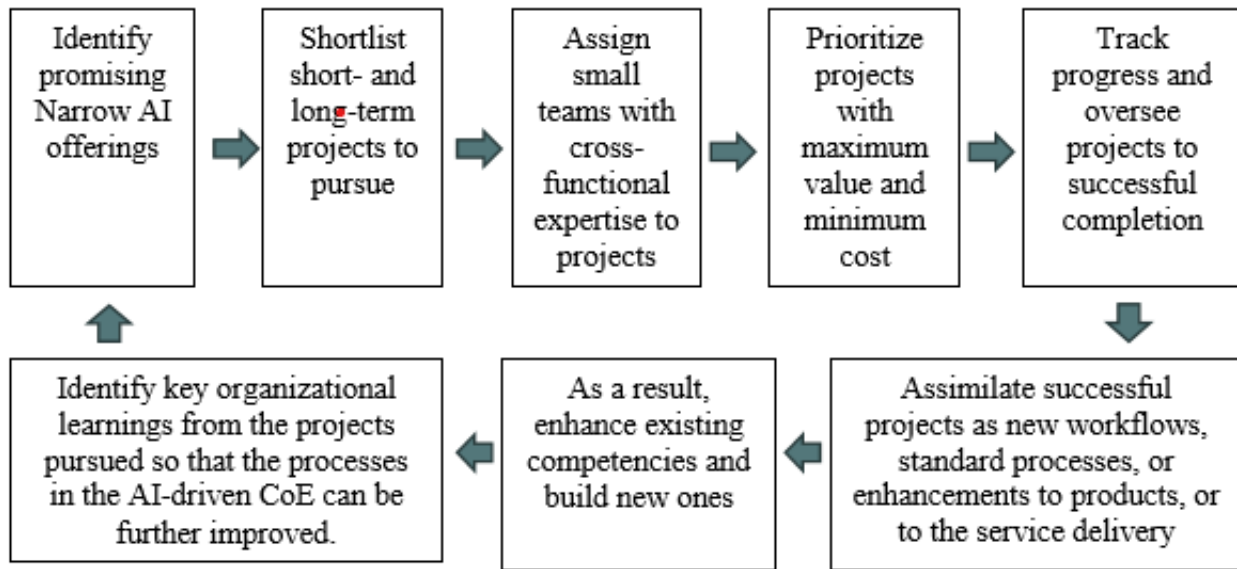
At present Super AI is a very distant dream, and researchers struggle to create even basic systems of General AI, with very little hope for practical applications anytime soon. Narrow AI on the other hand is the unsung hero that is disrupting industries. AI systems designed to trade in securities, identify malpractices, drive cars, control robots in high-tech plants, search through scientific papers and aid the work of doctors and scientists are examples of Narrow AI. It also helps managers and executives make decisions from recruitments to acquisitions, create customized feeds on social media and unique playlists for individuals, and even systems that use satellite images to identify levels of poverty are all examples of Narrow AI. While the word Narrow AI can sound slightly underwhelming, and media coverage often highlights Super and General AI; it is currently the most consequential and important type of AI system. A machine learning system that was designed by computer scientists to detect road side bombers in Iraq and Afghanistan was later used in South Africa to predict the movement of rhinos and identify poaching activity.¹³ It is possible to use a Narrow AI system that works in one domain and apply it to an otherwise unrelated domain or use case. Several industries are seeing this trend and going through radical changes originating from unexpected avenues.

¹¹ Aoun,2017 – Robot-proof.

¹² Choudhury, Ambika: Analytics India (Feb'2019)

¹³ Electric surveillance may save the Rhino.

a. The Block Diagram

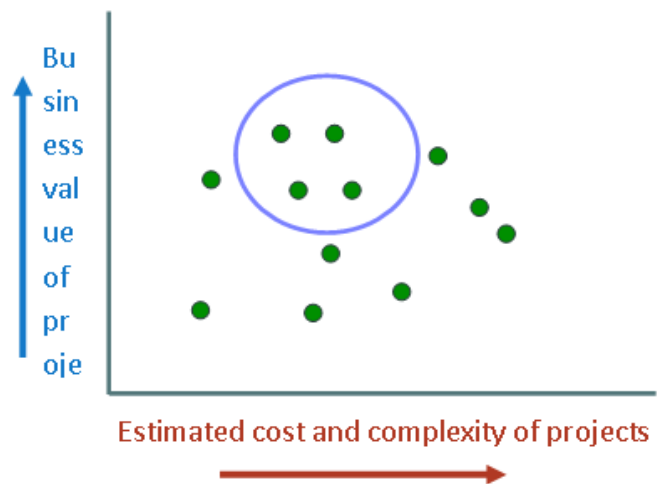


b. The Algorithm

Entrepreneurs and executives must make an active effort to identify the various Narrow AI offerings that exist in their industry for improving operations, identify repetitive functions in the workplace that can use automation, find ways to enhance products or service offerings with the use of specialized AI. It is crucial to actively investigate AI systems used in other industries and domains and assess whether they can be useful in the context of an organization or industry.

The first pillar – “Doing the right things right”

Doing the right things – is essentially knowing which AI projects to pursue and when. Not everything deserves to be automated, at least not at once. A good AI strategy is one that accords the highest importance to **timing**. A logistics company may consider deploying AI driven tools in their warehouses such as the robotic shelves used by Amazon. These **Short -Term Projects** offer immediate benefits like cost reduction and improved efficiency and must be implemented as soon possible. **Long-Term Projects** can include an AI system for investment decisions, a platform that analyses medical records of patients and aids doctors in decision making, or a school deploying an AI system that analyses the learning patterns of young children and acts as a teaching guide. Some of these projects may be open-ended (have a flexible budget and deadline) and some with fixed goals (rigid deadlines and budgets). Long Term Projects are slightly more complex, and a few small pilot runs will help to tweak and improve the solution until it is ready for full scale deployment. Projects can be evaluated using a graph: the y-axis representing how valuable the project is to the company and the x-axis should estimate its cost of development and complexity. **All projects considered must have a spot on the graph, and those with the maximum business value and minimum cost and complexity should be prioritized.**



Doing things right – The common resources and problems across all the projects must be identified and centrally addressed, so that resources can be dedicated to the most important areas of projects. Along the way, several projects will be not work out and despite the splurge of valuable resources will lead to dead ends. Inspiration and success will come from unexpected corners, and odd pursuits will lead to the best results. It helps to keep an open mind and consult experts who understand the impediments, shortcomings, and realistic possibilities of AI systems. A cardinal benefit of technology is that it democratizes opportunities of business; AI is no exception to that rule. Rivopharm, the small Swiss pharmaceutical company mentioned earlier said that “*The big companies’ factories look like craftsmen’s workshops compared with us.*”. An enviable strategic position like this is the result of years of patient experimentation by audacious leadership that understands the future that AI and human endeavour can create. Although not explicitly mentioned, the reference is made to a CoE here.

The second pillar - Cross Functional Expertise

Bell Labs is perhaps the most accomplished research and development centre in the history of the world. Their scientists are credited with nine noble prizes, and famed inventions and innovations that include the first solar cell, satellite communication, cellular communication, fibre optics networking, lasers, Unix, C and C++, and most importantly the transistor. Their theorists are responsible for formulating both information theory and the coding theory, and their astronomers won the noble for validating the Big Bang Theory. What's even more impressive is the ability of this laboratory to produce at an elite level in a very concentrated period of time. In the book *Deep Work*, Cal Newport attributes the historic and iconic success of Bell Labs to the fact that they could make experts in diverse fields work together very effectively.¹⁴ The Bell Labs headquarters in Murray Hill, New Jersey was designed to encourage social interactions between experts from different fields with a continuous structure joined by long hallways. They had created an environment where a linguist walking down the hallway could not help but have social interactions with theoretical physicists and mathematicians. **Bell Labs is unarguably one of the most illustrious Centre of Excellence (CoE) in the world.**

Members from functionally disparate parts of the organization and possessing varied expertise and temperament must be selected for the CoE. They must also possess strong leadership skills and have meaningful social relationships with the people in their respective departments or teams. Most importantly, all the members must be truly committed and even excited about the opportunities that AI has to offer. The CoE must report directly to the CEO (or any top executive). Members of the CoE teams must split their time between CoE projects and their routine jobs. This way the people who are working in the CoE are aware of the problems and opportunities in the organization. Their unique position will allow them to disseminate new ideas, systems, and changes, that are on the CoE's agenda. The only way for the CoE to succeed is to be inclusive, bold, and considerate for the immense change that they represent.

It is the duty of the CoE leadership to actively track the progress of all types of projects mentioned in the previous section and see them through execution, implementation, and acceptance. New ideas and possibilities should not be dismissed without due diligence and consideration. It is of utmost important that the CoE teams should be able to collaborate within themselves and have access to AI experts. It is not necessary that every solution must be created in-house. In fact, many companies like Amazon, Google, and IBM offer AI and Machine Learning solutions as services that are fairly easy to deploy.¹⁵ In recent times, a multitude of companies offer AI services for specific use cases such as hiring, analytics, or problem-solving, for a monthly or yearly subscription.¹⁶ AI solutions built by the CoE teams could use these services, or open source and paid AI tools,

and even some in-house development for a more specialized solution. The projects will often be a combination of all these methods, and that is great because it allows optimization and deployment of AI solutions in a relatively small budget and within a reasonable time period.

III. RESULT ANALYSIS

The successful fusion of CoE and Artificial Intelligence will only result from the tenacity of cross-functional teams working together towards strategic goals of assimilating AI in the workflows, processes, and products/services of an organization one step at a time. In order to ensure acceptance and success, companies must adopt a piecemeal strategy for integrating AI in their company's DNA instead of sudden company-wide changes. These efforts in the short-term could be perceived as an undue burden on limited resources, but it is the only way to ensure that companies and industries are going to be fit to compete for a future that will be dominated by intelligent machines. While the shortcomings and problems related to applied AI are considerable, the necessity to be invested in it **now** far outweighs the depth of the problems.

IV. CONCLUSION

An AI strategy does not have to be an extremely complex one. It is worth nothing that there are many incredible AI tools and platforms that are currently being used in various industries. In the beginning, even the simple act of taking something that works elsewhere and using it can lead to tremendous benefits. In the long-term, the vision and fortitude to see it through will make all the difference. The future is bright for AI to partner with CoE and jointly work towards the development of an Organization. The growth trajectory of the Industry scenario will have to be re-written in a positive manner soon.

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