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Transforming Business Operations with Large Language Models: Use Cases and Strategies

SUMMARY

Large language model based artificial intelligence has the potential to transform businesses operations. Currently the most common use cases are automating routine tasks, workflow assistance, supplementing education, generating summaries and supporting various marketing tasks. By improving data processing, large language models can greatly enhance information systems, allowing for better decision-making and faster response times. Improved data utilisation enhances management control, enabling companies to better manage their resources and achieve their strategic goals.

Keywords: Artificial intelligence , GPT, Large language models, management control, IT management

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INTRODUCTION

Machine Learning (ML) is a collection of mathematical and computational techniques for pattern recognition. Large Language Models (LLMs) are in simple terms probabilistic representations of language. They are created by analysing vast amounts of data to form connections and patterns with the help of human assisted reinforcement learning (manually assigning labels). The AIs in use currently are mostly Artificial Narrow Intelligences (ANIs) which were designed to do a very specific task such as image or voice recognition and are limited in scope.

LLMs can be further customised by supervised reinforcement learning, which has significant impact on the accuracy, quality and style of the outputs. Training LLM models is very expensive, therefore in most cases it is more cost effective to use an already pre-trained model and make small adjustments.

Most of the day-to-day processes in an organization rely on information generation, proper communication channels, the utilization of these channels and ad-hoc coordination efforts by managers. If we consider that most organisational output from inbound logistics to outbound and are composite – therefore simultaneously reliant on inputs from parallel processes across the organisational value chain – a technology that can bridge these gaps is invaluable.

A company has to store, process and utilize data. Various software solutions exist to tackle these challenges such as data bases management systems (DBM), resource planning systems (ERP), business intelligence dashboards (BI), interconnected sensor networks (IoT) and various data processing solutions (BigData). LLMs have the potential to streamline how various software solutions interface with business operations.

LLMs process inputs with Natural Language Processing (NLP) to enable the creation of interactive agents that can be prompted to tackle tasks of various complexity. Currently the most well-known LLMs are ChatGPT and GPT4 from OpenAI, Claude2 from Anthropic, Bard from Google and LLaMA2 from Meta. Most of the publicly available agents don't have direct access to the internet they respond based on their training data that has a cut-off date. The models are multi-modal which means they can process different types of input such as text and images. It is important to make the distinction between the ability the process an input and to understand it, results indicate that LLM models simply process the inputs, but don't understand them (Qi et al., 2023).

METHODOLOGY

This paper aims to explore the potential business applications and strategies of large language models as it relates to organisational and workflow transformation across the value chain by a review of self-selected published literature. Since this paper deals with a subsection of a very recent emergent technology there is a limited number of papers available with any actual implementation results, as most are protected by non-disclosure agreements.

RESULTS

Actual data on organisational implementations is almost non-existent (Just, 2023). The technology is not at a state where companies would consider substituting employees with LLM agents. An employee has to be reliable, accountable and deployable. Currently these cannot be ensured when it comes to LLM agents. Reliability means the expected errors are limited and measurable. Currently acceptable level of reliability requires human supervision, which considerably limits the upside of the technology. A major strength of IT solutions is that they can work parallel, but it makes it difficult to micro-manage them real time and accountability is hard to assign.

The risks and implications of LLMs is not very well understood yet therefore, the current and near future uses cases will be limited to lower frequency and lower stakes tasks or tasks that are constantly supervised such as real time assistance, monitoring, alternative and content generation (Wu et al., 2023). As the technology develops and is better understood, it has the capability to automate most processes within the organisation. The costs savings and lead time gains achievable with LLMs will be hard to ignore for management. Its deployable nature means, the technology is flexible enough to be deployed in a large number of different scenarios. Before wide spread

Table 1: Survey for use cases

Company	Opportunities
DHL (Leading logistics company)	DHL believes that GenAI/ChatGPT can be widely used in warehouse operations and in the driver's cabin.
Instacart (Leading grocery delivery and pick-up service)	With the support of the ChatGPT plugin, customers are able to shop for food more efficiently and ask for recipes from ChatGPT. In addition, derived from the conversation, ChatGPT can create the orders to be delivered to the customer in an easy way.
Salesforce ("Leading cloud-based software company for sales and customer relationship")	"ChatGPT app for Slack" can instantly summarize large amounts of information and find answers instantly about any topic. Also, it can be used to identify the best practices of a topic or draft messages in a few seconds.
Zalando ("Leading European online platform for fashion")	The company expects that the assistant can improve the customer's interaction and navigation through the assortment and support discovery and shopping in a better way.

Source: Wamba et al., 2023

Table 2: Generative AI use among marketers: Some representative surveys

Survey conducted by	Findings
Salesforce	Key finding: Generative AI saves marketers over five hours of work per week.
Boston Consulting Group	Use case: (67%) insight generation (51%) and content creation (49%).
AI-powered marketing chat solution provider Botco.ai	Performance benefits: (58%), increased creative variety (50%) cost efficiencies (50%), faster creative cycles (47%), ability to learn and improve (39%), augmentation of human creativity (34%).
The Conference Board, in collaboration with Ragan Communications	Use cases: summarizing content (44%), doing the legwork/ stimulating creative thinking (41%), personalizing of customer/user content (33%), research (30%), generating content faster (30%), enhancing customer service (17 %).
Software company Sitecore ("AI & Composable Marketing Software Survey")	Improving customer relations: more personalized content (75%), a better understanding of customer needs (74%), ability to provide a stream of relevant content (67%).
Management consulting company Chief Outsiders	Highest value use cases (out of 8): content creation and management (7.37), market research and competitive insights (6.1), digital marketing (5.6).

Source: Kshetri et al., 2023

adoption and integration, a supervision framework must be developed to limit the scope and the frequency of error. Supervisory AI agents must be created to monitor AI activity without losing to much efficiency.

The customer facing benefits of LLM systems help companies to attain new capabilities such as chatbots that provide a personal experience for each individual customer (Rese – Tränkner, 2023). It is important to note that the quality of prompts does impact the performance of LLM systems (Qi et al., 2023).

As business performance is always constrained by resource availability any technology that can generate new capabilities will have an impact not only on business operations but potentially also on the business model as a whole. When we measure performance, output (how productive) and outcome (proximity to strategic objectives) are key determining factors. Based on the surveys, we can clearly see that frequency of tasks (how often they repeat) can be vastly enhanced with LLM agents, and the aspect of personalisation (accuracy vs. demand) at scale, enable an entirely new approach to improve business outcomes.

Bottlenecks and lack of time are amongst the most common issues in the innovation process. How many FTE (Full Time Equivalent) of key research personnel we can assign to various innovation projects has a major impact on project performance and scope. LLM agents can act as a multiplier to the available FTEs of key personnel pushing them more towards a supervisory and strategic role. New capabilities (such as automated retrieval of relevant information, systematisation of domain-specific information, complexity reduction) and the system's ability to directly interface with project members to provide ad-hoc field specific guidance can ensure everyone is working towards the same goal with improved precision and efficiency. To achieve satisfactory performance metrics training talent with knowledge about the full scope of the LLM agents is a necessary time investment (Kshetri et al., 2023).

The goal of Business Process Management (BPM) is to improve business operations, to ensure the company functions in a manner that is both efficient and aligned with strategic objectives. The level and quality of this alignment has a major impact on performance metrics. The ability of LLM agents to extract information from large data sets and present it in an interactive and organised manner is key not only for the innovation process but also on the business operations side. LLM agents can interface with other software through their APIs (Application Programming Interfaces) and take a coordinator role (Vigof et al., 2023).

A poorly managed BPM process can hinder business operations just as much as the perceived improvements it provides. Current IT systems such as ERP and BI already help to manage and monitor processes, but searching for bottlenecks on a process-by-process basis is still a time-consuming task due to the amount of data that needs to be analysed. With the help of LLMs both the process owners and the BPM team can extract information and create models real time in a less disruptive manner.

The keywords of Industry 4.0 are integration (vertical and horizontal) and monitoring (sensor network). These tasks require real time communication (between machines, machine and supervisor) and constant review of sensor data. Since integration is already enabled by a software and sensor layer (IoT), it stands to reason that interpretation of sensor data and adjustment recommendation generation would also be an excellent fit for LLM agents (Javaid et al., 2023). The applications of the technology are numerous and it can contribute to a more reliable supply chain (Wamba et al., 2023).

CONCLUSIONS

The main drivers of efficiency and performance in a business organisation is the proper allocation of resources. Proper information flow enables the strategic alignment of resources and capabilities. Strategic and operational planning create a

Table 3: Innovation search with NLP

NLP approach	Process outcome
Semantic search	Overcome dominance of core concepts, identification of hidden relationships across different disciplines and information sources.
Text embedding	Semantic text representation of solution related information, foundation for many other complementary NLP approaches.
Topic modelling	Dynamic updates and anticipation of, opportunities, overcome the dominance of popular ideas, identify potential success patterns.
Association analysis	Automated generation of associations, relating different information sources, reduced complexity in volatile environments.
Text classification	Automated retrieval of relevant content, dynamic updates about customer feedback, anticipation of potential.
Clustering	Summarize attributes into coherent groups and hierarchies, avoid rigid classification schemes.
Network analysis	Identification of central and connecting entities, capture dynamic changes.
Knowledge base	Systematization of domain-specific information, relating different domains, dynamic updates about customer feedback and potential improvements.
Dimension reduction	Visualizations of patent and idea landscapes and possible solution paths, overcome fixation or production blocking in idea generation.
Keyword combination	Overcome fixation or production blocking in idea generation, dynamic and customized stimuli update, automated idea generation.

Source: Just, 2023

framework for the organisation to function in. The better the framework the better the company will perform. LLM agents are a good fit to participate in the management of internal processes that requires the evaluation of large sets of data in a time sensitive manner. Not only does this make the process much faster, but it enables employees to evaluate their own tasks with the help of an interactive interface.

Use cases vary in difficulty of implementation and resource requirements. While implementing the technology in the innovation process for idea and alternative generation may seem tempting the costs of supervision – in terms of available time – by highly trained research experts is high.

Most companies consider the lowest hanging fruit marketing. Customer facing chatbots present a low risk and high return opportunity. It allows the company to simultaneously communicate with a previously non-feasible amount of current and potential customers. The LLM agents not only increase efficiency but enable a previously unattainable level of personalisation to help companies retain and acquire new customers.

Table 4: Large language models and the Business Process Management lifecycle

BPM steps	Tasks	LLM opportunity
Identification	Not much structured process knowledge available in the company, and relevant information has to be extracted from heterogeneous internal documentation.	– Identifying processes from documentation – Process selection
Discovery	One or a combination of process discovery methods is selected to produce process models.	– Process discovery from documentation – Process discovery from communication logs – Interview chatbot – Combined process discovery – Process model querying
Analysis	The discovered processes are analysed to find problems and bottlenecks.	– Issue discovery – Issue spotting
Redesign	Process improvement suggestions are developed based on discovered issues and general process improvement methods.	– Business process improvement
Implementation	It covers organizational and technical changes required to change the way of working of process participants as well as IT support for the to-be process.	– BPMN model explanations with plain text – BPMN model chatbot – Process orchestrator
Monitoring	Already implemented processes are executed, and their performance is monitored.	– Process dashboard chatbot

Source: Vidgof et al., 2023

Table 5: Applications of ChatGPT for Industry 4.0

1. Real-time direction and training to the workers	6. Automate various tasks	11. Better planning for industrial operations	16. Handling customer support issues	20. Analyse and process client enquiries
2. Provide task lists and schedules	7. Improve cooperation between people and robots	12. Enhance human machine interaction	17. Helps for the creation of new products	21. Helps to automate inventory management
3. Analysed industrial data	8. Create technical documentation on manufacturing	13. Problem -solving	18. Potential to reduce the time to market	22. Better to meet customer demand
4. Analyse possible danger	9. Enhancing the efficiency	14. Improve predictive maintenance	19. Examine massive data sets of components	23. Management of logistics
5. Optimise maintenance schedules	10. Quality control in manufacturing	15. Helps to perform supply chain management operations		

Source: Javaid et al., 2023

Currently the technology is being used mostly as an add-on rather than something that fundamentally transforms business operations. As it stands the black box nature (cause and effect relationships are hidden) and the reliability of LLM agents limit the potential scope of their integration. We are still in the exploration phase where best practices haven't been developed yet, so data about successful implementation projects are guarded as enterprise secrets. We can expect companies to start advertising their achievements soon to attract top talent.

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