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Benefits of Transforming Organizations to Be Data–Driven and More Innovative

Summary

Based on multiple and unconnected literature it seems evident knowledge-based leadership styles positively influence organizational capacity for innovation, while some papers also denote lack of available literature to really understand relationships in. In general, the positive relationship is confirmed based on the findings. Also, it seems we're at the doorstep of the next organizational transformations leveraging data and artificial intelligence. This would complement knowledge-based management styles by bringing a scientific aspect. Merging these could result in innovation targeting specific business metrics more precisely and more efficiently. To succeed in that regard, organizational leaders will have to develop the right skills in these technologies to act as a catalyst for transformation.

Keywords: Data-driven leadership, Transformation, Organization management, Innovation

Jel codes: J50, J53, C50, C80

Introduction

Knowledge-based leadership has been in the works and a vivid topic of discussions for a long time when it comes to the enterprise management landscape. It is the process of relying on open communication across different levels and departments of the corporation, while ensuring everyone has his or her voice heard. It's not only beneficial to the people for its openness and fostering a welcoming culture, but also for a company that seeks continued innovation as a tool for its success.

(Black & Lynch, 2004) for example argues that changes in workplace organization. As driving factors, their paper mentions re-engineering, teams, incentive pay and employee voice, have been a significant component of the turnaround in productivity growth in the US during the 1990s. They further argue, that the steep productivity hike seen during the 90s is not solely driven by computers but is rather a multi-factor model and those who seek to understand it, they need to capture these additional factors as well.

While knowledge-based leadership and organizational reforms are definitely helpful, when it comes to practical data, the openness and fairness of the workspace often faces barriers a company's management is not willing to overcome, hence deciding to operate on a need-to-know basis. Arguably, the most solid and transparent source of information that is often considered sensitive is enterprise resource management (ERP) data. This relatively sensitive data on the other hand is equipped to arm an organization with the competitive advantage that only comes from sharing insights and responsibilities, making a matrix-like organization instead of the top-down managed structure.

While it sparks a fierce debate, being data-driven is increasingly more important for businesses to build effective tools to navigate the competitive terrain of their industries, hence time is due to re-assess the benefits of knowledge-driven organizations, compare them with organizations operating on a need-to-know basis and understand how data creates value in that aspect.

Innovation as an Organizational Tool for Success

In the following section we take a look at individual literatures regarding the most important topics ranging from innovation, what makes an innovation worthwhile for companies and conclude on the synthesis of related literature. The review is arranged in a timely order to depict the changes and directions of management principles over time in a concise manner, by revising only the closely relevant literature to the paper's topic.

The first paper reviewed focuses on organizational benefits and states they are a primarily factor leading company investment, there's literature indicating some sociological benefits as well. Even very early research (Tweksbuty et al, 1980) points to the conclusion that commercial innovations shows that there is great benefit to society that is often not reflected in the rate of return to the innovator.

Taking the conclusion further and applying the principle to how organizations are managed today, we can still see many links building on that early principle.

Indeed, the paper presents some good evidence to highlight the right innovation management helps a long way when it comes to redefining innovation within an organization. As (Leiponen & Helfat, 2009) further suggests, innovation comes with some more benefits that we might not think of the first time: which is moving operations or a company's operational areas in a horizontal direction. Their paper highlighted firms can improve the odds of success by pursuing multiple parallel objectives. To do so, a good way seems to be able to tap into a large number of knowledge sources. Furthermore, their research also suggested broader horizons of innovation objectives are associated with successful innovations, without diminishing results identified or noted when it comes to breadth in innovation objectives.

In the next paper reviewed (Kiron et al, 2012) focuses on the innovations from a sustainability perspective, few would argue an extremely important topic on today's market with an ever-rising focus on ESG scores and sustainability. As they said, "In any company, customer demand for sustainable products can be a compelling force for organizational change. The combination of sustainability-oriented collaboration and business model change is strongly correlated with sustainability-based profits. It has been observed that companies that change their business models due to sustainability and make sustainability a permanent part of top management's agenda appear more

likely to profit from their sustainability efforts than companies that make sustainability-related changes without that level of top management support."

Kiron's research makes it clear that companies are very much willing to invest into innovation when there is a clear path for reward, but they need top-down level management support to succeed.

More research arrived to a similar conclusion. Return on any investment is crucial for organizations racing in the market's landscape. As (Raasch & Hippel, 2013) suggested, it is one of the most important drivers to make a decision about an investment whether developing an innovation will be worthwhile, they tend to focus on the economic value of the outcome of the innovation process.

Building on that same thought a few years later, (Sadeghi & Rad, 2018) suggested, innovation is one of the key factors that makes any organization stand out from its competitors in today's ferociously competitive markets. Based on their findings, there is a meaningful relationship between knowledge management and innovation performance (the identified a coefficient value of 0.73) and between knowledge-based leadership and innovation performance (with a coefficient value of 0.73).

The literature showcases different takes on how innovation, but most papers seem to agree innovation is a crucial to outperform market peers via targeted investment in such activities. It's also clear innovation is not a charity-operation, even when it comes to sustainability. Seemingly there is a direct link to such innovations and a company's top line revenue.

Knowledge-Based Leadership

As we argued during the introduction, knowledge-based leadership is far from being new. It is the well-known process of encouraging openness and transparency in the workspace. As such a powerful leadership methodology, it has plenty of research papers to tap into. We'll overview some of those which ones we deem fit closely to this paper in order to consolidate information and provide the reader with a concise overview.

Firstly, the earliest research we look at from (English, 2006) focuses on the unintended consequences of the knowledge-based management, more precisely on standardizing knowledge base in educational leadership and building national standards. They argued standards assume the existence of a static knowledge base tied to a static social system. A very interesting point English notes in his paper is the fact current skill sets contained in the standards are in their essence antichange and antidemocratic, and the system as a whole needs to be challenged.

While this paper mostly on the enterprise related operations, the baseline of the above paper is something we could personally agree with, and considering the amount of educated workforce we thought this is an interesting example to include in the scope of our research to emphasize the importance of challenging the current stat of affairs.

(Gibney et al, 2009) in a later study committed to address changing leadership principles and tasks, with a focus on social governance (development of cities and regions). One of the very interesting points they note in their paper is the emergence of the creative cities and knowledge-based regions. It is their paper where the idea of such physical(space) and knowledge-based leadership clashes with each other. Even they note the lack of alignment of literature on leadership and

place-shaping, while they present an argument for a more competitive approach in this area.

With reviewing this next paper, we zoom in on the area of enterprise operations and leadership. A paper from (Donate & Pablo, 2015) focuses on examining specific organizational leadership types, including knowledge-based leadership. They focus on occasions where the inspiration of innovation is desired. Their results highlight that, knowledge management practices are important for innovation. Further, they note that the existence knowledge-based leadership encourages the development innovation practices, which therefore increases a firm's ability to improve it's performance in new production development or innovation.

The next paper subject to review from (Zia, 2020) establishes a clear relationship between knowledge-based mangement and innovation, while focusing on the small and medium enterprise sector. Zia's paper aims to put light on the relationship between knowledge-oriented leadership and related innovation performance on a project basis. The research concludes that knowledge-oriented leadership has a positive effect on innovation performance.

Finally, another recent study from (Ardi et al, 2020) looked into the effects of different leadership styles and their effect on innovativeness. Based on their review, the effect of transformative leadership styles has a positive effect on organizational innovativeness. On the other hand, they denote the fact corporations often face challenges when it comes to establishing the link between leadership style and real innovativeness.

Finally, one of the very fresh studies from (Bagheri et al, 2022) focuses on CEO level management patterns and their influence on organizational behavior. In their research they explored entrepreneurial practices of CEOs and how it affected their employees capability to innovate at the workplace in a knowledge-based corporation environment. The sample applied for their research was selected from Iranian firms using a simple random sampling method, encompassing 41 CEOs and 207 employees. The found that the practices of CEOs had power to enhance creativity on an individual level.

(Mariam et al, 2022) in a somewhat similar paper debated the effects of knowledge-based leadership on team cohesion and project success. While conducting the research they collected data from 121 employees and analyzed survey data. Their findings suggest that positive linkage is present between knowledge-based leadership and project success. Team cohesion was also partially mediated in the process, assumable by valuing people positively. Interestingly, the complexity of projects had a limited explanation power on project success.

(Donate et al, 2022) tired to explore some of the more unconventional roles of management style in the hotel industry. They mention the term "deceptive knowledge hiding", which hingers the creativity and innovativeness of an organization. They note the need for an engagement approach to mitigate deceptiveness and reduce conflicts. Their findings confirm that management conflicts erode innovation in the organization, and conclude that knowledge-based leadership has a positive and strong relationship with managing innovation in the organization.

Finally, (Liu et al, 2022) made mention of knowledge management and leadership in the context of organizational performance in a very recent study. Interestingly and in spite of

many other literature reviewed here, they denote multiple inconsistencies while evaluating the impact of management style and organizational performance. As the paper reads, "the findings, stemming from 6,272 research subjects making up 22 studies, demonstrate that KM leadership is positively associated with the overall (financial and non-financial) performance of firms." On the other hand, it's somewhat impacted by national cultures, industry or economic situation.

Using Data in Leadership

Based on the findings and literature we reviewed in the previous section there's a relatively transparent relationship between how an organization's capabilities to innovate itself benefits from the right culture and leadership. The leadership we're referring to directly translates to disseminating knowledge within the organization and therefore creating a so-called knowledge-based or oriented leadership style. We reviewed multiple examples how this openness within an organization influences its capabilities to innovate, which is highly likely to also affect the top line revenue positively.

While this is already beneficial, how such leadership style could be further leveraged for the best results in today's market? With IoT 4.0 and ERP systems being more popular than ever before on an enterprise scale, organizations need to tap into the power of data. This is especially true with the ever-growing amount of data organizations produce, and the best tools there ever were to leverage that data (see big data, machine learning, artificial intelligence). With this, the natural next milestones to establish a data-driven organization is around the corner, and leveraging this data in a structured way seems to be the next step in knowledge-based enterprise management.

As (Fabjan et al, 2017) noted, there's an ongoing increase in software companies and in their efforts to become data-driven. This is achieved by experimenting with products used by customers, and trying to gain a competitive edge by testing different technologies. In their paper, they establish a so-called „Experimentation Evolution Model", which evaluates the proess of moving ad-hoc customer data analysis towards controller experiments. The model looked at technical, organizational and business-related metrics to evaluate organizations. The model they designed is a significant effort to take data in a controller environment and optimize business cases, therefore I considered this as relevant literature when it comes to data-driven organizations.

In further studies, (Andersen et al, 2018) took mention of data-driven technologies automating labour-intensive and repetitive work. This way of working challenges the currently established labor market, and machine learning and analytics in general challenge managers leading companies. Their article frames the situation very well by also denoting that many of the current companies are being led on an intuition basis, while this reformation of technology and data comes with the promise of changing that into a more scientific process that is based on algorithms. They argue that with the right tools companies can be thought of as "intelligent enterprises" with enhanced abilities to sense, comprehend, act and learn. This would of course require existing management to learn these new tools and skills to help the transformation of their companies.

(BERNDTSSON et al, 2020) conducted a wide-spectrum study on attempts organizations make to become data-driven.

This compliments the earlier studies well as tried to capture the situation form a practical perspective. Their paper states that becoming data-driven as an enterprise is becoming a vision of more companies, and is something that is frequently mentioned in scientific literatures as well, while also taking note data-driven organizations are likely to be more successful than organizations without such capabilities.

Their paper also makes note of that only a few enterprises make a successful transitioning to become data-driven, and this is due to a number of reasons. Their article investigated the journey of 13 such organizations taking the path to be data-driven, and they documented a list of factors considering this journey:

  i) how they scaled up the usage of analytics to become data-driven;
 ii) strategies developed;
iii) barriers encountered; and
 iv) usage of an overall change process.

Their findings suggest that most organizations start he transformation by a pilot project and then start taking shortcuts when establishing the next steps in their journey. This then results in a lack of overall change in management processes.

In a study researching a somewhat similar topic of unlocking data-driven organizations, (Fletcher et al, 2020) looked into the central role of data insights in organizations and denoted data quality as a factor. They note "Unreliable, erroneous, and incomplete data lead to critical bottlenecks in processing pipelines and, ultimately, service failures, which are disastrous for the competitive performance of the organization." In their paper, they argue that the quality of data is one of the distinctive factors enabling data scientists and data engineers to deliver value for an organization. They also take note that other than data quality and the right technology, its also a differentiating factor if an organizations identifies the central importance of meaningful and maintainable data, and its democratization, especially as organizations are increasingly relying on data.

A very recent study from (Chowdhury et al, 2022) focused on the transformative powers of artificial intelligence and its collaboration with human labor. They denote an impact of such relationships on business performance and apply "a novel theoretical model examining the relationships between knowledge sharing, employees' AI skills, trust, and role clarity in a collaborative working environment to enhance business performance". In the paper the researchers conducted survey with 164 employees in creative industries. The findings presented evidence to develop collaborative capabilities with AI in these organizations.

(Kayabay et al, 2022) looked into data science roadmapping in their recent research. As they said, leveraging data and data science – which is a way of applying statistical models of machine learning algorithms on top of data to create meaningful business insights – according to their paper, many industries are struggling to take use of data science in real life business processes as they lack a comprehensive approach such as a well-established roadmap. The proposed approach is to build a technology roadmap for these activities that include context, architecture and process design revolving around data science related activities. This will then help to establish collaboration in an agile way and facilitate generating or realizing value from

such activities. The depicted process in the paper - Data Science Roadmapping (DSR) - will therefore act as a guide for the organization and a source of information to get all the required insights regarding how to establish the right data science related tools and processes.

Conclusions and Next Steps

Based on the literature review of knowledge-based leadership, it seems to be a universal agreement that it affects innovation positively. On the other hand, some papers denote either a lack of available literature to really understand relationships in detail, or they highlight challenges when it comes to fairness or translating efforts into real innovation impact. That said, the link between leadership styles and corporate performance for innovation seems to be clear based on multiple papers. Furthermore, its not just a leadership style, but as some of the papers denoted the organization nature in terms of how it operates, whether it provides transparency to its employees and makes details and knowledge available to them also has the capacity to directly impact the top line revenue of the company by altering the success of its innovations.

While some of the earlier operating models were on a need-to-know basis, today it's relatively accepted by large scale organizations that being knowledge-based is the way forward. The next step is to translate this into today's market and technology environment. Today, after many of the companies are either implemented a Big data or complex ERP system and also went through the IoT 4.0. revolution, it is an important aspect to turn data into knowledge and then realize business value. Multiple papers also backed up the theory of data technologies disrupting how companies operate, while some of them also put emphasis on the importance of building the right processes and tools to overcome organizational barriers.

One of the papers also took mention of data-driven technologies automating labour-intensive and repetitive work. This is definitely a disruptive change induced by technology, and has the power to potentially directly influence the operations of many companies. If we think about how excel transformed the workplace after its release, and what innovation and automation capabilities visual basic represented, the power of artificial intelligence driven advanced solutions becomes extremely apparent. While these technologies are way more complex to implement of course, the magnitude of effect they can potentially have is also much higher – but for such effect to successfully materialize, companies need to establish and reach multiple goals, including the right data collection, data quality and engineering practices for A.I. to leverage and be built on.

To connect these dots, in today's world for those organizations which ones successfully implemented knowledge-based leadership models and were succeeding in their innovation activities, leveraging data seems the next step to maintain their edge on the market. To succeed in these activities, managers and organizational leaders who already embraced the open-minded leadership based on knowledge also need to step up their skills to guide their organizations to be data-driven and apply the relevant technologies. The final steps might include also tightly monitoring data quality, leveraging artificial intelligence and building a data-driven organization roadmap that leverages the best of both worlds – being data-driven and utilizing knowledge-based leadership styles to maintain the in-

novative nature of the workplace while supplementing teams with timely and high quality data insights. If done right, these enhancements seem to enhance an organization's capacity to deliver innovation addressing or improving the right business metrics in a scientifically fine-tuned manner.

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