

Economic Analysis of Artificial Intelligence & Its Implications in Business Management

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Abstract

The value and power of Artificial Intelligence (AI) is growing dramatically every year and will soon dominate the internet and the economy as a whole. In this paper, it is proposed to assess the impact of Artificial Intelligence on business management. The effect of Artificial Intelligence on the cost and product curves are enumerated by graphical method. AI in the fields of finance, marketing and HR are described. An attempt is made to present applications of AI in business in other relevant areas.

Expert systems, machine vision and speech recognition form the basis of AI. This would enable use of such systems using computer language. Machine learning and language form the foundation of operations of systems where repetitive logic is used in solving human issues in a speedier way.

A definite caution need be expressed as regards use of working of these systems in large scale operations. While subtle human questions cannot be answered by programmed intelligence, the question of ethics cannot, however, be attempted by machines. What is true today as an ideal system for solution to a mass of humans may change over time. Such temporal changes cannot, however, be adapted by AI. The human who has made a system solution must remodify the AI of one time period over another time period.

Key Words and Phrases: *Artificial Intelligence, Internet of Things, Cost, Marginal Product & Average Product.*

1. Introduction

Human beings reflect on an issue on a unique way. Their reflections are based on intelligence, emotion & volition. Intelligence refers to solving a problem in a way others easily cannot emulate. Emotion means

reaction based on inheritance, experiences & family norms coupled with norms established by society. Volition is a trait that a human exhibits in making right decision in spite of absence of or of part data or data not in favour of the decision made.

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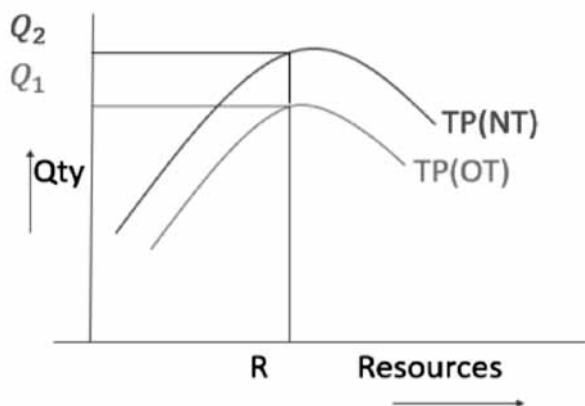
AI enables a long drawn thought process in machine language to be used for large scale applications. The programme may enable speedier, repetitive & continuous solutions for a problem in any area of human activity. This would become stale or not acceptable under a changing environment wherein path of thought process would change over time. In such situations AI becomes sterile leading to no creative solutions. How AI can be made use of in businesses wherein the thought process of decision making changes continuously? How could AI be used as a data bank? Can AI provide quick solutions to an emerging & infectious disease? Could AI help in making investment decisions? Can we bring AI to a classroom or to a Boardroom where discussions are led by facts of a manifested problem? Some of these questions are attempted to answer in this discussion paper.

2. Impact of AI on Product Curves & Average Cost Curve

AI is a technical change. Technical change refers to a situation of producing more output with the same amount of resources and/ or producing same amount of output with less resources. This is to imply that product curve shift upwards. Due to upward shift in product curve, there is a downward shift in average cost curve.

2.1 AI on Product Curves

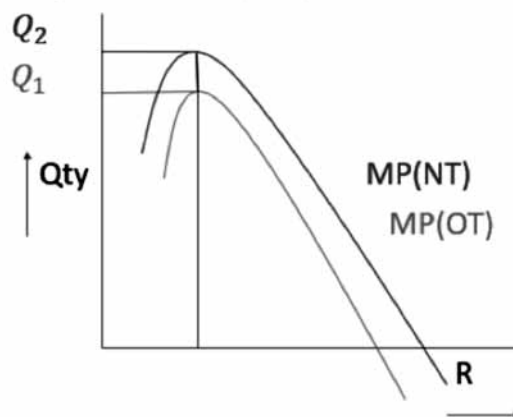
2.1.1. Total Product (TP)



Any company intending to buy will analyse their resources. This is an investment decision having ramifications on the resources in the short as well as long term. When a company has sufficient resources in terms of liquid cash or in terms on assets, they move to pledge these assets to redeem the loan on the assets

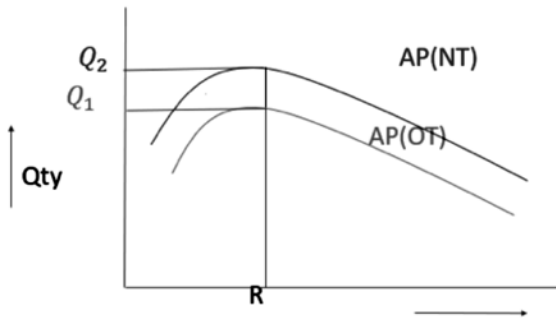
after making purchases and deriving the utility of the new technology. Purchase of AI system refers to a system product, As such, mere purchase is not enough to begin with its derivation of utility. The company has to invest in training for adaptation of its human resources to new technology. So the purchase of AI is dependent on availability of resources-both liquid cash & assets- to enable to make a decision on its buying and its adaptation. At R the company would buy Q_2 units to make the company complete in its implementation of new technology. At this point of meeting of R & Q_2 the best would happen to the company in its efforts to adapt new technology. This is point of inflexion where would get best replacement efforts and move on more competitively than peer competitors. The adaptation of AI thus needs lead time for its acceptance.

2.1.2 Marginal Product (MP)



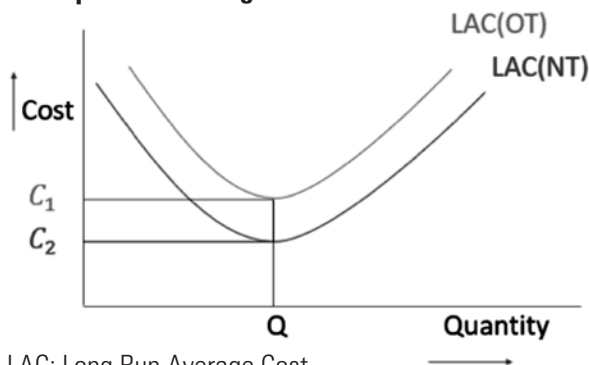
Now look at Marginal product curve and its behaviour for AI products. Marginal Revenue will increase as quantity sold would increase at a higher level. In respect of new technology AI products will increase in its marginal revenue up to a point of inflexion. And at that point the Marginal Revenue will be maximum. That is the point where total physical product will be at its maximum. Any company producing AI products must stop at this point and sustain it well to sustain total revenue. The application of marginal principle is as relevant as it is for any physical product. The new technology of AI will have a higher marginal curve of AI products and hence will facilitate economic value to company by its production. Businesses will improve with its value addition by introduction of AI products in any contextual scenario.

2.1.3 Average Product (AP)



Average Revenue (AR) will follow the pattern of MR curve at a different intensity. However, total production pattern must sustain by continuous improvement. It is essential to produce AI products of longer life. Such products must be continuously be adapted to enable update product to derive more life for AI products and to facilitate sustenance of higher growth for a longer period. Higher average levels of production may enable economy of scale and scope of operations by suitable adaptations of updated products.

2.2 Impact on Average Cost Curve



LAC: Long Run Average Cost

OT: Old Technology

NT: New Technology

The above diagram suggests that as the size of purchase increases the cost would decrease and hence cost per unit. Interestingly any new technology is likely to bring a new cost line much below the cost related to earlier technology. The cost curve of any technology is on a higher pedestal mainly because it was 'new' at the time of its introduction. R & D efforts enable a new technology to get replaced mainly because of better utility curve it derives in terms of advantage over the earlier one. Once the new technology takes over the

old, replacement cost to buyers will be at an advantage in terms of utility and in terms of its acceptance by cost to the buyer. There is point which a buyer would relent to buy and that is point Q. At this point, the cost will be at its minimum for quantity purchased. This is how companies derive their cost/price to get at their best which in turn is accepted by the seller. The price discovery process will enable completing transactions. The use of new technology will make the buying company competitive and as such, they would influence to fall in their line of application. The industry as a whole becomes updated and would move on further to survive and hence grow. The cycle of business thus starts operating and hence the economy.

3. Implications to Business Management

AI has its implications on various fields and business management is not an exception. The implications of AI on some areas of business management such as Finance, Marketing, Human Resources, Production and Big data analytics are elaborated as below:

3.1 AI in The Field of Finance

Finance sector including markets can derive advantage of AI products by its adoption. Finance markets can gobble up speed, accuracy and higher level of efficiency by investment in AI products. Higher investment will lead to higher revenue streams for any organization adopting AI products. AI products adoption will make finance markets more efficient that what they are at present. Few of them are listed below:

Risk Management: Say for example banks, they need to decide who is eligible for a credit card and who is not. AI systems have the capability to go through 1000s of personal financial records and can recommend the banks to whom the credit offerings can be made. Any such risk oriented decisions can be made by using AI. The probability committing errors would minimize by data base, number crunched and simulation deliberated issues.

Trading: Highly advanced digital assistants like Alexa, Siri can help reduce unpredictability of stock market, minimize errors and trades that are mood based. Training in the use of these soft wares would enable a Manager crack a problem to make a clear yes or no for a problem on hand.

Robo-Advisory: Robo-Advisors provide financial planning services with minimal human supervision thereby reducing the commission rates. Also, they are available 24/7 for the customers and even monitor the markets non-stop unlike their human counterparts. One should note that Robots are for programme oriented actions. Since humans think, use of a Robot must be under his/her control.

Conversational Banking & Customer Service: Banks use Chatbots that allows their customers to make payments and track budgets. Chatbots engaging with customers can result in significant cost savings. FAQ chat boxes will help us answer most questions that emerge in day to day transactions. However, personalized questions are to be attended to by Managers with human face.

Wealth Management for Clients: AI helps the banks to provide insights on how to best serve their high net-worth clients by offering personalized, tax-optimized investment decisions to clients. Given changed circumstances of taxation, say after a budget, investment decisions in terms of allocation of personal resources can be done in a most cost effective manner. This area is growing as per capita household income has been increasing in India with both spouses contributing to it.

Fraud Prevention & Anti-money-laundering: "AI is especially effective at preventing credit card fraud" by recognizing suspicious activity, "which has been growing in recent years due to increase e-commerce and online transactions". This typical human tendency can be prevented by the application of AI. All possible simulation of frauds and money laundering can be attempted to make a large company system free from such events.

Automation: AI allows banks to make loan decisions in seconds not months by assessing risks and spending patterns etc. Banks can reduce their risk of default loans and reduces its costs plus provide improved customer experience. Credit decisions and repetitive statements are now being generated on a SAP platform. However, AI automated platform may enable data related decision issues can be attempted by the use of AI. One must exercise caution on making an organization

fully automated. It is easier to get system collapse on complete automation.

Future of AI in the Finance industry

- "Reduce or eliminate transaction fee due to the absence of intermediary"¹.
- Personal/Unit transactions are easier to update & ensuring continuity of transactions.
- Ease in managing personal finances "as the smart AI machines will be able to plan and execute short- and long-term tasks from paying bills to preparing tax filings"¹.
- Better customer care by AI machines will reduce the time of Customer Interface Manager.
- More efficient and reliable legal compliance by helping companies detect deviations and keeping them on the right side of law.
- Reduction in legal complaints & better tax & legal compliance will be ensured by AI.
- Legal scrutiny of detection of corrupt practices using AI may enable faster & speedier clearance of cases.

AI in The Field of Marketing

One of the main ways in which Artificial intelligence helps in marketing is using concepts like machine learning to anticipate possible next move of customers and help improve the customer journey.

Some identified uses & benefits are listed here:

Mass Customization & Mass Custermization:

There is always a conflict whether mass customization is possible together with customerization in marketing. The argument advanced was against it. Now with AI, it is possible to achieve it.

Content Curation & Updating: "Content curation and updating is the act of continuously identifying, organizing, formatting for repetitive use and sharing the best and most relevant content on a specific topic or issue online and on time. AI can help in revealing ideas as to how they can own or disown a product (in the sense of buying) to the customers"².

Personalization of News Feeds: Using machine learning, AI system helps in personalization of news feeds. An 'interest profile' for the user is created by the

AI system. Since AI is data driven, it cannot assimilate emotions.

Pattern Recognition: Patterns are recurring data and it can be used to predict trends. These patterns are recognized by the AI system and helps businesses in serving their customers better. Time series forecasting is accurately possible by pattern recognition. The errors in prediction would get minimized. The random errors can be tested for their intensity.

Language Recognition: This is basically a tool used to detect the language of a text document. This does not however, mean communication. It can check grammar, structure of a sentence and not 'feel in communication'.

Tracking: AI can track Ads for a track user who reads Ads and search for a product to buy. AI Browse Cookie would help in tracking Ads, share information on products and share the information others.

Data Analysis & Customer Segmentation: The profiles created are filled with data and this is analysed by inspecting, filtering and transforming it into useful information. Based on this, customers are segmented or classified into demographic, behavioural, psychological and geographical segments.

Automated Web Design: "Here, the AI system uses machine learning to identify and implement web design trends. This AI technology can make websites on its own. It is not necessary to type a long HTML code for creating a webpage anymore. Instead, the user states what they want, and the AI system generates a personalized design"³.

Predictive Customer Service: Companies today have access to a lot of data with respect to customers. With the help of AI technology and predictive analytics, companies can dig deeper into the data and provide personalized customer experience. Brands use this information to target the right customers or potential customers and provide personalized services and recommendations.

3.3 AI in The Field of Human Resource (HR)

Personal Detail Documentation & Updating of Employee Data: Critical employee details such as contact address, telephone and mobile numbers, blood group, leave on hand, position, qualification, approval

status etc., can be keyed in. Access to such information without violating privacy is possible.

Availability of Transaction Data: Any officially categorized data can be accessed for making an assessment of the employees. Key Performance indicators, status of performance, progress in his/her career, career options and all such other details may be made available.

Training Gaps: In order to have a career advancement, data on gaps for improvement can be identified to enable empowerment of an employee carve out his/her career. Gap-need data will help HR to take concerted action for employee welfare.

Sourcing, Searching & Hiring Process: This function can help in referencing, identifying and face to face interaction for potential and apt candidates for a career in the organization. Talent search can be made more effective by building Talent Bank.

Reduction in Repetitive Low Value Tasks: HR section may avoid or reduce rhetoric low value work by reorganizing priority areas for human welfare in terms of career development plans. Strategic areas of improvement for the organization can be attempted using AI.

3.4 AI in The Field of Production

AI can generate production function for each commodity/produce/product. It can facilitate in supply chain activity. Further, assessment of quality, interconnecting supply for form change, appropriate packaging, storage and several such activities can be functionally connected and managed through AI. Data on product base and its change, on usage, and on deriving utility on the change base of consumers can be effectively implemented. Data on costs on the field, field data on marketing nuances and on changing pattern of consumption can be continuously compiled and updated by AI. Generation of reports on signalling market changes, public issues and several such organizational problems can be attempted by AI. Global connectivity can be established by IoT & AI to enable assessment of spatial problems. Macro changes in consumption, marketing and production can be captured by AI. Simulation of market changes for forecasting is another important application of AI.

3.5 AI in The Field of Big Data Analytics

Big Data analytics is a science of dealing with large and complex data sets. It enables to answer questions connected with human activity in all its manifestations. Macro data analysis would provide insights into patterns, trends, associations, correlations and hidden relationship between explicit and implicit variables. AI and Big Data together will help in assessing uncertainties in its natural and induced patterns. Anomalies, pattern recognitions and graph theory are some of the tools used along with these two technologies. Machine and mind languages have to be integrated to make results more meaningful and transparent.

3.6 Some More Indicative Applications of AI in Business

Spam Filters: AI can be effectively used in filtering spam mails. Naïve Bayes filtering may not be of much use. One can develop spam filters from the beginning using machine language. However, the best way is to develop filters using AI and induct into your email.

Smart Email Categorization: Categorization of emails by methods of logic can be attempted using AI. The objective is to enable priority of the emails to attend to on the basis of personalized relative importance.

Voice to Text Features: Voicing of texts is now in common use. There is clarity in GIS system when in use on road as to what we need to do, where we are heading to and hear, listen and are directed.

Smart Personal Assistants: Siri, Cortana and Google are some of the machine personal assistants used to perform routine and repetitive transactions. Efforts are to customerize to enable it to be individual friendly.

Automated Responders & Online Customer Support: These are now common in ATMs, in Railway Stations, Airports and in several places where there is continuous display and announcements on the status of travel. Extension of such facility in other areas such as hospitals and institutions are on.

Process Automation: Manufacturing industries of heavy, FMCG products, or mega kitchens depend on process automation. The process is to be extended to many other areas of larger application.

Sales & Business Forecasting: This is critically

essential for any executive to deal with them to move on. AI packages are being attempted to make it more accurate to lead on actions.

Security Surveillance: Land securities in the border areas are being worked out to make security fool proof. AI is being best used in India.

Smart Devices that Adjust According to Behavior: Development of smart devices are on to enable it to adapt to the behavioral changes. Neurological modulation in AI is a new field in the R & D.

Automated Insights, Especially for Data-driven Industries: Big Data in the areas of e-commerce and in financial services are researching on development of customerized packages to enable make right decisions at the right time. On-time decisions are enabled mainly because of the insights provided on the programmed intelligence. There are limitations of this application. However, attempts are being made to make the product derive its value.

4. Conclusion

AI can be used to document, store and retrieve data to capture information. Intelligent information can be extracted in a way to provide insights for decision making. AI can penetrate into any activity connected with humans for their welfare. While statistical analysis helps in categorising data and establish relationships; AI enables to drive out subtleties which are not easy to detect through just numbers. The use of AI is spreading across for authenticity of drawing actionable decisions in business, education, health care and services. Speed and Accuracy of data matter along with organisation of data for generating value at a time where inconsistencies rule the world. Insights and flashes may be apparent when crunched numbers reveal what is not expected. Only support systems can lead us to right action track with almost certainty in what is expected to reach at.

Bibliography

1. <https://www.techfunnel.com>, 23rd April 2019 at 11.00pm
2. <https://www.ca.com/en/blog-itom>, 23rd April 2019 at 10.00pm
3. <https://www.investopedia.com>, 23rd April 2019 at 9.00pm