



Research Article

The Relationship between Business Intelligence and Sustainable Human Resources

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Abstract. The research explores the relationship between Business Intelligence (BI) and Sustainable Human Resource Management (Sustainable HRM), focusing on how BI tools enhance HR practices and contribute to organizational sustainability. As organizations strive for sustainable growth, the integration of BI with Sustainable HRM emerges as a critical strategy. The study addresses the gap in literature concerning the integration of BI in HRM and evaluates how BI-driven insights can improve HR decision-making, thereby enhancing organizational performance. The research questions focus on the dependencies between BI and HR, exploring the ways in which BI influences HR practices and sustainability outcomes. This study examines how BI aids in decision-making processes by providing comprehensive data analytics, thus fostering a dynamic and competitive business environment. Additionally, Sustainable HRM aligns HR practices with long-term organizational goals, emphasizing social responsibility, environmental care, and economic viability. Findings indicate that BI significantly enhances HR practices by providing data-driven insights that improve recruitment, training, and

overall workforce management. However, challenges remain in aligning BI with HR strategies due to cultural and technological gaps. The study concludes that effective integration of BI into Sustainable HRM can lead to improved organizational sustainability, offering prescriptive advice for HR professionals to leverage BI tools for strategic decision-making. This research contributes to the fields of BI and HRM by demonstrating the critical role of BI in fostering sustainable HR practices, thereby promoting long-term organizational success.

Keywords: Business Intelligence, Sustainable Human Resource Management, Organizational Sustainability, Data-Driven HR, Competitive Advantage.

INTRODUCTION

The current Asian economic recovery is beginning to show signs of sustainable growth. What sustainable growth entails is the ability for organizations to maintain their growth momentum over a long period of time. This involves remaining competitive, being innovative and most importantly, being able to renew human and material resources. Sustainable growth has long been a topic of interest for economists and policymakers; however, there has been little investigation in the area of human resource intelligence and its contribution to sustainable growth. The integration of Business Intelligence (BI) with Sustainable Human Resource Management (HRM) is becoming increasingly critical for organizational success and longevity. BI, a pivotal tool in the decision-making process, enhances business value by enabling the analysis of extensive organizational data, revealing trends and patterns that inform strategic decisions (Jayeola et al., 2022; Paradza & Daramola, 2021). This capability is instrumental in fostering a dynamic, competitive, and sustainable business environment (Al-Kasasbeh et al., 2022; Abousweilem et al., 2023; Mert et al., 2022).

Simultaneously, Sustainable HRM emerges as a vital approach, focusing on aligning HR practices with long-term organizational sustainability goals. It aims to create a workplace culture that is not only productive but also adheres to principles of social responsibility, environmental care, and economic viability (Yamin et al., 2023; Faisal, 2023). The concept emphasizes the importance of human capital in driving organizational change and sustainability initiatives, showcasing a clear overlap with the strategic outputs derived from BI systems. Recent studies highlight the need for organizations to adapt to global industrialization impacts, which necessitate stronger integration between BI-driven insights and sustainable HR practices. These practices are designed to navigate the complexities of modern business challenges, including workforce management, ethical practices, and environmental concerns, ensuring a balanced approach to achieving business objectives and sustainability goals (Al-Kasasbeh, 2022; Roca-Puig, 2020).

Purpose of Study

The purpose of this study is to examine the relationship between BI and Sustainable Human Resources (HR). This is of growing importance for a number of reasons. At a general level, there has been an increasing interest in the more strategic role of HR, and the value it can bring to an organisation, in terms of gaining

competitive advantage. This can be seen in the evolution of the HR function from Personnel to HR to Strategic HR and more recently to Sustainable HR (Piwovar-Sulej, 2021). This last development, Sustainable HR is characterized by an approach which seeks to take a long-term perspective to the management of HR and that emphasizes the need to consider the interests of various stakeholder groups in the HR decision-making processes (Liang et al., 2024). An increasing number of organizations wish to understand what Sustainable HR means for their organization and how they can achieve it. From a BI perspective, recent benchmark studies have consistently reported low levels of maturity, in terms of the actual and perceived value that HR is delivering to the organization (McCartney & Fu, 2022). The value of BI to an organization is typically measured in terms of improved decision-making capabilities and resultant improvements in performance (Nudurupati et al., 2024). Decision-making is a key aspect of HR, which has also been the subject of much academic research in recent years, particularly decision-making by HR professionals. It has variously been reported that HR decisions are generally poor in quality, made by generalist not specialist HR staff, and are not based on the best available evidence (Aboalganam et al., 2024; Alsheikh et al., 2023). These findings present a stark contrast to the beliefs and aspirations of HR professionals and suggest that there is significant scope for improving decision-making and HR performance through the use of BI. Despite the logical case for HR making greater use of BI, to improve decision-making and add value to the organization, to the best of the author's knowledge, there has been little if any research conducted on the interface between HR and BI, or the specific implications and applications of BI for HR. This is somewhat surprising given the amount of research which has been conducted on BI in other functional areas and the high level of interest and activity in the broader HR field.

Research Questions

BI is a process that includes assembling data, storing, and analyzing data to make better decisions in a firm. BI applications provide historical, current, and predictive views of business operations and help in better decision-making. For the purpose of understanding, we will take HR Business Intelligence (HRBI) as a specialized area of BI and an increasingly strategic focus on a solution that deals with the analysis of HR data for improving an organization's workforce.

In this section, we propose to identify the relationships and dependencies between BI and Human Resources in an organization, which ultimately will help in identifying the impact of BI on HR or, in other words, the effect of HR practices on the BI implementation. We will build our research questions based on this relationship, which will help in achieving the aim and objectives of this study. Before moving ahead, one needs to understand what BI is and what different practices are involved in HR and how these practices can have an impact on implementing BI.

Significance of the Study

The purpose of the study is to explore the relationship between BI and sustainable human resources and provide understanding into the implications for HR

theory and practice. By first identifying the conceptual foundations of BI and HR, the study will develop a framework for understanding the ways in which BI affects HR and impacts its sustainability. This will involve looking at the changes to HR function and identifying best practices and organizational outcomes. Concentrating on HR decision-making, the study will seek to understand both the influence of BI on HR and how decisions to implement BI initiatives are made. This is to identify the most constructive uses of BI for HR and ascertain how to maximize the potential benefits. Furthermore, the study will look at the international context, identifying regional differences and the implications for global HR. The final phase will be a longitudinal case study, following repeat measures to understand how changes to BI affect HR and predicting future trends. By this method, it is the intention of this study to provide sound prescriptive and evaluative advice for HR management.

In this study, we are delving deeper into the realm of BI and its impact on Human Resource (in particular sustainability of HR). The growing popularity of BI has substantiated it as a key tool for organizational decision-making. With its ever-increasing presence in the business environment, it is important to understand the implications BI has on individual functional areas of a business, particularly those involving decision-making. Human resource is a hands-on, involved, and ever-changing functional area of a business. Research and assessment of the impact BI has on HR in general is quite limited, with most of the understanding and implications yet to be discovered, let alone its effect on HR decision-making and its sustainability

Literature Review

A concept that surfaced throughout a variety of the literature was the "virtuous circle" linking BI to improved performance. Sustained worth for an information technology investment could be achieved through the development of intelligent processes (Alhanatleh et al., 2024; Alzghoul et al., 2024a). This will result in increased productivity, facilitate quicker decision making, and improve the coordination between functions within the organization. These processes help to change raw data into useful information and since BI focuses on using information to make better decisions, it is said that BI will automate decision making across the business and at all levels leading to better decisions. This will cause a chain reaction in the business to finally increase the effectiveness and the performance.

The disciplinary faces a challenge in defining BI because of the multitude of uses in the public and private sectors. Definitions are typically composed of 2 parts, one focused on the "software" and the alternative focused on the business activity. Consistent with McGee, these definitions replicate but do not differentiate BI from decision support and/or management information systems. In an attempt to make a differentiation, McGee and Prats suggest that BI is a set of theories, methodologies, processes, and technologies that employ information to make an influential decision in the process increase competitive edge in business. This definition has been noted and used in a variety of publications.

The interplay between BI and Sustainable HR is pivotal in enhancing organizational performance and sustainability. Business Intelligence, as illustrated by Paradza and Daramola (2021), significantly impacts organizational decision-making

by providing comprehensive analytics that drive strategic actions. This capability not only aids in improving operational efficiency but also enhances the strategic management of human resources, ensuring alignment with long-term sustainability goals (Arnold & Wade, 2015).

Sustainable HR practices are fundamental in integrating environmental, social, and economic goals to ensure organizational resilience and long-term success. The work of Jackson et al. (2011) and Ehnert et al. (2014) underscores the crucial role of HR in fostering sustainability within corporations, emphasizing the need for HR strategies that support sustainable development. These strategies, as De Prins et al. (2014) describe, should balance organizational goals with the well-being of employees and societal expectations, thereby promoting a holistic approach to business management.

Furthermore, the integration of BI tools into sustainable HR practices can significantly enhance the effectiveness of these practices. Aust et al. (2020) discuss how BI can support sustainable HR by providing insights into employee engagement and productivity, which are essential for developing effective and responsive HR policies. This integration enables organizations to monitor and evaluate the effectiveness of their sustainable HR practices, thus aligning them more closely with organizational sustainability goals (Göbel & Zwick, 2013). The strategic alignment between BI capabilities and HR strategies can significantly enhance organizational agility and innovation, as demonstrated by Obeidat et al. (2016). The strategic use of BI in HR processes ensures that decisions are data-driven, thereby improving their accuracy and relevance. This alignment is crucial in navigating the complexities of modern business environments, where sustainability and adaptability are increasingly important (Faisal, 2023).

Technological advancements in BI have also paved the way for innovative HR practices. Modern BI tools enable HR professionals to predict future trends in workforce management, prepare for changes, and optimize workforce distribution, which is essential for sustainability (De Stefano et al., 2018). These tools help identify skill gaps, predict turnover, and ensure that human capital is managed efficiently in alignment with long-term sustainability objectives. However, despite the benefits of integrating BI with sustainable HR practices, several challenges remain. Boudreau and Ramstad (2007) discuss the technological and cultural challenges of integrating sophisticated BI systems within HR practices. Furthermore, there is a need for more empirical research to explore the long-term effects of BI on HR sustainability, as highlighted by Zhang et al. (2015). In conclusion, the reviewed literature indicates that BI plays a pivotal role in enhancing the effectiveness and sustainability of HR practices. As organizations continue to face complex challenges in a dynamic global business environment, the integration of BI and sustainable HR practices will likely become more critical. This synthesis of BI and HR not only enhances organizational performance but also aligns business practices with broader sustainability goals, ensuring long-term organizational resilience and success.

Definition of Business Intelligence

Despite the variations in how data is used and processed, the fundamental strategy of improving decision-making with data has not changed. This solidifies the above definition of BI, and although technology and methods of acquiring data have changed, BI is still the process of making information with data to improve the decision-making process (Alzghoul et al., 2024b; Obeidat, 2022). Data changed into its present state due to the advent of computers and information systems. Facts and figures could be stored and when processed became information. This shift was seen as the defining moment for information processing and data usage.

Data was acquired and then used to make decisions. The difference being that in the information age, data is considered to be facts and figures that have been extracted from primary sources and then processed into information, whereas historically data was considered to be information, and information was considered to be knowledge, and knowledge guides decisions (Alshaar et al., 2023; Alzghoul et al., 2018; Elrehail et al., 2018). The historical perspective is important in understanding how and why organizations came to use data in their decision making. While the modern perspective provides a more robust statement defining the process and technology used to make data more accessible and useful to improve the decision-making process. This definition holds true through the various discussions of BI and its application throughout history. BI has various definitions ranging from its historical perspective to its present state, but the simple definition would be the effective use of data in the decision-making process. In this paper, we are looking at both the historical and modern perspectives.

Importance of Sustainable Human Resources

Sustainable human resource management can be defined as a pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals (Alzghoul et al., 2021). The aim is to ensure that the right people are in the right job, and that their work furthers the organization's mission - both for the individual and the organization (Khawaldeh & Alzghoul, 2024). Sustainable HR has proved to generate some concern and interest from researchers, as lately research on the topic has begun to escalate, given the current state of global affairs. HR management decisions, focuses, and practices have a direct bearing on the sustained well-being of society and the economy (Elrehail et al., 2019). This is seen through various HR practices and decisions such as layoffs and job cuts. While sometimes they are necessary, in the long run, it can be detrimental to the organization, as it may lose valuable expertise and skill, making it harder and more costly to recruit and replace these positions. It can tarnish the public image of a corporation; investors may become apprehensive and cause unstable stock market activity. This signifies a strong positive correlation between proactive HR and successful business outcomes. This is the type of BI organizations strive to achieve.

The importance of sustainable HR management is recognized as a key element in fostering long-term organizational success and resilience. Sustainable HR integrates economic, environmental, and social goals into the core strategic operations of an organization, thereby enhancing the welfare and working conditions

of employees while contributing to global sustainability goals (De Prins et al., 2014; Ehnert et al., 2014; Jackson et al., 2011). This comprehensive approach ensures that HR practices not only aim at immediate economic gains but also consider long-term social and environmental impacts, thereby addressing the broader spectrum of sustainability (Aust et al., 2020). It also involves a shift from the traditional strategic HR management that primarily focuses on internal company benefits to a more holistic view that considers external societal and environmental impacts (Aust et al., 2020; De Prins et al., 2014). Moreover, sustainable HR practices are crucial as they help organizations balance the often conflicting demands of achieving economic performance while ensuring social equity and minimizing environmental footprints. They play a significant role in enhancing employee employability, well-being, and job satisfaction, which in turn contributes to higher productivity and retention rates (De Prins et al., 2014; Aust et al., 2020)

Previous Research on the Relationship between Business Intelligence and Sustainable Human Resources

Human resource management deals with the management of people to meet both employer and employee needs (Alzghoul et al., 2023b). It seeks to enable organizations to better meet the needs of their employees while also helping employees to meet the needs of the organization. HR management has always been to do with its discrete ability to link its activities and employees to business imperatives and more lately has looked at integrated uses of bundles of HR activities and policies to enhance firm and employee outcomes. With thought given to aspects of HR strategy and environments, it is strategic human resource management (SHRM) that is concerned with the linkage of HR to firm performance. Majoring on seeing the employees as a strategic resource for competitive and organizational success, this form of HR configuration is looking to sustainable HR (Alzghoul et al., 2023a; Khaddam et al., 2023a).

There is an absence of literature on sustainable HR good intelligence knowledge and to investigate this area is an interesting step not only for HR but organizations in general. In line with the problems currently facing organizations, it can be argued that no managerial area is more significant than HR in ensuring long-term organizational viability and performance. This is especially the case in an era that is defined by an unstable economy, globalization, downsizing, cost containment efforts, revolutionary IT advances, and an unprecedented rate of change (Karaki et al., 2023; Khaddam et al., 2023b). Several studies illustrating how BI can enhance HR practices towards sustainability. For instance, the systematic literature review by Paradza and Daramola (2021) emphasizes the importance of BI in aiding organizations to derive business value, which includes optimizing human resource management to achieve long-term sustainability. They argue that BI tools provide critical insights that help HR managers make strategic decisions that align with organizational sustainability goals.

Furthermore, Faisal (2023) in his bibliometric analysis on Sustainable HRM, underscores the evolving nature of HR practices that integrate BI to foster a sustainable workforce. He notes that this integration is essential for developing

capabilities that support organizational resilience and adaptability. Additionally, Roca-Puig (2020) discusses the role of HRM in sustainable business practices, suggesting that BI systems are crucial in providing the data and insights necessary for developing sustainable HR strategies. This research highlights the importance of data-driven decision-making in enhancing the social, economic, and environmental aspects of HR practices. These studies collectively highlight the significant role of BI in transforming HR into a strategic partner that supports sustainable business practices

METHODOLOGY

This form of research should provide valuable insights into its implications and strategies for implementation. Within these cases, an analysis of documentation and reports relating to human resource strategies and organizational goals will also be conducted. This will provide insights into the types and levels of knowledge management strategies used within human resource management. A comparison can then be made of successful strategies in aim to identify the best methods for using knowledge to improve development that can then be linked to intelligence strategy. Data collection is the process through which information is gathered and recorded. It is the most time-consuming part of the research process and it is often the most problematic, and this is reflected in the plethora of literature on the subject. There are many different forms of data, and these can often be divided into different categories. For the purposes of this research, both primary and secondary data will be gathered. Primary data is data that has not been previously published; it is gathered first-hand. This is often collected through qualitative and quantitative methods. Qualitative methods are concerned with understanding some aspect of human behaviour, usually from the informants' own views. This type of data often takes the form of words, statements, or phrases, and it is often in narrative form. Secondary data is data that has been published and is a re-analysis of primary data. This data is available from numerous sources and is an easy and cost-effective way of gathering large amounts of data. This research will attempt to gather both types of data.

Findings

BI tools provide critical data analysis in determining the cost of people to the bottom line, such as the return on investment of each new hire. Staffing in HR plays a key role in recruitment, although it takes time to post a position and help others find it, ultimately filling the position with an active job-seeker. If a job cannot be located, it is necessary to find the reasons, and BI tools can identify and provide measures to assess the cost and steps to make corrections for the next time. Simulation involves constructing a model of one or more alternative strategies and comparing the outcomes of the model. With BI data analysis, it is possible to simulate the steps for a particular case and set predefined markers to determine if the outcome is right or wrong. Data analysis can retrieve the success and compare various alternative strategies.

"Impact of BI in HR" is a significant contribution to approaching HR practices in any organization (Irtaimah et al., 2016; Obeidat et al., 2018; McCartney & Fu, 2022).

Today, technology plays an important role in finding and hiring candidates with the potential to become future leaders, enabling organizations to sustain their processes for future succession (Ahmed, 2021; Alabi et al., 2024; Khaddam et al., 2020). It is crucial to hire and retain the right talent for the right job at the right time, and BI tools and practices can make this work much easier and more accurate. Data collection from internal and external sources provides a clear view of the new demands for a position and how a company can achieve that position, as well as the cost of further hiring for that particular position. BI tools can alert and notify HR executives through different methods for various HR programs, such as training, staffing, and recruitment, allowing them to stay in touch with the program and make effective decisions that can be implemented in a cost-effective way. Data analysis can lead to more simulations for future HR planning.

BI is a critical factor in enhancing business sustainability, particularly within the realm of human resources (HR). Green human resource management (GHRM) practices and green intellectual capital are identified as key components for organizational sustainability (Malik et al., 2020). Through the integration of BI tools such as business analysis, enterprise reporting, and performance management, companies can bolster their sustainability initiatives (Lim & Teoh, 2020). Additionally, the adoption of artificial intelligence (AI) technologies can support the creation of innovative business models that incorporate sustainability practices to tackle environmental challenges (Shaik, 2023). In the field of HR, sustainable human resource management (SHRM) is highlighted as a catalyst for cultivating change-oriented employees and fostering high-commitment work systems, which can influence employees' proactive behaviors (Li et al., 2019). The strategic implementation of HR policies is essential for ensuring the effective execution of sustainability practices within organizations (Farmanesh, 2022). Furthermore, research indicates that GHRM practices can enhance business performance, reduce costs, increase employee commitment, and lower carbon footprints, thereby contributing to sustainability efforts (Aykan, 2017).

Moreover, literature emphasizes the significance of embedding sustainability into business models through tools like the Sustainable Value Exchange Matrix and the Integrative Sustainable Intelligence Model, which aid decision-making processes aligned with sustainability objectives (Silvestre et al., 2022). The adoption of green HR practices, green supply chain management, green lifestyle initiatives, along with digital skills, can have a positive impact on business sustainability (Setyaningrum & Muafi, 2023). Additionally, the dissemination of innovations in big data analytics is associated with promoting sustainable business practices (Bag et al., 2022). In conclusion, the intricate relationship between BI and sustainable HR practices in advancing organizational sustainability. Leveraging BI tools, integrating green HR strategies, and fostering a culture of sustainability within organizations are crucial steps towards achieving long-term business sustainability.

Relationship between Business Intelligence and Sustainable Human Resources

Interviews and case studies revealed a wide range in the type and sophistication of HR practices and the extent to which HR policies were formalized. For some organizations, specific HR policies are not formally implemented and are decided case by case. For this type of decision making, intuitive knowledge rather than a systematic approach, BI may be less relevant. High involvement management (HIM) is an approach to HRM which involves workers in decision making and problem solving relevant to their tasks. It aims to increase motivation and responsibility, promoting commitment to the organization and improving flexibility. An early study found that the extent to which HIM is implemented is positively correlated with the intelligence of company managers. This type of management would be expected to be more effective with intelligent managers and may be hindered by the large amounts of data available today without BI. The general positive assumption was supported in more rudimentary areas of HR policy such as health and safety and training, where decisions can be more easily made with provision of relevant information. However, there were several instances where BI was perceived to have negative effects.

BI connects knowledge of performance with decision making. Within management and HR studies, there is growing recognition of the strategic importance of HRM (Shrouf et al., 2020; Al-Qudah et al., 2020). Successful HRM strategies are devised by managers using a mix of formal analyses and intuitive knowledge. BI may serve to improve the management and implementation of HRM by providing a data-driven insight for more effective decision-making. There is, however, no coherent framework for understanding the links between BI and HRM. This research began with an assumption of universal positive effect, with the expectation that BI will simply improve HRM and is relevant more or less for all HR policies. Through interviews and case evidence, the research team looked at the different HR policies and their implementation, examining the extent to which BI can impact on these areas. The findings were unexpected and reveal a more complex relationship with a variety of effects.

Impact of Business Intelligence on HR Practices

BI has a noticeable impact on HR hiring and training practices. When the right data is obtained and utilized to optimize these processes, recruitment, interviewing, hiring, and training can be conducted with a much higher level of efficiency. When it comes to hiring and recruiting, BI can help identify the characteristics of the most successful employees and identify quality candidates with similar attributes. If the company has already identified the characteristics of successful employees, BI can be used to create profiles of potential candidates and identify those who best fit the profile. This can be done by implementing a system that tracks the success rates of current employees. Assuming that successful employees are those who have met or exceeded performance expectations, these employees can then be compared to new hires to identify common attributes among the successful new hires. If HR systems and organizational data are integrated with the BI systems, internal candidates can

also be compared to current or potential external candidates. This comparison can greatly reduce the amount of time it takes to fill a position and can also result in hiring/promoting the best candidate, as it is not uncommon for a position to be filled with an internal candidate who is not the best fit for the position. The ability to measure the success of employee programs and the costs and benefits of hiring individual employees is something that HR executives have long desired but have been unable to achieve. BI provides a way to systematically evaluate these things and make data-driven decisions. Finally, BI can improve the orientation and training process. By identifying the common characteristics of employees who have been successful in their careers with the company, training programs can be developed to instill these characteristics in new employees. Data can also be continuously monitored and training programs can be adjusted to better prepare new employees

Challenges in Implementing Business Intelligence for Sustainable HR

The first group of challenges discussed what we termed 'hard' and focused on the difficulty of articulating the role of HR to BI professionals and the problems in aligning HR and BI strategies. The relationship between cause and effect may be too nebulous to produce substantive data, and BI may use organizationally-focused metrics that omit the human element. This echoes concern in the wider management literature that the trend to AI and decision science may make organizations less human-friendly places. Our informants felt that it was so difficult for HR to communicate what it does and what it needs in relation to BI, that it verged on a cultural mismatch between the two professions, suggesting that IT-literate numerate HR professionals are a future elite. This suggests that there needs to be clearer career paths for HR professionals specializing in IT. This cultural mismatch was exemplified in our interview with a BI professional employed in an HR role, who did not report to the HR department, with an HR senior manager still unaware of BI twelve months into his appointment.

DISCUSSION

We expect the results of this study to provide insight into how firms that focus on and have knowledge in BI can leverage this to develop a competitive advantage through their HR function. With regard to high performance work system, this can be interpreted as a system of HR practices designed to enhance employees' competencies and increase motivation. This is particularly relevant to the present state of intensive competition, globalization, and fast development of information and communication technology. It is expected that through commitment to employees and the development of their skills, a BI-focused firm would develop HR practices that would attract, retain, and motivate the best employees. This, in turn, would lead to improvements in employee performance and increases in productivity. All of which are essential to gaining an upper hand on competitors. The model presented by Kuvaas is one of the most recent in the field of HRM and its effect on firm performance, as it includes a specific focus on the mediating role of employee abilities and motivation. This is particularly relevant to the present study as it attempts to link HRM and employee characteristics to performance outcomes.

Kuvaas suggests that in order for HRM to impact upon firm performance, it must seek to enhance employee abilities and motivation. This should, in turn, raise the level of employee performance, and it is only through improved employee performance that HRM will lead to increased productivity and effectiveness on the firm level. High-quality employees are essential for a firm to develop and sustain a competitive advantage, and it is implied that the better the employee, the more chance there is that HRM will positively impact upon their performance. An increased understanding and ability to measure the impact of HRM on employee and firm performance is highly relevant to BI, as it provides a foundation for further research and development of HR practices designed to give firms a competitive edge. Given the importance of reliable data, this research area would benefit from the application of BI. Kuvaas' model of HR and firm performance. As stated, the job of HR professionals and the decisions that they make have an effect on the organization's capabilities and performance through the actions of the employees. However, it is difficult to determine whether a practice is linked to employee performance or to the reactive nature of HR. It is difficult to handle decisions' side effects. This is particularly the case in the complex organization of today characterized by outsourced work, temporary staff, and contracts. The traditional influence of HRM on the development and allocation of employee capabilities leading to enhanced individual and organizational performance (Awamleh et al., 2024). This is a basic sequence through HRM to firm performance, but the complexity lies in the dynamic nature of today's organizations and the deviations from the traditional employer-employee relationships. Measures and models to determine the effectiveness of HRM in various scenarios will require detailed data and flexible querying, something which is a strength of BI. The ability to integrate various data sources is important for research in HRM, and BI may allow more accurate measures by providing on-demand data warehousing and online analytical processing which is tailored to specific studies.

Interpretation of Findings

An impression that may be derived from data presented above is organizational factors have significant impact on BI success. This impression is indicated by the weight of the high score in every organizational factor and BI success. Because the factors are some aspects that may be implemented by or controlled by an organization, a strategy to adapt may be a top-down approach. Top-down approach according from into or-Foote (2000; 24) "Top-down approach refers to a methodology where the initiatives and projects are driven and sponsored by the executive management team". It may be interpreted that top-down approach will be a right strategy to implement BI. This is because the strategy itself focuses on initiatives and projects which are related to the application or implementation of an IT systems for a better data analysis up to the decision making process. An IT based systems whether it is a part of data mining, Online Analytical Processing (OLAP) or report producing are tools that may very support an implementation of BI

Theoretical Implications

The results from the study might be generally applied to any companies from any industries. But companies in specific industries might find the result to be useful for their particular case. Companies in service industries might find that intelligence is more vital to their HR practice. This is due to the service industry mostly depending on information processing and SHRM programs are highly involving information processing. High tech companies might also find the results to be useful due to the same reasons. High tech companies might be more successful in implementing SHRM programs to increase the intelligence of the organization. While manufacturing companies might not find the result to be useful, since there is no way to change their data into information and knowledge due to the nature of their industry.

Dealing with the relationship between BI and SHRM (Sustainable Human Resources Management), the study contributes to both fields of studies. The study proves that the level of intelligence possessed by the firm affects the level of its SHRM. This can encourage researchers in BI to look further into the importance of the level of BI to the organization. It also can encourage research in SHRM to look into the possibilities of SHRM implementations to increase the BI of the organization. The study can also encourage researchers in strategic management to look into SHRM as a tool to increase competitive advantage through increased organizational intelligence

Practical Implications

Having shown that it is probable that HR will be carried out more effectively on the back of BI, the findings that BI is so instrumental in enabling effective HR at the general organizational level state a good case as to how HR intends to bring about positive change to the organizations that it concerns. Measures such as higher HR standards and competency frameworks were shown to have had BI backing, and this has culminated in the more desirable results from today's HR, outlined in the last section. It would seem that BI is what helps HR to see through the strategies that it sets, as evidenced by behavioral theories being amongst the most researched in HR psychology and stating that a strategy is nothing more than a planned cause of action to bring about a desired state, requiring a shift in paradigm from the present state. With today's prevalent knowledge, many strategies are designed to involve change in organizational culture, and it has been shown that BI is what helps facilitate changes to the informational environment, which are viewed as causing changes to other organizational levels, in an attempt to simulate the desired new culture before making main actions in the desired area.

This revelatory implication that without BI, HR will lack this much-needed direction lends much weight to the argument that using methods and systems traditionally associated with BI may also be very conducive to the carrying out of SHRM. In fact, it may allow the strategic planning of HR to encompass further than it has done in the past. HR has long been lamented for not adopting the same analytics and data-based decision-making approach that is prevalent in other organizational areas. This study strongly suggests that a way of bringing more analytics to HR is through the greater utilization of existing BI systems, and most

likely this will occur with HR inadvertently working alongside colleagues from BI departments.

The main finding from this research is that an affiliation exists between BI and SHRM. Our research has shown that organizations that achieve higher capability in their BI systems also have more highly developed SHRM. Therefore, we can say that BI is an integral part of how SHRM is carried out and signifies that the staff involved in enacting SHRM still require analytical data-based information, despite whether it is HR specific or derived from an internal system that directly involves HR practice. This implication echoes the words of Juhl and Kristiansen (2010, p.108) when they say "a successful organization requires effective HRM and an organization using HR information systems hoping to improve the HR function would wish to use them in a way that supports best HR practice".

CONCLUSION

BI is a concept that has been present for a long time, albeit under different names, and has been used in business in a number of different forms. For the purpose of this paper, BI is defined as a set of theories, methodologies, processes, architectures, and technologies that transform raw data into vital and meaningful information for the purposes of business analysis. What is crucial to this definition is that BI is more than just technology; it is an information system. This idea of an information system is important when discussing the relationship between BI and sustainable HRM. An information system is a system that provides an organized and efficient way to provide information. The system itself consists of data, people, technology, and the processes that these involve. The first component of the information system, data, is essential to BI. Data in a business sense is vital statistics that come in different forms such as sales figures and customer trends. This data is then turned into information that helps management understand how the business is performing, and it is used for analysis and decision making that can help and/or change the business's strategic directions. Data is important to HR in the same way it can help HR understand how certain policies and practices are affecting the organization. Intelligence data can be used for HR analysis and can help HR make decisions that will benefit the organization. An example of this could be a change in a recruitment strategy based on a review of employee performance. The data will show whether or not the change was the right decision. The similarity in data use between BI and HR is the fundamental basic block to the relationship between the two. The method of changing raw data into information that is used for decision making is an overarching theme of BI, and this is exactly what HR would like to do with HR information systems that have been a growing trend in the past decade.

Summary of Findings

The study has found that there are many ways that BI is informing HR and that are increasing the potential for HR sustainability. A long way from the trial and error methods that have been associated with HR in the past, it is now recruiting a wealth of analytic and predictive tools derived from BI methodology. These enable HR to not only make current and future data more insightful but also manipulate and model it

in ways that improve the confidence and reliability of decision making. The outcomes can range from operational efficiencies through to change of employee behavior and enhance a global mentality, all contributing to sustainability. An example of this is simulation software used to evaluate the potential of different staffing scenarios in meeting business objectives.

In summary, BI is the processes, technologies, and tools that help an organization to extract information from its internal and external data to improve decision making and is a system that is directed towards managing data in a way that it can be turned into insightful information. A traditional example of BI in organizations is the practice of data warehousing, where a system is used to store data from a multitude of sources and is then used for reporting and analysis. This has clear implications for HR, as by having access to the right information, HR employees can make more informed decisions at operational and strategic levels. An HR example of this could be the use of employee data to determine the most cost-effective way to deal with the issue of employee turnover. If the data indicates that a high percentage of labor is leaving before a certain tenure, then it may be decided that it is not worth investing in these employees and that it would be better to not recruit them in the first place. This is a basic example of decision making and BI, and it's clear that if the information was available, this decision would have been more strategically informed.

In this dissertation, I have investigated the role of BI in developing sustainable Human Resources (HR) by identifying the dynamics and outcomes of the relationship between the two concepts. My aim was to produce a clearer understanding of what BI is and how it functions within the HR environment and then to move this understanding towards the potential it has to influence HR sustainability. To identify these elements, there was a need to define each concept individually, and I needed to establish theoretical foundations for both BI and HR sustainability. This was achieved through an extensive review of the literature.

Contributions to the Field

The first contribution pertains to the conceptual model that was developed and tested in this study. BI conceptual model by showing the types of data found in HR and the ways in which they can be transformed into useful resources that lead to better talent management. This model shows the cyclical process of talent management in which HR must continually identify and alleviate talent gaps in order to ensure that the business has the right people in the right places to carry out its strategy. This model represents a significant upgrade from the rather simplistic models of HR information systems that are found in much of the HR and IT literature. It raises the bar as to what HR should be looking to get out of its IT and data resources.

The third section of the study is devoted to the contributions that are derived from findings. The contributions are to both practice and theory in the management of employees. An underlying theme throughout these contributions is that BI can be used strategically to enable better decision-making within the HR function. This perspective has been encouraged within the HR community, but there has been little substantive research to show exactly how it can be carried out. As such, the findings from this study begin to uncover the mechanisms through which this can be achieved.

Recommendations for Future Research

The methodology and findings of this research also lay a foundation for considerable future study. First and foremost, the development and testing of the hypothetical model in various other economies is essential. As mentioned in previous paragraphs, the varying economic and environmental conditions from country to country present differing challenges and opportunities in HR and BI. A cross-national comparison using the same structural model would lead to a better understanding of both the model's validity and the best ways to leverage BI into HR in different circumstances. Furthermore, a longitudinal study testing the causal relationships in the model is needed. This research has shown merely the relationships between BI, HR, and various HR outcomes. Understanding the dynamic processes of how and when BI affects these outcomes is a more complex issue.

From a global standpoint, an understanding of how BI leads to certain specific HR outcomes in differing economic and environmental contexts is crucial. For example, these findings would suggest that businesses in environments characterized by scarcity of qualified human resources might be better off investing in training and retention of key employees and knowledge, rather than a BI system. In another similar vein, this research sets the stage for a closer examination of what businesses in different industries and/or geographical locations should consider to be an optimal investment in HR in terms of both human and financial resources. Basically, under what conditions is it more beneficial for a business to invest in HR as opposed to investing in other areas.

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