



Reigniting the research collaborations in the mining industry: too little, too late?



The global mining industry has experienced unprecedented challenges within the last few years. Some, if not most of the challenges affecting the industry are not new, however, the complexity of the prevailing global economic and geopolitical environments makes their navigation more challenging. Global disruptions such as capital scarcity, volatile commodity prices, climate change, resource and reserve depletion, cybersecurity and technological disruptions, and increasing exploration and operating costs, among others, will continue to significantly impact the profitability and sustainability of mining operations in many jurisdictions. Rapid technological changes will not only require deeper understanding of technological cycles but will also dictate agile adoption and implementation of state-of-the-art technological solutions so as to minimise disruption. The emergence of new value chains driven by the clean energy transition, although presenting a net positive impact to the industry, will continue to create new operational requirements that require a deeper understanding of processes and technologies in order to build economically viable, safe, and socially responsible business models.

Obviously, the Southern African mining industry is not immune to these global challenges and dynamics. However, behind every obstacle lies an opportunity for growth. For example, the mining industry can leverage on the rapid advancements in technology to boost productivity and safety. Collaboration among the key stakeholders in the mining industry, such as leveraging on relationships involving industry, academia, and state-owned research institutions, can also unlock solutions to collective challenges that no one entity in the industry can solve on its own. Although this collaboration can take many forms, the implementation of multidisciplinary strategic research projects and programmes designed to strengthen capacity through postgraduate training and collaborative research programmes can significantly assist the industry to navigate operational challenges and uncertainty. If designed and managed properly, such collaborative platforms can lead to the successful development of new technologies and adoption of agile solutions and postgraduate training programmes that are accessible to all stakeholders in the industry.

Postgraduate training can involve many shapes and forms. Of particular interest, and perhaps the most relevant to the Southern African context, is the implementation of industry-based doctoral training and research programmes. Although the impact of doctoral recipients in most developing economies is a subject of intense debate, there is no doubt that doctoral training programmes create an ecosystem that enhances the capacity to adopt foreign technologies and develop own or endogenous innovations. Industry-focused doctoral training programmes (simply referred to as industry PhDs) are increasingly becoming popular globally. Such training programmes tend to be more practice oriented and are structured to allow the generation and application of advanced knowledge and skills directly in professional settings. In this case, the training programmes are designed to solve real-world problems faced by the mining industry and are carried out in close collaboration involving industry partners as the potential end-users of the solutions. The conception and development of research solutions in situ naturally increase the chances of developing new technologies, products, and processes that are relevant to the market.

Industry PhD training programmes can have a long-term net positive impact on the competitiveness of the mining industry by providing the flexibility to solve common challenges that no single entity has the capacity to solve on their own. Mining companies and/or service providers can have access to fresh

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perspectives from other research partners and gain timely access to cutting edge research results, thereby reducing the risks and time to implementation. The ability to share resources, infrastructure, and access to intra- and multi-disciplinary expertise increases the ability to develop robust solutions to the challenges faced by industry. The training programmes also present unparalleled benefits to researchers and doctoral students alike. In addition to providing access to shared research facilities and industry expertise, industry PhD training programmes provide the researchers with the opportunity to conduct relevant research that solves industry problems through an authentic community of practice. The ability to obtain hands-on research experience in an industry setting, including opportunities for secondment, also broadens career and employment opportunities for the doctoral recipients.

Although the benefits of proposed collaborative research programmes are obvious, the implementation can be challenging due to the need to address the myriad funding and legal issues. One typical approach to navigate the legal complexities, such as those of IP ownership, is to focus on non-IP specific research projects and topics designed to generate and disseminate knowledge in open access platforms. The implementation can be achieved by establishing a research advisory committee representing the various stakeholders, networks, and/or segments to identify the key industry challenges, conceptualize common and cross-cutting research topics, and to align and drive common purpose and strategic objectives. The role of the advisory committee also includes defining and establishing a clear and robust legal and governance framework to manage complex Research and Development contracts, including implementing a robust and yet flexible IP governance structure through collaborative research agreements. In addition to a well-structured legal framework to guide the strategic partnerships arising therefrom, it is also crucial to develop and sustain trust and interpersonal relationships among the key stakeholders. For state-owned research and academic institutions, developing and implementing the right policy levers are also critical success variables.

In conclusion, as the mining industry continues to face existential challenges, it is futile to assume that there can be a single entity that can solve such challenges on its own. Although there is no quintessential solution to the quantum and complex nature of some of the challenges, collaboration through industry-based doctoral training programmes can have sustained impact on the sector and broader economy. Research collaboration is a complex endeavour and, for this reason, the implementation thereof requires a collective approach by all the stakeholders.

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