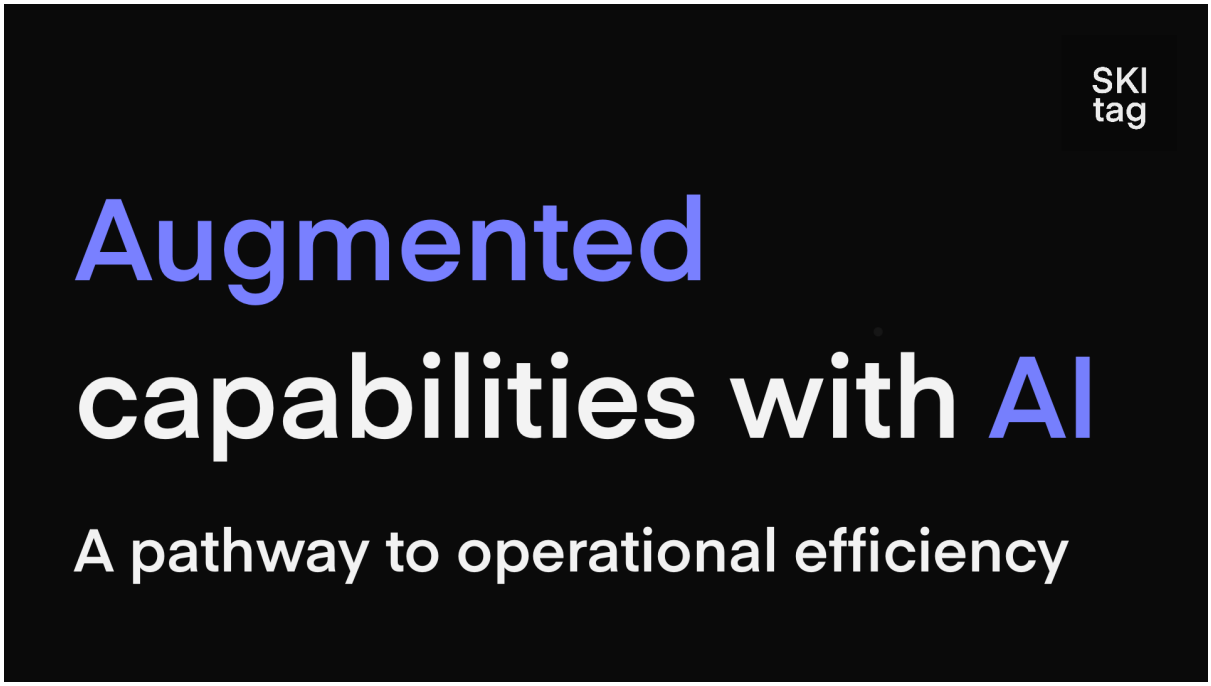

Augmented capabilities with AI

A pathway to operational efficiency

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Big data analytics (BD), data science (DS), digital transformation, machine learning (ML), artificial intelligence (Narrow AI), or generative artificial intelligence (GenAI), they all emerge and evolve with a common goal: augmenting human beings' capabilities to solve problems in a better way (e.g. better informed, efficient, effective, frictionless, and even risk-free decision-making). As a matter of fact, some see the combination (or the composite) of all these components as a source of superhuman augmented capabilities. This note will address the **value proposition of AI** in a company looking for operational efficiencies.

What's the problem?

Let's begin with a list of the most common problems to solve for operational efficiencies. Starting from the basics (macro-overview), some companies might face uncertainties related to the price and availability of **commodities**, the costs derived from the **logistics** to get supplies and to deliver their products, and the intrinsic dynamics of the **market**, including **economics** and **politics** events, or the design of an industrial process or a product. Each of these categories can be decomposed into many small subcategories (micro-overview), all of them with impact in a company's operational efficiency. On the other hand, there are some external dynamics that also can have impact on the operations of a company. For instance, changing climate conditions, natural disasters,

and even sudden conflicts, among others, can introduce disruptive effects on a company's operations (e.g. Black Swan events).

Somehow, all of them leave a trace as actionable data. Some are very easy to find, collect, and process, and some others are costly and very hard to work with. Moreover, some signals must be estimated or engineered until some innovation translates that information into an actionable source of intelligence. Physical, digital, and even biological worlds are connected in a very complex way. Fortunately, most of these connections are measurable. Artificial Intelligence tools are helping the ecosystem to reduce the gap between what is measured and what is potentially measurable. Probably, this is the most important source of opportunities for a company looking for operational efficiencies, together with the proliferation of edge devices that connects the physical and the digital world in so many ways, even within the range of a company's operations.

Where to start with?

Starting by collecting the available data (structured and unstructured) seems to be the most reliable strategy for most of the projects. This is a logic first step since common sense on AI says that the success or failure of an AI-driven implementation will rely on the quality and availability of the data. In other words, no matter what kind of AI technology a company is implementing, whether it is the most advanced neural network model, or a simpler decision tree model, poor data will output poor predictions, while good quality data will output high quality predictions.

Sometimes the information is collected within the operations of the company. Some other times the information can be augmented thanks to some strategic stakeholders that have already implemented AI-driven, or data-driven solutions to their operations, and can share some insightful and actionable datasets to build AI-driven and data-driven synergies within their own ecosystem. Finding or encouraging this kind of stakeholders is a good strategy for gaining additional operational efficiencies out of the existing datasets.

Starting with an inventory of "What's the problem", "Who are the stakeholders", and "What's the data" seems to be a good alternative roadmap for implementing any AI-driven operational efficiency. Set some metrics like KPIs, or OKRs to benchmark your starting point and evaluate the operational efficiency gains (or losses). Next, take a look at the AI and data analytics toolbox to see what the best implementation is to improve those operational efficiencies, i.e. "What's the value proposition".

Finally, measure your results (outputs) and evaluate the effort invested in this project. It is a wise strategy to start with a sandbox environment before moving on to production. Moreover, an AI-driven implementation could be the tool used to evaluate the impact of other AI and/or data-driven implementations. Like smart spaces, immersive reality, simulations and optimizations, etc. Why not fine tuning a company's operation domain

specific Generative AI to come up with actionable insights to start with? Ask your "ChatOPS" what's next.

What's the value proposition?

AI and data-driven solutions augment the capabilities of people by letting them obtain actionable insights out of the datasets in an efficient and scalable way, automate some tasks, or scale (augment) their capacity to complete repetitive tasks. There are a few examples of *operational efficiencies (i.e. value proposition)* derived from the augmentation of capabilities with **AI** below:

- **Narrow AI**, deep learning models trained (supervised and unsupervised learning) to perform a domain specific task, i.e. find patterns out of the input datasets to classify/discriminate events. ***Value proposition****: predictive markets, or predictive maintenance*.
- **Generative AI**, deep learning models trained (self-learning) to predict the next token (e.g. word, image, audio, formula component) in a sequence of events, or trained to generate outputs having the same distribution of the inputs. ***Value proposition****: Automation and scalability of some tasks, Industrial Design, Virtual Assistant, Content Generation (e.g. marketing), Insight Generation (e.g. intelligence analysis), User Experience enhancement, or Knowledge Base (e.g. Compliance)*.
- **Immersive Reality**, hardware and software technologies (e.g. headsets, mobile devices, spatial computing, etc.) implementing Virtual Reality, Augmented Reality, or Extended Reality, that allows the creation of virtual environments (e.g. metaverse) and lets the user interact in a seamless and immersive way with other real users, digital representations of them, or even with physical objects. ***Value proposition****: Digital Twins, Operation Exercise, Simulations and Optimizations, Employee Engagement, Employee Training, Virtual Corporate Presence, Virtual Tour*.
- **Composite AI**, defined as the combination of Narrow AI, Generative AI, and Immersive Reality, among other core techs, into a composite of technologies that augments the capabilities of humans, AI-driven implementations, simulations, and optimizations. It is very close to the concept known as **Smart Spaces** (*e.g. a combination of solutions implementing IOTs, AI, and robotics to connect a digital representation of an operation within its physical space*). ***Value proposition****: Complex Problem Solving, Crop Management, Fish Farming, Weather-driven Early Warning Insights*.

Augmented capabilities

Can AI augment the capabilities of a company to work on its operational efficiency? Of course. There are lots of possible problems to solve and value propositions to operational efficiencies. The larger the company, the greater the possibilities to find use cases where AI can bring some positive outputs. Even though starting with understanding the data ecosystem of the company's operations is the smartest way to start with, think about **prioritizing the problems that must be solved**, what are the **main stakeholders involved in that problem**, what is the data, and then go to the AI toolbox to match your problem with the many AI and data-driven value propositions available to solve them. Whether it is a simple Narrow AI, or building a Smart Space within your company, AI can augment your company's capabilities to gain operational efficiencies.

Annex I

What are the tools that AI offers?

A list of the most useful tools that a Digital Transformation task force can have:

- **Data**, meaning the capability to collect and process insightful data. This is probably the most important tool, the most available, and sometimes the most underutilized resource. The most common types of datasets a company can take advantage of are: Time series data (e.g. commodity prices), Structured data (e.g. transactional data), or Unstructured data (e.g. text, image, and audio)
- **Machine Learning**, meaning the algorithms (unsupervised, supervised, or reinforcement learning) used to find hidden patterns from datasets used for classification tasks (e.g. Clustering, Decision Trees, Deep Neural Networks, Graph Neural Networks, Recurrent Neural Networks, Convolutional Neural Networks, or Transformers)
- **Generative AI**, meaning the technology designed to output data that is similar but not the same to the input. It can be text, image, audio, or video. ChatGPT, or DALL-E are examples of this kind of technology (e.g. Auto-encoders, Generative Adversarial Networks - GANs, Transformers, or Diffusion Models). It can be used to generate content, augment the capabilities of employees to process information, complete and/or automate tasks, or coding.