
Management Consulting in the Artificial Intelligence – LLM Era

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Abstract

Management Consulting is one of the oldest and most well-established professional services across the world. Consultants have developed subject matter expertise and competency in a variety of areas such as General and Strategic Management, Financial Management, Marketing & Distribution Management, e-Business, Operations Management, Human Resource Management, Knowledge Management, Enterprise Performance Management, Business Transformation, Quality Management, and Information Technology. Information Technology as a discipline has evolved rapidly in the last three decades with software development paradigms and the advancement in artificial intelligence (AI) and machine learning (ML) technologies. The space of AI & ML technologies is rapidly evolving, impacting the way insights are arrived at, how decisions are taken, organization models, and organization structures. This article explores the challenges, new opportunities and potential changes to the ways of working for management consultants given the developments in AI, particularly with large language models.

Introduction

Modern management consulting is believed to have started in the 1890's with firms such as Arthur D Little and Stone & Webster (McKenna 1995) with corporate spending on management consulting increasing to the extent that AT&T and other organizations spending more on management consulting services compared to corporate research & development. Along with management consulting, the field of data and analytics has also been undergoing rapid evolution through the late 1900s and early 2000s. The arrival of the internet, IT, and globalization expanded the data volume and production of information at a competitive rate, resulting in a data explosion in the 2000s as per Shabana and Dr. Sharma's article in the Journal of Applied Sciences and Computations (Shabana & Sharma 2019). In this article, the author focuses on the impact of the advancements in Artificial Intelligence (AI) and particularly Large Language Models (LLM) on the profession of management consulting.

Evolution of Data Science & AI

Productivity in Data Science Projects

Data Science as a discipline has evolved considerably over the last few decades. At the turn of the 20th century, data science projects borrowed extensively from software application development projects in terms of methodology.

Steps for requirements development, design of application features, and validation were adopted for data science projects. Data scientists applied the application feature development concepts to create data features that would best meet the needs of the analytic model, such as in predicting the modeled outcome variables. Custom-built/hand-crafted analytic models were then enabled through tools such as H2O.ai and Auto ML, which took away the need for humans to go through the grind of model selection, model training/tuning, and validation. H2O.ai asked humans to specify the amount of compute, memory, and time to be used to solve the problem; H2O.ai and Auto ML applied multiple different modeling approaches, presented results of each, and recommended the best performing analytic model given a comparison of standard test parameters. The task of result interpretation from model output is then left to humans (Figure 1).

The advent of large language models took productivity a level further, eliminating the need for coding, feature selection, and feature engineering by pre-training analytic models on a large corpus of data already available (public domain). Leading organizations in the AI space, such as Microsoft, Facebook, and Google, got into the action with LLMs soon enough – with Microsoft investing in OpenAI, which had developed Generative AI based (GPT) technologies to create ChatGPT, Facebook creating and open-sourcing Lambda and Google which developed the Bard offering by using Lambda.

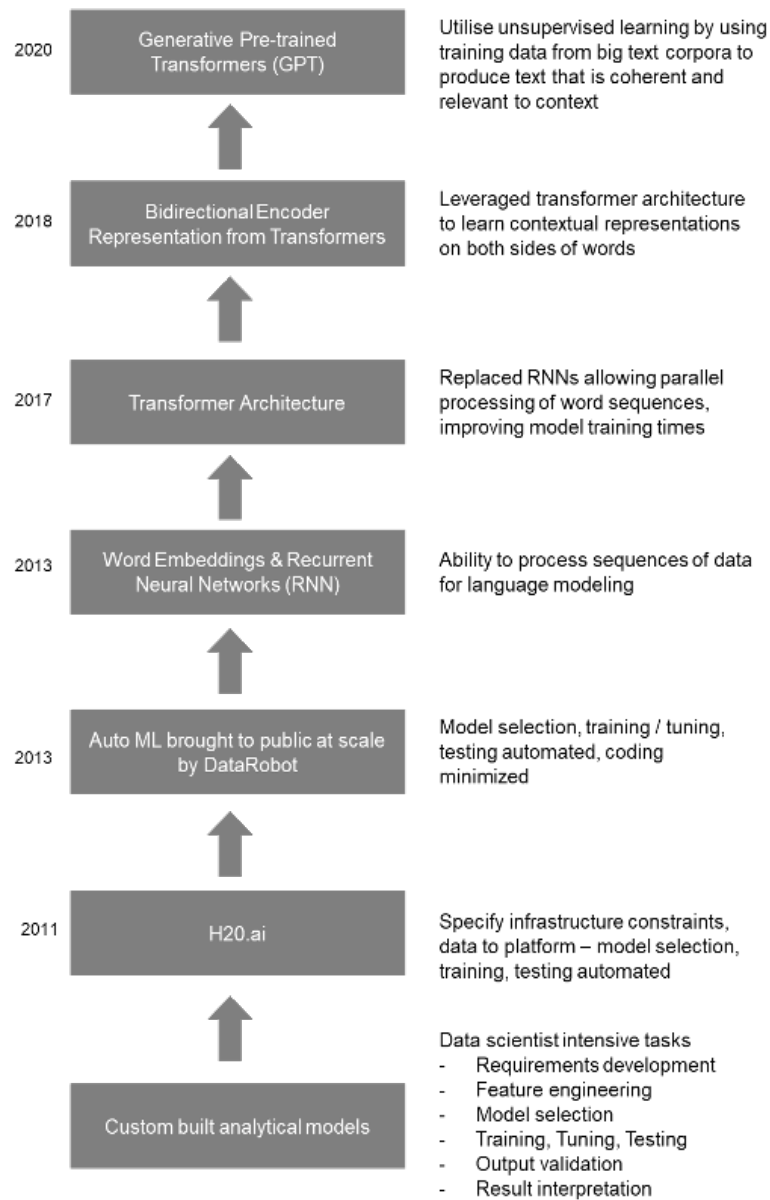


Figure 1: Evolution of analytic model development

ChatGPT has captured the imagination of the public at large. Generative AI reached over 100 million users in two months after the ChatGPT launch, while in comparison, smartphones took two years to get 100 million users after the launch of the iPhone in 2007 (Southern 2023). There have been varied reactions to ChatGPT. Jena McGregor, in an article with Forbes (McGregor 2023) titled 'ChatGPT starts changing work, non-linear career paths and Dilbert gets shown the door' stated that "It may be too early to know if the bots are coming for your job, but it's clear they're going to impact how you work."

In an interview with India Today, Manny Maceda, Bain & Company's worldwide managing partner, described the advancement in AI as an industrial revolution for knowledge work, with clients needing to rethink their business architectures. The article (Sharma 2023) further states that ChatGPT poses a risk to content writing, management consulting, and low-level coding jobs.

Given all the excitement with ChatGPT and Bard, there are also significant challenges. LLMs are known to hallucinate in abstractive summarization, generative question answering, and general data generation. In the article titled 'Artificial

Hallucinations in ChatGPT: Implications in Scientific Writing' on PubMed Central (Alkaissi & McFarlane 2023), the authors state that despite ChatGPT's ability to produce convincing scientific articles, the material it produces is a mixture of facts and wholly false information. This raises questions regarding the reliability and accuracy of utilising extensive language models, like ChatGPT, in academic writing.

Cognitive biases influence and negatively impact AI design, such as in the examples of AI being used for shortlisting candidates for recruitment, excluding candidates from a particular gender in Amazon, as suggested by Mujtaba and Mahapatra (Mujtaba & Mahapatra 2019). Mujtaba and Mahapatra point out that the analyst's bias is transferred to analytical models through feature selection and feature engineering. Such examples work against the values of inclusiveness and diversity that organizations seek to uphold. As per the article titled 'Ethics of AI-Enabled Recruiting and Selection: A Review and Research Agenda' (Rahmat et al. 2023), there may be a gap between business ethics and actual AI recruiting applications which needs to be closed through theoretical and empirical research.

Difficulty in identifying potential errors or biases due to difficulties in interpreting the inner workings of LLMs is also called out by Jansen, Jung, and Salminen in the article 'Employing large language models in survey research' (Jansen et al. 2023).

Apart from these, data privacy, residency, and protection implications of training LLMs based on data available on the internet is a topic currently discussed by regulators and enterprises.

Data Privacy & Residency

The definition of data residency (Day 2019) is "Storage of personal information within a region where data is processed per laws, customs and expectations of that region (country/economic boundary)." According to the IAPP (IAPP 2023), you can decide how your personal information is gathered and used.

Government enforcement, class action lawsuits, financial penalties, and liabilities, reputational damage, and loss of customer and business partner confidence could be the organisational risks of failing to handle these components (IAPP 2023). So companies need to get data security and regulatory compliance right.

Data Security

DAMA defines data security as "the planning, development, and execution of security policies and procedures to provide proper authentication, authorization, access and auditing of data and information assets."

A roadmap for controls, rules, systems, and processes that protect data from diverse threats can be used to develop data security (de Groot 2022). Preventing data loss, preventing unauthorised access, ensuring data is safe and not destroyed, and ensuring the organisation and its reputation are protected, as well as the data assets, are some of the concerns that need to be addressed.

Data compliance (Risk Optics 2023) is the collection of procedures to ensure sensitive data is gathered, arranged, and handled to enable organisations to comply with their internal business rules and legal and governmental requirements. The scope of data compliance typically includes privacy and security.

Exponential growth and data – the need for governance

By 2025, global data is expected to increase by 61%, from 33 zettabytes to 175 zettabytes (Reinsel et al. 2018), according to IDC. The management of company data flows between systems and business divisions while maintaining an alignment between data and business is significantly hampered by this expansion.

The following are some of the seven security and risk management trends that Gartner highlighted for 2019 (Gartner 2019):

1. How crucial it is for leaders in security and risk management to communicate risk appetite and security issues to company decision-makers.
2. The establishment of security operations centers equipped with threat detection and reaction tools.
3. Frameworks for data security governance are used to categorise data assets and put data security procedures in place.

Therefore, a vital component of the whole data governance system is data security and compliance.

Data Management Challenges

Data Governance defines the operational parameters for Data Management, which may include policies, roles and stakeholders, standards, references, valuation techniques, and expectations for operational teams.

Data Governance and Strategy

One of the top strategic priorities for organisations (Profisee Group 2023) is data governance, which is significant for several reasons.

- Developing a Data Management Plan
- Utilising metadata
- Defining ownership and stewardship
- Ensuring data quality
- Maximising data use

Data governance is concerned with how information is gathered and managed inside an organisation. The focus of data management strategies was the integration of data strategy with business goals, establishing the value of expertly managed data, and delegating data management duties to specialised people.

Managing heterogeneous and scattered data throughout the life cycle is a typical difficulty for businesses; only then can the data governance boundaries be watched over and managed. Additionally, industry-specific data risk and compliance standards may exist. Beyond storage and routine administration, there is a critical need for automating and responsibly managing data, including tagging, categorising, safeguarding, and preserving it. If humans mainly handle data management, it is expensive. Automation and data intelligence benefit enterprise data management capabilities (Raisch & Krakowski 2021).

Data Protection

Most nations have laws relating to data protection, and various agencies may be in charge of enforcing them. For instance, there would be huge differences in how data security applies to cable television, video privacy, children's information, and motor vehicle registration.

State-specific laws, such as the Driver's Privacy Protection Act (DPPA) of 1994, the Children's Online Privacy Protection Act (COPPA), and the Video Privacy Protection Act (VPPA), are now in place in the USA (Pittman et al. 2023).

Sections 43A and 72A (Mozota 2010) of the IT Act 2000 in India (Indian Information Technology Act 2000) provide compensation standards if personal data is improperly disclosed. The AADHAR Act (Unique Identification Authority of India 2016) protects confidentiality agreements and the use of personal data by any sector of the economy, among other things. Additionally, the right to privacy is acknowledged in Article 21 of the Indian Constitution as a part of the rights to life and individual liberty.

In recognition that almost all digital activities undertaken by individuals involve some sort of data transaction, the Government of India passed the digital personal data protection act, 2023 (Ministry of Law and Justice – Government of India 2023).

Data Residency vs. Sovereignty vs. Localization

It is crucial to differentiate between the terms as mentioned earlier. There are three degrees of a single concept about how data privacy affects cross-border flows; for instance, GDPR law reaches far beyond geographical boundaries to give people more control over how firms use their data.

Data Residency is the term used to describe a set of regulations, compliance requirements, or policy considerations, including cross-border laws, relating to the geographic location of data storage like tax information and health records.

Data Sovereignty is the term used to describe how a country's geography and laws safeguard data. This is critical since 'data subjects' will have varying privacy and security protections based on their data center / hosting site. (For example, email or personal or business data archives). In addition to defining national rights and obligations, data sovereignty also defines stakeholder rights of access to data (such as government, corporate, person, affinity group, and social media data).

The term 'data localization' is becoming more widely accepted because the complete data life cycle is maintained within a single geographic border. It is the narrowest definition solely based on legal duties. As any transaction would require audit, validation, or verification, it is used primarily when creating and keeping personal data for audit and traceability. Several nations are developing data localisation and privacy laws. While the GDPR's data protection principles provided a foundation for the majority of them, there are regional variations.

Data Privacy Principles

The GDPR and similar laws provide guidelines for the ethical processing of personal data. For instance, if we take a look at the UK GDPR and the UK ICO (Information Commissioner's Office), which cites a 2016 EU regulation in article 5(1) that reflects seven crucial principles, we can see how EU nations use these principles to determine fundamental policies and guidelines on data privacy. The guiding principles are accountability, accuracy, integrity, confidentiality (security), purpose restriction, data minimization, storage restriction, lawfulness, fairness, and transparency. To address concerns about data privacy, boards might use these principles to establish a wide framework for enterprise governance.

AI's Value Creation Across Functions

Despite the previously mentioned challenges, AI is creating value across functions in activities required to automate tasks, consolidate, and synthesize information.

As per Michael Porter, the competitive advantage of the enterprise depends on how activities are organized and performed (Mozota 2010). Porter considered enterprise activity to create value on three levels: primary, support, and activities supporting the value chain of the industry (Mozota 2010). Primary value creation activities are considered core to the value creation process and include product / engineering package design and tasks such as marketing, production, delivery, and customer service.

Support activities include tasks including purchased materials, technology, resources (human and otherwise), and company infrastructure. Activities connecting the enterprise with suppliers and distributors are considered supportive of the value chain of the industry (Mozota 2010).

Based on this framework, AI-enabled value can be categorized as follows.

Enabling 'primary' value creation through AI

AI use cases from marketing, sales, production and operations are illustrated inline below.

Activities	Use Cases
Marketing & Sales	Generation of social media and technical sales content (Schweidel et al. 2023).
	Helping potential clients choose products and services (Ameen et al. 2020).
	Analysis of customer feedback (Lee et al. 2022).
	Flagging risks to sales KPIs and recommending the subsequent best actions (Kashyap 2017).
Production	Identification of production errors, anomalies, and defects from images to provide rationale (Yang et al. 2020).
Business Operations	Streamlining customer support through process automation and agent productivity increase (Ng et al. 2021)
	Customer support chatbot to resolve questions about products, including generating sales opportunities (Patel, 2020).
	Review documentation, including contracts and service agreements, and highlight relevant risks and conflicts with rationale (Bravo 2021).

Enabling value creation in supporting activities through AI

AI use cases from information technology enablement, risk management & and legal and human resource management perspectives are illustrated below (McKinsey, 2022).

Activities	Use Cases
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Information Technology Enablement	Generation of social media and technical sales content
	Product/user guide creation, helping potential clients choose products and services.
	Analysis of customer feedback.
	Flagging risks to sales KPIs and recommending the subsequent best actions.
Operations, Risk Management & Legal	Identification of production errors, anomalies, and defects from images to provide rationale.
Human Resource Development	Streamlining customer support through process automation and agent productivity increase.
	Customer support chatbot to resolve questions about products, including generating sales opportunities.
	Review documentation, including contracts, service agreements, and codes, and highlight risks and conflicts where relevant with rationale.

Implications for Management Consultants

ILO's framework for management consulting delivery by Milan Kubr (Kubr 2002) recognized the following competency areas (illustrated in Figure 2).



Figure 2: Competency areas in Management Consulting, ILO

The AI use cases mentioned earlier are able to add considerable value in areas such as Operations Management and Human Resource Management. As mentioned by Kubr, the management consulting process consists of the phases and steps illustrated in Figure 3.

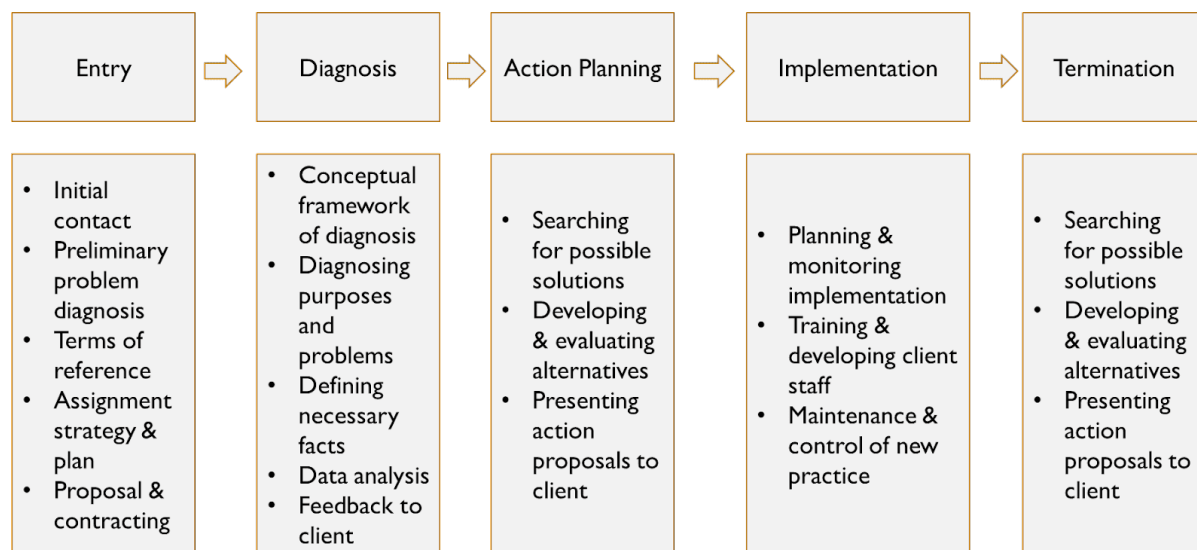


Figure 3: Steps in Management Consulting, ILO

AI can help marketers comprehend the activities, signs, and behaviour of their customers (Haleem et al. 2022). Marketers may therefore be enabled to quickly and effectively target the proper approach to the right person. Given the capabilities of AI, especially since the advent of LLM and technologies built on it such as GPT, and Bard, the author envisions management consultants utilizing AI in the process of management consulting, as shown in figure 4. Management Consulting is regarded as a people business (Aharoni 1997).

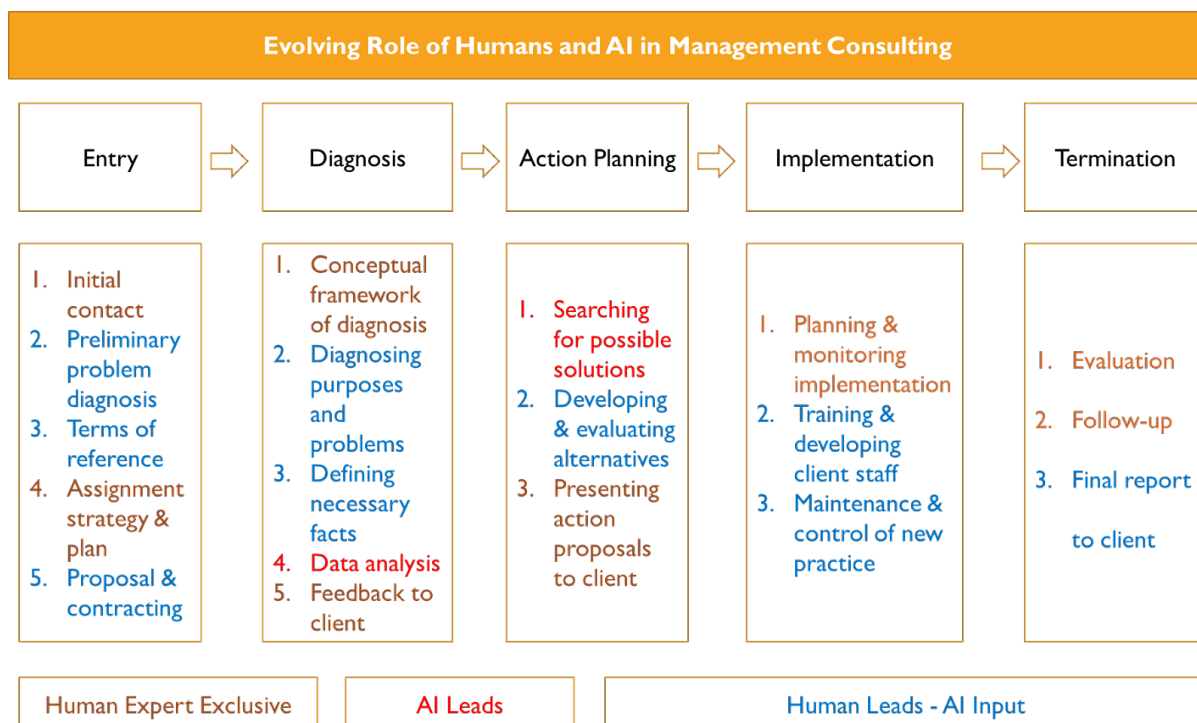


Figure 4: The evolving role of humans and AI in management consulting

Given management consulting as a people business, entry to client engagement & initial contact with the client can still be the exclusive purview of the consultant. The role of AI is elaborated in problem diagnosis in the healthcare domain (Shafi and Parwani, 2023) and opportunities for diagnostics in mechanical systems (Zhao et al., 2021). AI capabilities continue to develop for accurate problem diagnostics across industry domains and use cases. Hence, initial assessment of the problem space based on the client's brief can be the human's role in initiating the engagement. Management consultants can train AI / LLMs based on assignments completed previously and subsequently utilize AI to provide precedents for the problem statements/symptoms described by the client.

After this, standard terms of reference can be catalogued based on the types of assignments the consultant undertakes. Terms of reference may be retrieved through an AI-enabled process to help a management-consulting firm operate at scale.

AI's role is increasing in contributing to marketing strategy formulation (Eriksson, Bigi and Bonera, 2020) and as per Kiron & Scharage (MIT Sloan Management Review 2019) creating strategies with AI matters as much or even more than a strategies 'for AI'. Hence, equipped with preliminary problem diagnosis and terms of reference generated through AI intervention, the management consultant can devise an assignment strategy and plan aided by AI. AI can generate draft proposals based on templates provided by the consultant, which can be refined further by the consultant.

In the diagnosis phase, the conceptual framework for diagnosis can be generated from a human perspective. This framework can consider the people, process, and technology aspects of the problem including data & AI, supplemented by the preliminary diagnosis of the problem / opportunity statements provided by AI. With the establishment of necessary facts and data acquired, the data analysis phase can be led by AI through the use of Auto ML and LLMs. After the outcomes of the data analysis phase have been aligned, the consultant can give the client feedback on the problem diagnosis.

Both general and domain specific planning have been enabled through the use of AI (Hendler et al. 1990). In the action-planning phase of consulting, AI may generate solution patterns for the consideration of the consultant. Evaluation of the alternative solutions is the domain of the consultant with AI input, thereafter the consultant can present action proposals to the client for feedback and execution thereafter.

The role of AI in educating people (Chen et al. 2020) and in training & performance measurement (Jeffery 1983) has been postulated with considerable developments in the education technology sector (Zhang & Aslan, 2021). The consultant could carry out planning and monitoring implementation of the recommendations covering people, processes, technologies (including data & AI) with AI aiding the training and capability development activities through interactive interfaces.

Deep learning techniques are being used for predictive business process monitoring applications (Kratsch et al., 2021). The management consultant may lead maintenance and control of the new practices and client teams, with AI playing a role in monitoring whether the new processes and procedures are followed as intended in the company through the analysis of process workflows and logs.

Generative AI and LLMs are playing a role in summarizing text and documents (Bandi et al. 2023). The consultant and client sponsor can evaluate the engagement with Generative AI aiding the preparation of the final report.

As the capabilities of AI evolve and AI's ability to process natural language with LLMs, these capabilities intersect with the traditional ways of working deliverables from management consultants. As McKinsey's AI chief Alex Singla states, 'Problem-solving, creativity and change management aren't replaced by technology' (Chui et al. 2023). Given the improving capabilities of AI, it is imperative for management consulting firms and professionals to review / re-invent / reconsider their skills and professional opportunities.

Opportunities for Management Consultants

Management consultants can utilize AI in the process of consulting in a core role with data analysis and in enabling roles in other phases, as described in the earlier section.

Given the improving capabilities of AI, the following opportunities may be considered by management consulting firms and professionals:

- Helping companies develop Tech strategy and AI stack aligned to business strategy
- Learning and development of staff in new skills such as 'prompt engineering'
- Guidance/counsel on data protection and regulatory compliance, given the evolving regulatory landscape regarding data protection (Mohan & Iyengar 2021)
- Developing concepts of data valuation in enterprise valuation for M&A, investments and other scenarios (Mohan & Iyengar 2022)
- AI triggered business model transformation of software companies
- Emerging Paradigms with Information Infrastructure and Information Security
- Enhanced knowledge management content and tech for 'point of use' applications
- Public Sector – Information Security and Infrastructure Strategies for National Security

Summary

AI capabilities, particularly LLMs are rapidly evolving and increasingly intersecting with the processes and deliverables of management consultants. This development requires the attention of management consulting firms and individuals, to reskill and develop new value propositions for their clients. Management consulting firms and professionals can seek to embrace the rapid developments in AI capabilities by incorporating the use of AI in the consulting process, seeking maximum value to client from human and machine partnership in consulting.

Glossary

Term	Description
AI	Artificial Intelligence
AT&T	Americal Telephone & Telegraph Company
Auto ML	Software package to automate machine learning processes
Bard	Google's conversational generative AI technology
ChatGPT	Artificial intelligence chatbot that uses natural language processing to create humanlike conversational dialogue
DAMA	Data Management Association
DataRobot	AI software company
DPDP	India's Digital Personal Data Protection Act, 2023
EU	European Union
GDPR	EU's General Data Protection Regulation, 2016
GPT	Generative pre-trained transformers – a class of neural network models
H2O.ai	Software company that develops open-source platforms for artificial intelligence
IDC	International Data Corporation
IT	Information Technology
KPI	Key Performance Indicators
LLM	Large Language Models
Lambda	Language model for dialog applications – developed by Google
ML	Machine Learning
RNN	Artificial neural network that uses sequential data

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