

## *Stochastic Modelling and Computational Sciences*

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### **GENERATIVE AI AND TRANSFORMATIVE VALUE TO BUSINESS MODELS: MEDIATING ROLE OF HUMAN INVOLVEMENT**

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#### **ABSTRACT**

*Generative AI has emerged as a useful tool for enhancing the profitability of the business through identification of the services or products that a company plans to sell, identification of new target markets and planning of the estimated future expenses. Generative AI can go a long way in customizing a business model for a specific industry or company. The sample of the study constituted of 496 respondents from different business. The questionnaire for the study comprised of dependent variable "Business Model improvement" and independent variables related to generative AI namely Virtual Environment, Professed Security, Enormous efficacy, Supportive Access, enhanced personalization and the mediating variable namely Human involvement. Analysis of data was done with the help of AMOS-18. The results of analysis state that professed security and enormous efficacy do not have an impact on Improvement of business model. Enhanced personalization has a partial impact, whereas virtual environment and supportive access have positive impact on business model improvement mediated by human involvement. Future area of research can cover identification of resources and skills required for effective implementation of generative AI for exploration of social and business environments, determination of ideal blend of generative AI and humans for achieving optimum advantage along with development of capabilities to tackle the legal and ethical uses emerging from the use of generative AI in varied areas.*

*Keywords: Profitability, Business model, Human involvement, Personalization, Business Environment, Ethical.*

#### **INTRODUCTION**

Artificial Intelligence (AI) is one of the fastest growing fields, making its presence felt in the business world. It has applicability in the day to day and commercial life. The corporate sector can benefit from quicker, less expensive, and more accurate marketing strategies as a result of the use of AI. Businesses can have a strong competitive presence in addition to other online companies by implementing AI into their marketing strategies. AI is not just for marketing; it can also be used to innovate and revitalize businesses. It also provides solutions for challenging jobs, which contributes to the business expansion. Less than 5% of businesses today have employed generative AI models, APIs, and/or deployed generative AI-enabled apps in production environments. By 2026, it is expected that the percentage grows to over 80%.

Chen, Wu and Zhao (2023) state that generative AI has led to a tremendous transformation in the business world by enhancing accessibility, reducing cost and enhanced accessibility. Open AI and Chat GPT are the examples of such AI tools. Capacity of a company for management of risk and successful stock returns can be measured by sentiment scores provided by generative AI. Dencik et al., (2023) generative AI adoption is still at a very nascent stage. Majority of the organizations are trying to find out the best possible use of generative AI. In a survey very few executives responded in favour of use of generative AI tools in their Companies. Majority of the organizations see opportunities for application of AI in the primary areas of research, function, innovation and growth of business value in contrast to automation of tasks a recent survey by IBM IBV states that security, ethics privacy, regulation and economics are the key barriers to the effective deployment and use of generative AI.

Palanivelu and Vasanthi (2020) in their study state that the primary factors affecting the use of AI in business are customers, media attention, digital maturity, and pressure from competitors.

A variety of responses were obtained from the respondents regarding the findings of the advantages of incorporating AI in marketing. Time- saving, increase in efficiency, improvement in the conversion rates,

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improved customer satisfaction and service, a higher return on investment, a deeper comprehension of consumer data, and practical decision-making are few of the advantages. There were concerns regarding technical compatibility and availability of data at proper time and place. Post application of generative AI business have become more effective. Generative AI helps in the development of proper sales and marketing strategies for considerable improvement in the performance of business.

Dencik, Goehring and Marshall (2023) Executives hoping to leverage generative AI to enhance corporate value do not give top priority to work automation, contrary to the popular belief about AI. Organizations see prospects for generative AI mostly in research and innovation, when considering advantages by function. According to a recent IBM IBV poll of CEOs, ethics, security, legislation, privacy, and economics—rather than access to the underlying technology itself—are the main obstacles to the successful deployment and application of generative AI. Huang and Rust (2021) state that businesses make use of AI for framing a research strategy for market segmentation, identifying the target population and market positioning. Mechanical AI is used for collection of data. AI can be used strategically in various areas of marketing for standardization and personalization.

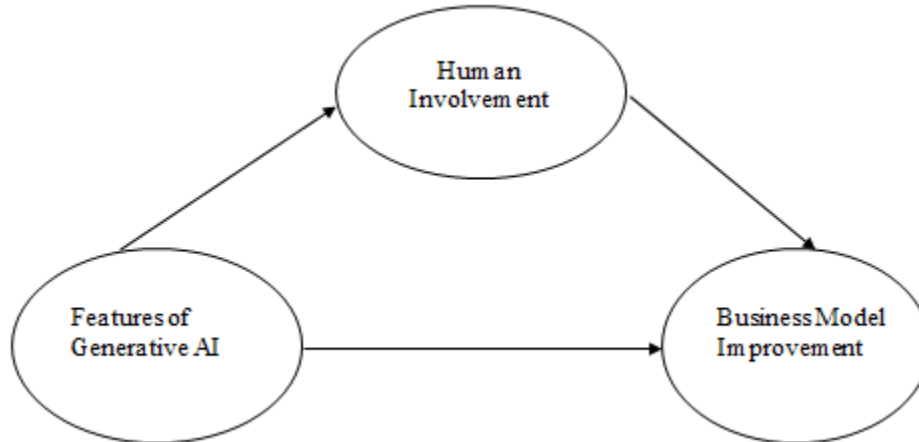
Yahaya, et al., (2023) conclude that generative AI tools like Chatgpt and Bard have brought about a revolutionary transformation in the field of communication, research and business information. Interest of public and success of the AI developers and their organizations has become imperative in the present scenario. Numerous functions of AI will continuously influence the lives of individuals in future as an outcome of latest developments in the field of AI. Ameen et al., (2023) conclude that AI can very efficiently use some basic skills such as learning, intelligence and skill for handling and processing large data sets. AI can also offer assistance to the employees in skills such as problem solving, assisting in decision making, design thinking. However skills such as intuition, empathy and emotional intelligence cannot be yet be handled by AI.

Dencik et al., (2023) state that in Executives seeking to leverage generative AI to increase corporate value do not prioritize work automation, in contrary to what one may assume from AI. When analyzing advantages according to function, firms primarily perceive opportunities in the areas of research and innovation, where AI can be effectively utilized for growth in the business value. Security, ethics, privacy, economics and regulations are some key barriers concerned with the effective utilisation and deployment of the use of generative AI. Generative AI is used to harness data, technology and insights from across stakeholders and partners along with granting authority over the competencies that are most essential to the value proposition of an organization.

There is a challenge of loss of job in future there is an estimation that many people may lose their jobs owing to the automation in the generative AI. An analysis in the US concludes that two thirds of the occupations are very much exposed to automation as an effect of implementation of AI technologies. In the same report the company estimates that only natural language generation technologies could lead to a significant rise in the Productivity and GDP.

### **Model Development**

The impact of Generative AI on user engagement, satisfaction, and experience on digital platforms. Also, reaction to, approval of, and willingness to utilize the AI-generated content for improvement in business model is considered in the present model. Ma and Sun (2022) state that the business scenario is rapidly being transformed by machine learning algorithms. Large scale and unstructured data can be easily processed with the help of machine learning methods for yielding strong predictions of performance though such models may lack proper interpretability and transparency.



### **Human Involvement in Generative AI**

Training and updating generative AI with the objective to achieve better result on digital platforms. It has been observed that the generated images show different results for images like metallic shoes (it will show image related to metal), plastic beauty (beauty products related to plastic are shown), Bat (Bird is shown instead of Cricket bat). Generative AI can produce incorrect results with respect to homonyms (same words and phrases can have different meanings). When searching for images of metallic garments, different metal results may appear. Additionally, stutters, accents, mispronunciations, and other spoken language quirks can make it challenging for a machine to comprehend speech. These problems can be reduced, though, as language databases expand and personal users educate intelligent assistants.

Distinct industries and corporations frequently speak in quite distinct ways. For example, an NLP processing model required for processing legal texts would be much different from one needed for healthcare. NLP models get smarter the more data they are trained on. It is true that new machine learning methods and bespoke algorithms are developed daily, just as data (and human language!) does. Enhancing any of the aforementioned problems will necessitate additional investigation and novel approaches. Davenport et al., (2020). Lastly, the authors propose that AI will work better if it supports human managers rather than taking their place. Huang and Rust (2021) state the use of AI for framing a research strategy for market segmentation, for identifying the target population and market positioning. Mechanical AI is majorly used for collection of data. AI can also contribute towards business model improvement through strategic performance in various areas of marketing.

### **Hypothesis Development**

#### **H11: Human involvement mediates the effect of Virtual Environment of Generative AI applications on improvement of business model.**

Generative AI has brought a revolution in the way of operation of business. It has led to growth of business and achieving sales growth. Generative AI has led to better management of resources and goods through accurate predictions. AI algorithms may determine which of the current customers are most likely to purchase an upgraded version of what they already have (upsell) or which of them are most likely to be interested in a whole new product offering (cross-sell). Sales managers can now use dashboards that visualize which salespeople are likely to fulfill their targets and which open offers have a strong probability of closing. This all has been possible with the use of artificial intelligence.

Ilgram and Laarmann (2023) conclude that generative AI is becoming more user friendly and accessible owing to the potential for revolutionizing the work processes and innovation management. The present study focuses on use of generative pretrained transformer (GPT) for enhancing the initial stages of innovation namely generation of idea, exploration and digital prototyping in business.

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### **H12: Human involvement mediates the effect of Professed Security of Generative AI applications on improvement of business model.**

The dissemination of false information and fake news carries several risks. How, for instance, does generative AI affect the quality and dissemination of misinformation? Generative AI has the ability to automate a wide range of tasks, increasing productivity, cutting expenses, and creating new growth prospects. It can be made open and accessible to business users, offering a vast amount of information. With the advent of AI, marketing methods and consumer behavior have been significantly impacted. Lastly, the authors propose that AI will work better if it supports human managers rather than taking their place. Ma and Sun (2022) conclude that the business scenario is rapidly being transformed by machine learning algorithms. Large scale and unstructured data can be easily processed with the help of machine learning methods for yielding strong predictions of performance though such models may lack proper interpretability and transparency.

### **H13: Human involvement mediates the effect of Enormous Efficacy of Generative AI applications on improvement of business model.**

Alasadi and Baiz (2023) state that a paradigm change in teaching and learning has been introduced by AI in the education service sector. In this sector AI has been used to achieve educational goals effectively. The study discusses accessibility and equity issues and looks at the ramifications of employing AI-generated content in professional settings. The need of the hour is to adopt a careful, moral and inclusive approach towards the integration of appropriate modern technologies in education.

Pahune and Rewatkar (2023) conclude that a range of industries have been revolutionized by using large language models and generative artificial intelligence, especially healthcare industry. The paper highlights the role of AI in bringing about a transformation in the healthcare application. The AI models have brought about a tremendous revolution in the bio medical field, through exhibition of remarkable performance in the production and comprehension of the textual data. It has opened up new avenues for diagnosis and research. Apart from tremendous potential in the generative AI technologies, there are some issues of privacy of data and ethics which are to be taken care of in healthcare applications.

### **H14: Human involvement mediates the effect of Supportive Access of Generative AI applications on improvement of business model.**

Jain et al., (2023) state the reform introduced by generative AI in the financial sector by providing accurate and pertinent information to the investors. The combination of environmental, social, and governance (ESG) standards and the sophisticated language model GPT 3.5 has the potential to completely transform the investing landscape. This study investigates the uses of GPT 3.5 in ESG investment and its ability to react to stimuli relating to ESG. GPT 3.5 can detect pertinent ESG characteristics for companies by creating an ESG classifier module, which enables investors to make well-informed selections that are consistent with their values. In order to help with the selection of sustainable and socially conscious investments, the module also enables study of industries' ESG performance. The findings of the study conclude that stock returns were dependent on ESG-related news to the extent of 20 percent.

### **H15: Human involvement mediates the effect of Enhanced Personalization on improvement of business model.**

Harrer (2023) states that generative AI has the potential to develop into extremely reliable, effective and assistive tools for the information management subject to their positioning responsibly as human companions for enhancement rather than replacement of human involvement in decision making, retrieval of knowledge and other cognitive processes. The study focusses on the functioning of the underlying technology, offers an evaluation and also indicates how these tools bring about a change in the way the data management workflows are managed in medicine and healthcare sector. Generative AI has tremendous potential to create personalized content and enhance the relevance of recommendations and search results. These recommendations would be based on the past purchases and browsing history of the customer.

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Apart from maintaining personal accounts and tangible illustrations, generative AI is also used for prototyping, generation of ideas and user journey mapping. The present study also throws light on the potential integration of LLMs into future knowledge management systems. Further the study contends that AI would be majorly responsible for revolutionizing the business models in the present competitive scenario. While battling the ethical challenges that come with generative AI, businesses are rushing to take full use of its advantages.

### **OBJECTIVES OF THE STUDY**

1. To identify the impact of generative AI on improvement in the business model.
2. To examine the role of human involvement as a mediating factor in the process of business model improvement.

### **ANALYSIS AND FINDINGS**

The participants were leaders and employees with different backgrounds who likely to perceive different views about how to use GenAI such as ChatGPT in business and how it impacts the business output. Therefore, purposeful sampling was used to select participants to collect different views. An online questionnaire was shared to participants, of whom 496 responses were considered suitable. The survey items were developed on a five-point Likert scale (5 = strongly agree and 1 = strongly disagree). Pre analysis testing for suitability of the entire sample for factor analysis was computed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett tests of sphericity. The KMO measure of sampling adequacy of five dimensions of generative AI, Business model Improvement, and Human involvement was found to be 0.952, 0.747 and 0.759 respectively and the Bartlett tests of sphericity was significant at 0.000 for all three variables. The current study also identified five factors of generative AI which hold Eigen values greater than one and accounted for nearly 65% of the variance (see annexures). The five factors extracted were Virtual Environment, Professed Security, Enormous efficacy, Supportive Access, enhanced personalization which were considered as independent variables in the study. The dependent variable was Business model Improvement whereas Human involvement and innovation acts as mediating variable.

The convergent as well as the discriminant validity was examined using confirmatory factor analysis. Outer loadings of all indicators of all constructs ranged between 0.580 and 0.878 and were statistically significant. Thus, the indicator reliability was established. Further, the composite reliability of the five generative AI dimensions were 0.778, 0.791, 0.804, 0.7 and 0.744. As all the composite reliability values were above the widely recognized rule of thumb of 0.7, the internal consistency reliability was proved. The convergent validity is attested based on the value of Average Variance Extracted (AVE). The value of each construct of service quality 0.676, 0.699, 0.7, 0.66 and 0.605 respectively. Since all the values were above the threshold value of 0.5, the convergent validity was confirmed. The average variance extracted was higher than all squared correlations of first-order latent variables (Fornell & Larcker, 1981) and the factors scores weighed high on their own and low on other constructs which confirms the attainment of discriminant validity.

The examination of the conceptual framework was conducted with the use of the structural equation modelling technique using AMOS. 23 (see figure1). The final Model summary is as follows:

- ▶ Normed fit index= 0.89 (NFI  $\geq$  .95 for acceptance)
- ▶ Incremental fit index = 0.9 (IFI  $\geq$  .95 for acceptance)
- ▶ Tucker–Lewis index=0.92( TLI  $\geq$  .95 can be  $0 > TLI > 1$  for acceptance 0.96)
- ▶ Comparative fit index=0.94( CFI  $\geq$  .95)
- ▶ RMSEA= 0.043 ( nearer to zero if good)

All the values reveal that the model is mediocre fit.

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The results of hypothesis testing is given in table.2. The results revealed that hypothesis  $H_{11}$ ,  $H_{14}$  accepted at .05 level of significance which shows that human involvement and innovation fully mediates the effect of GenAI features like Virtual environment and supportive access to improvement in business model whereas partial mediation is seen in enhanced personalization feature. The hypothesis  $H_{12}, H_{13}$  are rejected which confirms that directly and indirectly there is no effect of human involvement on features professed security and enormous efficacy.

### **DISCUSSION AND CONCLUSIONS**

AI is being used in almost all field such as healthcare sector for identification, diagnosis and treatment of deadly diseases, like cancer. Abnormalities can be much faster and accurately detected with the help of AI. This can prove to be a boon for the patients owing to early detection of disease, healthy life and availability of a longer time span with the loved ones. Now AI has taken a plight from using narrow and purpose built tools for making predictions, recommendations and automation towards its co-pilot phase, which offers voluminous opportunities for revolutionizing the way things get done. There are certain activities in business which are process driven, such type of repeatable and rule based processes can be properly streamlined with AI. Generative AI software can easily handle manual repetitive tasks and enable reshaping scores of the business processes. Businesses are able to offer better, efficient, faster, new experiences ranging from chatbots on websites to predictive text on the phones. Numerous functions of AI will continuously influence the lives of individuals in future as an outcome of latest developments in the field of AI.

Vehicle industry make use of AI for analysis of voluminous customer reviews and present key take aways to the customers for the model make as well as the year of vehicle in its inventory. AI is also working for offering improved employee experiences. In most of the businesses majority of the employees and business decision makers have access to automated and AI powered tools for leveraging the already available resources to offer a transformational experience to the people.

AI is used for extraction of data, classification of data, customer support and offering writing assistance. In the present times business leaders are facing challenges concerned with innovations, to offer something unique and completely different. Businesses have taken steps for integration of AI in their organizations, framing strategies for creation of a feeling of delight for the customers. Generative AI is used for getting ideas or for conduction of research, thus enabling a deep thought about a problem that is being solved.

While generative AI has its own limitations related to safety and reliability, but it can still offer immense benefits to any business. With new technologies cropping up every day, these limitations can be overcome through introduction of laws, policies and regulatory frameworks. It is important to build level of trustworthiness in AI systems and there should be involvement of human and innovativeness to provide correct answers because that could significantly affect lives and livelihoods.

AI can pose a challenge to many existing professions, as there is a possibility that many existing professions will be replaced by this latest technology. Many companies are opting for the creative process to be more AI- assisted and technology enabled (Vincent, 2023). Harrer (2023) states that Generative artificial intelligence (AI) applications rely heavily on large language models (LLMs) for generation of audio, text, images, videos, and code in response to instructions in textual form. Absence of over sightedness, appropriate guidance, responsible designing and operation in generative AI applications may lead to production and dissemination of erroneous and damaging content at an unprecedented scale. Posic and Krekovic (2020) state that rapid advancement of technology is closely linked to development of philosophical perspectives on art. Generative AI has introduced contemporary technologies in the creative domain which was traditionally occupied by the humans.

Business models can utilize a change management strategy that puts employee training and welfare first. This involves giving employees the skills they need to use generative AI tools securely and confidently and reassuring them that these tools will help automate repetitive jobs. Technology has always been an enabler and accelerator for development of truly new and innovative solutions. Safeguards are required for realizing the full potential of

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AI. AI also presents potential risks that are required to be managed. The success of responsible AI initiatives in any company depends upon involved and committed leadership, building of actionable guidelines and inclusive governance models and, an investment in research led incubations and new engineering systems. Every organization will have a different AI roadmap depending on whether it is a tech company or not. AI is offering tremendous opportunities to business for adaption to the ever changing business scenario. It has a tremendous potential to lead and drive change in the society.

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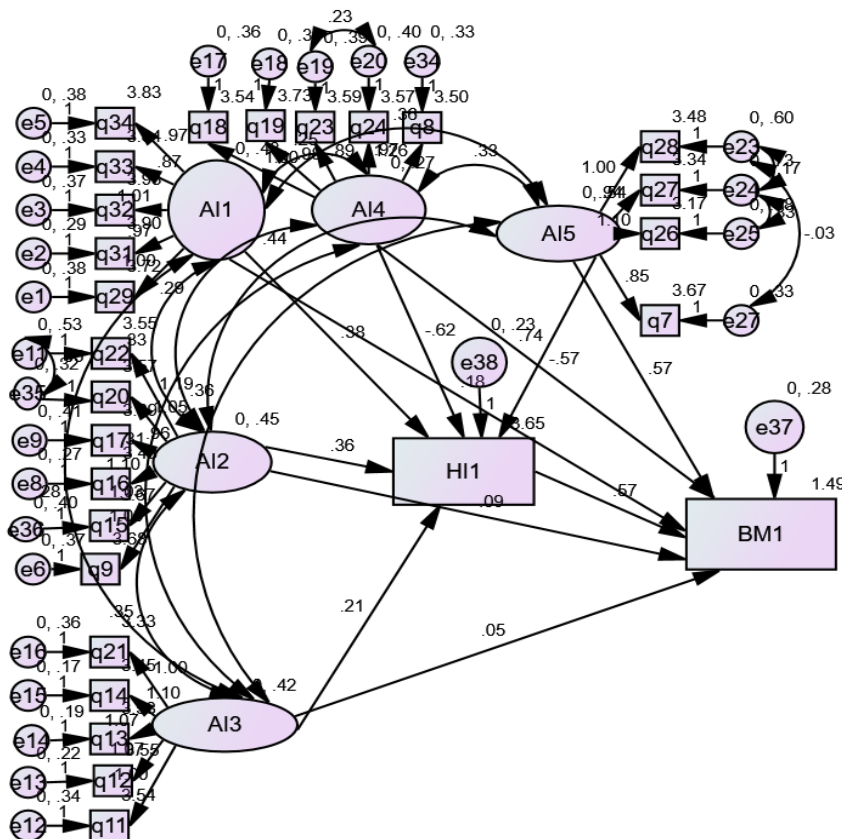
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### ANNEXURES

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	14.697	45.929	45.929	14.697	45.929	45.929	5.538	17.307
2	2.257	7.052	52.981	2.257	7.052	52.981	5.407	16.898	34.205
3	1.586	4.955	57.936	1.586	4.955	57.936	4.948	15.464	49.669
4	1.260	3.936	61.872	1.260	3.936	61.872	2.624	8.201	57.870
5	1.103	3.447	65.319	1.103	3.447	65.319	2.384	7.449	65.319

Extraction Method: Principal Component Analysis.



**Figure 1: Structural model**



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**Table 3: Results of mediation**

S.no	Hypothesis	Direct effect (estimates )	Indirect effect estimates	Result	Remarks
<b><i>H<sub>11</sub></i></b>	<b>Virtual Environment→Improved Business Model</b>	.182(ns)	.215*	Hypothesis Accepted	Full mediation
<b><i>H<sub>12</sub></i></b>	<b>Professed Security→Improved Business Model</b>	.086(ns)	.206(ns)	Hypothesis Rejected	No effect
<b><i>H<sub>13</sub></i></b>	<b>Enormous Efficacy→Improved Business Model</b>	.049(ns)	.120(ns)	Hypothesis Rejected	No effect
<b><i>H<sub>14</sub></i></b>	<b>Supportive Access →Improved Business Model</b>	-.0568(ns)	-.353**	Hypothesis Accepted	Full mediation
<b><i>H<sub>15</sub></i></b>	<b>Enhanced Personalization→Improved Business Model</b>	.574*	.419**	Hypothesis Accepted	Partial Mediation