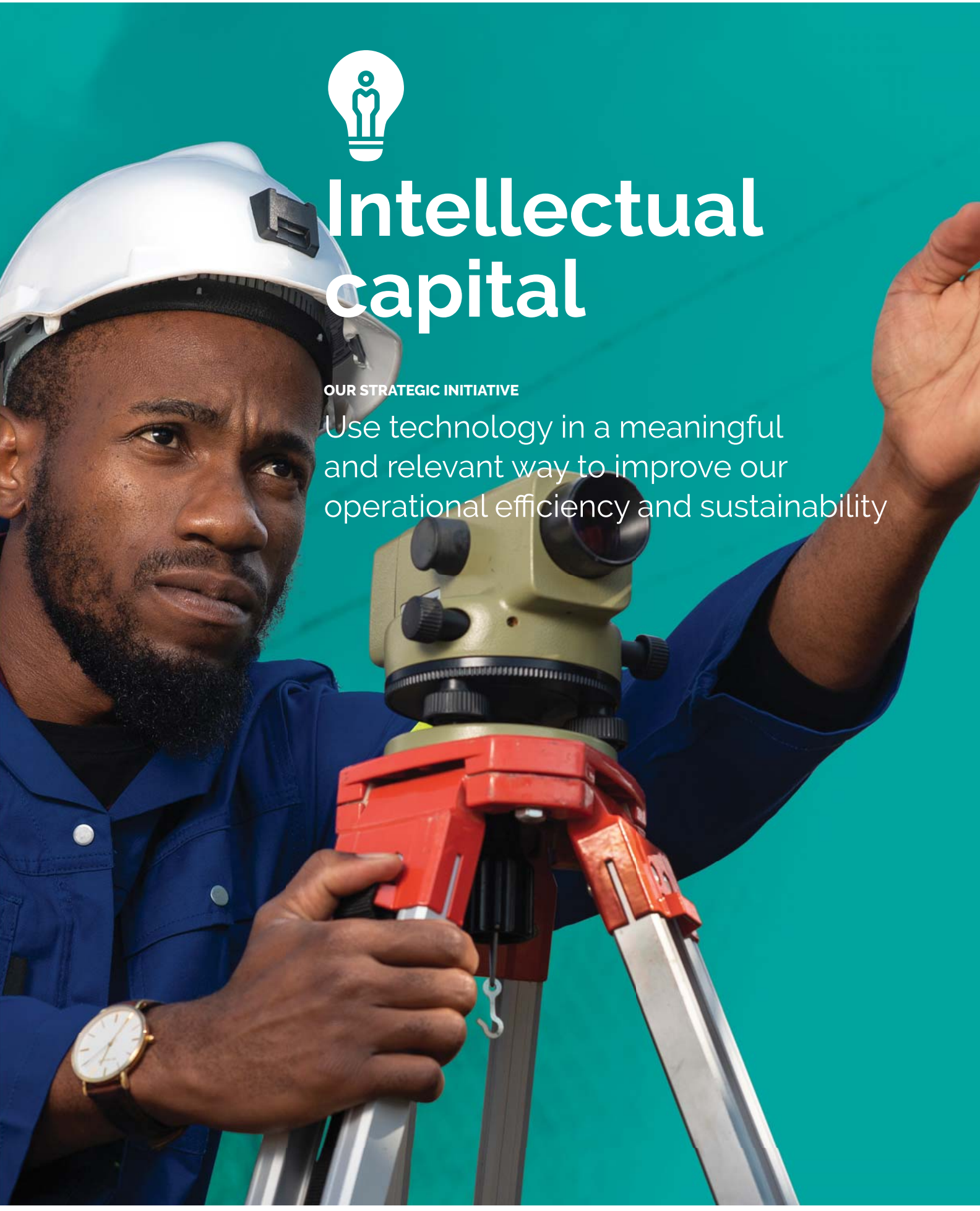


Intellectual capital

OUR STRATEGIC INITIATIVE

Use technology in a meaningful and relevant way to improve our operational efficiency and sustainability

THE PROGRESS WE HAVE MADE

The Group's well-established mines are constantly upgraded to employ modern and innovative technology and methods within viable returns and cost-effective constraints.

This includes the investment in ICT (refer to page 96) and drones (refer to page 98).

KEY PERFORMANCE INDICATORS

Capital expenditure (US$ million)

2020	34.6
2019	55.1

IT expenditure (US$ million)

2020	1.2
2019	1.4

OBSTACLES TO VALUE CREATION

- Interruption to stable power supply
- Strategic capital allocation
- Geological variability in Mineral Resources and Mineral Reserves base
- Infrastructure dependency and constraints

MATERIAL MATTERS

- Capital allocation
- Geological complexity
- Energy availability
- Technological interconnectivity

KEY STAKEHOLDERS

- Providers of capital
- Security exchanges
- Customer
- Suppliers
- Employees

Innovation

GOAL 9: BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALISATION AND FOSTER INNOVATION

Why the goal is material to Pan African

Innovation is fundamental to the sustainability of the Group. Challenging the way things have always been done is a priority. By developing new solutions, encouraging new ways of thinking and finding new ways of working, we are dramatically improving the business.

Continually adding to our ability to make agile decisions, innovation will ensure that opportunities for enhancement are not missed.

Highlights

- Improved employee management, productivity and safety through the implementation of the biometric time and attendance system at Barberton Mines
- Upgraded IT infrastructure which includes various network and server upgrades
- Ongoing research into practical application of technology at our operations
- Use of drones for interactive on-site optimisation and efficiency in planning
- New training management software and upgrades to the current medical software are being implemented

Challenges

- Security
- Lack of buy-in

How we make a difference in the short term

The Group encourages employees to challenge the status quo, not for the sake of confrontation but rather to create better solutions to existing situations.

Ongoing research and development ensures that existing paradigms are challenged to the point of sparking innovative but practical ideas for rapid execution and continuous improvement.

The Group has designed its tailings plants to incorporate a unique modified pre-oxidation methodology to enhance gold extraction successfully. Fairview Mine at Barberton is the original concept implementation site for BIOX® and the Group can be considered to have mastered this biological oxidation expertise that has seen international application to refractory orebodies.

The BTRP plant produces a single tailings stream with a cyanide detoxification unit process before deposition onto the TSF.

How we make a difference in the medium to long term

- Continue research and development
- Further IT infrastructure enhancements
- Replace all legacy software.

Research and development assists in improving the efficiency of our operations.

INTELLECTUAL PROPERTY

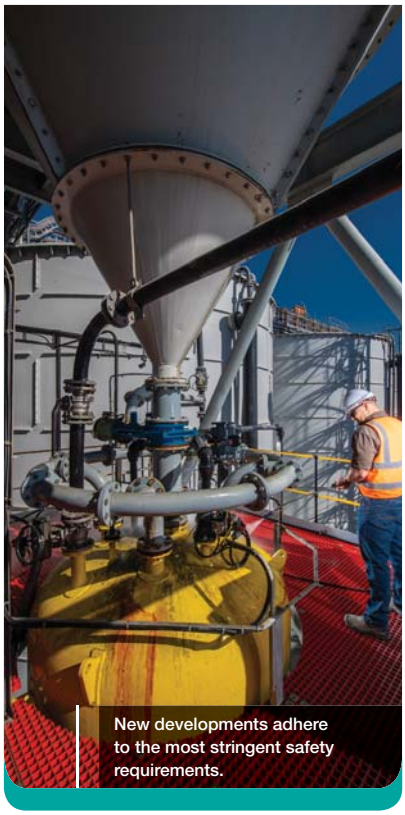
Pan African operates as the only large-scale mines in the Barberton Greenstone Belt and the Evander goldfields. The orebodies in both districts are unique and unlike any other mined within South Africa. The geological complexity of the hydrothermal lode gold deposits of the Barberton Greenstone Belt require very specific mining methods to effectively extract the ore. It also represents an opportunity for organic growth of the mines through projects like the Royal Sheba project and Ulundi Syncline. The Group regularly hosts professors and students from South African tertiary education institutions to conduct academic and technical studies on the Group's orebodies. This assists with the effective identification and exploration of targets.

When we commissioned our flagship Elikhulu tailings retreatment operation, we also implemented grade control on the tailings feed sources, which is vital for effective planning. A re-mining specific grade control process was developed in-house to accurately forecast production throughput and gold recovery in a 12-month period. This is achieved through advanced grade control drilling and reserve delineation drilling on the feed source prior to the commencement of re-mining activities, monthly drone surveys, evaluation of block factors and monthly mine planning.

The Barberton operations host the proprietary BIOX® technology. The current management team has more than 35 years' experience in treating the Barberton refractory ores, where they have increased gold recoveries by 58%. The BTRP plant also hosts a unique modified INCO cyanide destruction process that was developed in collaboration with Maelgwyn Mineral Services.

RESEARCH AND DEVELOPMENT

We frequently partner with tertiary education institutions such as Stellenbosch University to conduct advanced geological and geo-metallurgical studies, specifically on the Barberton orebodies. The studies and research, directed under supervision of the on-site technical services manager and Professor Alex Kisters of Stellenbosch, have delineated additional exploration targets which lead to the successful drill intersections at Royal Sheba and New Consort surface and underground exploration phases for improved orebody modelling.



New developments adhere to the most stringent safety requirements.

We frequently partner with tertiary education institutions such as Stellenbosch University to conduct advanced geological and geo-metallurgical studies, specifically on the Barberton orebodies.

Ongoing collaborative efforts with Outotec are conducted for the BIOX® plant to develop thermophilic bio-leaching in Barberton with the aim of reducing cyanide consumption. BIOX® microbiological research with the University of Cape Town remains ongoing.

At the Elikhulu operations, the retreatment process was developed in-house, utilising a unique combined pre-oxidation process in collaboration with Outotec and Maelgwyn.

The potential for Osmiridium recovery from the underground ore processed at Evander Mines' Kinross plant is being investigated.

TECHNOLOGICAL INNOVATION

ICT infrastructure

Barberton Mines is actively improving its use of technology. It has invested extensively in its ICT infrastructure and systems and has partnered with leading mobile telecommunications provider Vodacom in securing microwave internet links for its operations, with full redundant links in place. Vodacom is contributing four new cell phone towers to Barberton Mines' villages.

The server platform was changed from VMWARE to Hyper-V, enabling greater data security, improved data processing speed and more data storage capacity. This technology contributes to the mine's disaster recovery processes and thereby significantly reduces information technology risks. It has also reduced licence fees and provides a more stable platform to be used on all Pan African operations, easing future file sharing. To this end, the Group upgraded the data links between the mines during the year.

An intranet is being developed with the aim of having only web-based systems with information consolidated in a single location but available to all operations.

Plant automation

BIOX® and BTRP installed three new servers to link the automation of the two plants to a central location, thereby creating a more stable location for plant monitoring and backup and better control.

Payroll, time and attendance

Barberton Mines is in the process of implementing a new payroll system, Sage VIP, which will fully integrate with

the newly upgraded biometric time and attendance system. These two systems will result in improved employee monitoring through upgraded time and, attendance and payroll processes, process efficiencies, reduction in manual effort and ultimately, cost savings. The systems will also introduce the flexibility of processing salary payments outside of the normal month-end payment cycle, integration with the Dynamics ERP system and additional banking file security. The new payroll system offers fully integrated bank file exports compatible with all banks, various recruitment tools, exportable reports and a self-service portal for employees to access their personal payroll information, thereby removing the manual leave and payslip processes.

Other developments

New training management software and upgrades to the current medical software are being implemented.

Future projects

The Group is planning to upgrade the network infrastructure backbone to faster and more stable equipment, facilitating faster data transfer to the server infrastructure
New fibre cable is to be installed between Fairview and Sheba Mines, replacing a 10-year-old cable, with more bandwidth between the sites and enabling the commissioning of a full disaster recovery site at Sheba for all critical servers
A new microwave link is to be installed between Consort and Fairview Mines, increasing the reliability of the connection and bandwidth between the sites. The current equipment will be used to upgrade backup connectivity between Consort and Sheba
New fibre cable and network equipment is to be installed between the Fairview server room and the finance offices to improve reporting
Legacy technical services software will be replaced, enabling easier file sharing between operations.

CASE STUDY – DRONES DRIVE INNOVATION

Unmanned aerial vehicles (UAV) or drones represent the latest technology in surveying, much as GPS was before.

Drones are capable of obtaining more data than traditional survey methods in a shorter period of time. The increased amount of accumulated data must, however, be checked and verified before use by competent and qualified persons.

UAVs facilitate substantial time savings in the field and provide much denser point cloud information, allowing for far more accurate surfaces and plans, in turn leading to far more accurate volumes for planning and production purposes. In addition, survey data can be reflected on actual photographs of the area, leading to improved decision-making and record keeping for the design, maintenance and re-mining of TSFs.

When combined with world-class mine planning software, as is done at both the Evander and Barberton operations, the data delivers a fully integrated three-dimensional (3D) model, including geological and evaluation models. It allows Pan African to implement a production schedule against a cost/grade requirement as per the life-of-mine plan for each TSF. Full production results are then interrogated against these schedules after each measurement with the drone, resulting in accurate recording of depletions and reconciliations against the mine plan.

Monthly drone surveys are also conducted to accurately measure the slope faces for monthly advances, tonnage re-mined and slope face angles. The speed of surveying has also guaranteed that each feed source could be surveyed on the same day by a single survey crew, where previously this required more than a week. This data is processed in a 3D space and used to update the mine plan for a rolling three-month re-mining plan. This enables the consistent throughput for the retreatment operations (BTRP and Elikhulu). The re-mining plan is also displayed as animations for all supervisors for the effective communication of the Group's strategy in mine planning.

A pseudo pillar is a specifically-designed high-strength concrete structure which is placed into the worked out area, relatively close to the mining face.

PSEUDO PILLARS

Permanent mine support has traditionally involved timber mat packs and timber elongate, which have limited energy absorption capabilities and are unable to control closure. Some improvements have been made with the use of concrete-based packs, but they have limited life spans and are unable to control closure in order to reduce the rate of energy release on the mining faces. The rate at which this energy is released gives mining engineers an indication of the likelihood of seismic activity and therefore the increased risk of injury to humans or damage to workings and machinery.

Until recently, the only way to control the rate of energy release has been with a cement backfill – like filling the entire mined out areas with cementitious pumped mine tailings. Backfill is, however, extremely costly and bulky and must be compressed before it is able to offer any appreciable support resistance.

This has led to the development of the pseudo pillar concept. A pseudo pillar is a specifically-designed high-strength concrete structure which is placed into the worked out area, relatively close to the mining face. It has the ability to more effectively control closure and thereby limit the rate at which energy is released. This limits the likelihood of seismic emission, making the mining environment much safer and more productive.

Benefits

Because pseudo pillars are placed by pumping cement grout through high-pressure pipes, they have the following benefits:

1
There is a significant cost saving in shaft time

2
It eliminates the requirement of extensive logistical underground transport with the inherent dangers that rolling stock presents to personnel, and is less labour intensive

3
It is capable of offering a far higher support resistance than traditional methods, while greater hanging wall control is possible

4
It offers the opportunity of complete extraction at mining depths of up to 2,500m

5
Far more hanging wall control is possible

6
After initial cure, it can offer an added benefit in terms of ventilation control.

Daily drone imagery is obtained from our Elikhulu feed sources. This enables proactive responses to previously unforeseen operational difficulties. Drone imagery can also be used for interactive on-site optimisation and efficiency discussions by displaying a live, aerial view of the operation and mining activities, facilitating quick turnaround time for important decisions and alignment of all operations.

Drone imagery is also used to manage environmental management programmes such as dust monitoring and water management.

Drones are utilised within very specific legal and operational parameters:

- Drone operators are in possession of an operators certificate issued by the South African Civil Aviation Authority
- Data is checked, processed and verified by a competent person, being the duly appointed mine surveyor.

Barberton Mines is in the process of implementing high-resolution 3D lithological, structural and mineralisation models. The geological complexity of these deposits historically resulted in complicated exploration plans, which are now aided with up-to-date 3D geological models. Advances in targets generated through these models were made in both the Hope and Rossiter Reefs at the Fairview Mine and enabled inclusion in the Group's Mineral Resources and Mineral Reserves declaration at 30 June 2020.