Underlying Chile’s success as a leading metals producer is a robust ecosystem of service providers. Drilling contractors, engineering firms, mineral processing specialists, and consultancies all play an equally important role in contributing to the country’s high level of production. Unfortunately, when commodity cycles are in a down phase, service providers are susceptible to tightened margins, falling utilisation rates and less ambitious planning for greenfield projects.

According to Stephanie Ashken, CEO of Grifith Drilling, a diamond drilling company capable of drilling at 2,300 meter depths: “There has been little capital for greenfield exploration, nor any appetite for it from a timeline and permitting perspective... The current trend is for companies to do expansions of their existing operations. One of the ways in which the industry is confronting the problem of permitting and not being able to develop new projects is by drilling deeper at their existing operations.”

On the engineering side, Ivan Rayo, general manager of JRI Ingenieria, observed: “Nowadays we have a lower copper price and demand for engineering services has shrunk. There are less opportunities to expand the business, and many engineering companies have been forced to take austerity measures to increase efficiency. It has also meant fiercer competition.”

“Social demands are being made as part of the unrest and it is giving Chile the opportunity to start over. Hopefully the silver lining is that regulations and laws will be clearer moving forward.”

Carlos Leigh, Regional CEO Latam, DSI Underground

“A great advantage of Chile’s system is that our environmental permit system addresses the entire lifecycle of the project. This eliminates the need to obtain temporary permits for each stage of the project.”

Hugo Andrade, General Manager, Arcadis Chile

One of the primary demands on service providers in today’s market is to lower costs, and that often means careful planning. Claudio Martinez, commercial director at Worley, highlighted his company’s success in this area. “Worley has expertise in the designing and reviewing of CAPEX and OPEX estimates. We have been able to support customers with significant reductions (approximately 20%) in their CAPEX investment in brownfield projects.”

Another demand from clients is reduced energy consumption. In addressing this need, Fellsmith is working on flotation cells capable of reducing energy consumption by approximately 50% while at the same time improving recovery.

Additionally, there has been a push for service providers to offer tailored solutions to meet specific client needs. McLanahan general manager Jean Pierre Mary outlined his company’s experience developing tailored solutions: “The Chile team has in-house capability for design and service. Having a new focus on engineering for specific sampling systems has improved outcomes for clients.”

There are also opportunities for Chile’s service providers to grow their expertise. Despite its reputation as an export-oriented country, only 5.6% (271 of 8,577) of local Chilean mining suppliers are currently exporting their products and technologies, according to Pricheal. One of the biggest complaints among service providers is that regulations are too tight, and that cuts into profits. According to Jorge Maldonado, general manager of Superex, “The rules are not clear. We do not have big communities in the north, but a few people are creating big problems for business: In the Domingo project, they have not been able to begin because of environmental regulations and community issues.”

Equipment manufacturer Liebherr is seeing the effects of the downturn manifest through a lack of investment in new equipment. Managing director Dale Claydon said: “Our strategy has been to continue with our maintenance and service contracts while we wait for the market to pick up. Companies are extending the life of their assets, and eventually, it will get to a point where the cost to repair is uneconomical, and they will have to look for replacement equipment.”

The strategy in this case is to wait out the downturn long enough to capitalize on companies transitioning to newer, more efficient equipment.

That is not to say opportunities aren’t present for service companies. Both a growing lithium industry and an increasing push into underground mining will continue to keep service providers busy for years to come. Furthermore, the mining industry is becoming much more focused on sustainability, so there will be a host of new opportunities and challenges associated with reducing water usage and lowering carbon emissions.
“New mining projects have been slow to develop because it is tough to get approvals and the standards are very high in Chile. Dominga and Pascua Lama were forced to suspend development due to environmental regulations. From a blasting company point of view, our job is to ensure environmental compliance by developing products that minimize environmental impact.”

Diego Rodriguez Christensen, Director of Latin America, Maxam

grating permits, then the rules should be clear.”

Ashen of Griffith Drilling also pointed to policy issues that were complicating operations: “From a cost efficiency perspective, we have to comply with a significant number of standards, which has increased our operational costs over time. The same amount of work that we used to perform with three crews now requires four to meet the current labor regulations.”

OPPORTUNITIES UNDERGROUND

Given Chuquicamata’s US$5.6 billion dollar switch to underground cave mining from open pit and El Teniente’s new level proposal requiring an additional US$5.5 billion of investment, underground mining

The correct tailings solution for your mine’s requirements

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WE DISCOVER POTENTIAL

“Demand for teleoperation has not been affected by the price of copper. Rather, it has been affected by the need to get people away from the worksites. Safety has become the most important concern of our clients. This is even taking precedence over value.”

Brian Laroque, General Manager, Hard-Line

one of the more promising areas for service companies, JRI Ingeniería, KCP Ingeniería, Worley, Nornet, Master Drilling and DSI Underground are all finding lucrative opportunities in this space. According to Carlos Leigh, head of Latin America at DSI Underground - a company providing dynamic anchor systems and injection rocks for underground mining and tunneling – service companies play a critical role in ensuring the safety of mining underground. “Any mine that is deep or located in a country with seismic issues needs belts and systems with dynamic conditions that absorb energy.”

In this case, DSI provides fast setting resins that reduce bolting cycle times and increase safety.

JRI Ingeniería has a division specifically devoted to providing the most efficient and innovative designs in underground mining. Throughout the downturn in copper prices, JRI has been able to increase market share and since 2017, has experienced 20% per annum growth. A large contributor to this growth came from underground mine engineering and design.”
Innovation that Offsets
Long-awaited disruptive technologies are now arriving to Chile’s mining sector just in time to compensate for declining ore grades

Thanks to George Lucas and his Star Wars franchise, as a society, our most popular image of a robot is R2D2. For a small number of visionary thinkers, however, robots are more than science fiction; they are a critical enabler for safer and more productive mining future.

Marcelo Ruiz, manager of ENAEX Robotics, is one of the thinkers attempting to bring disruptive change to the mining industry. He said, “We recognized that as ore grades decline there is a need to facilitate access in difficult to reach deposits while protecting the safety of operating personnel.”

Within the mining industry, robotics may be considered niche and unready to immediately replace traditional methods, but their development and presence is indicative of a broader trend in which companies are investing heavily in technology. According to a KPMG survey, the highest level of investment in the mining technology space is occurring in data and analytics tools, autonomous vehicles and robotic process automation.

Andrés Costa González, president of the South America division at FLSmidth, an engineering firm that supplies productivity enhancing equipment, has been observing this influx in investment and is positioning his company to capitalize on the trend. He commented, “The future of mining is going to be tough. Deposits are getting deeper, and costs are rising. Mining operators need to maintain productivity in order to be competitive. With technologies and technical support, our clients can offset the degradation of ore and increasing costs.”

AUTONOMOUS MINING AND TELEOPERATION
It is no longer an uncommon sight to see a mine truck cabin empty as it is being operated remotely or fully autonomously. Trucks that drive themselves can spend more time working because software does not need to stop for short changes or to take a lunch break.

Companies at the forefront of this technological transformation in autonomous mining are Finning-Cat, Epiroc, Komatsu, Belaz, Hard-Line and Liebherr. In speaking about the autonomous future these companies are helping to facilitate, Pedro Danjane, senior vice president at Finning-Cat, said, “The routine and risky processes will be done by machines, and the focus can now turn to planning, mine design and new design of the operation. This will aid companies in capturing ore that were previously uneconomical.”

One of the added benefits of investment in autonomous solutions is that it also encourages innovation from suppliers. For example, there are several new autonomous trucks being introduced to the market today. Companies such as American Air, which supplies air conditioning, are then encouraged to tailor innovations to complement new fleets. According to Joel Araujo Stoul, CEO of American Air, “The challenge of automation is that there are not enough qualified people in the industry who are prepared for this rapid change. We are developing the most automated AC unit on the market, and it will require minimum work on installation and maintenance.”

Additionally, American Air is developing a predictive maintenance system for air conditioning units to be launched in 2020.

Beyond vehicles, there are also autonomous solutions for other segments of the mining process. Norrie, for example, has developed a smart scan technology that senior vice president of sales Marcelo Añabalin, senior vice president Latin America said “improves the quality of the sprayed concrete, securing the concrete in the mine, which supports the tunnel and therefore mitigates the risk of tunnel collapse.”

Technologies such as this will have big implications for increasing safety in the mines. When asked about the biggest risks associated with teleoperation and autonomy, Brian Linque, general manager of Hard-Line Chile, a leading supplier of automation, teleoperation and remote control technology, responded: “The most prominent risk is in companies taking too long to adopt the technology available. The pace of technological adoption in mining is accelerating at an unprecedented rate, and mining operations must partner with support companies to ensure the acceleration in adoption is implemented effectively.”

Chris Knowles, global marketing manager at McLellan, had a similar perspective:

“Our strategy has been to continue with our maintenance and service contracts while we wait for the market to pick up. Companies are extending the life of their assets and eventually that will get to the point where the cost to repair is uneconomical and they will have to look for replacement equipment.”

Dale Clayton, Managing Director, Liebherr

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Photo courtesy of Liebherr
“When we talk about automation, artificial intelligence and robotics, there really is not an option to not participate. Businesses will have to accept adoption as a cost of being in the marketplace.”

Chris Knowles, Director of Sales and Marketing APAC, McLanahan

“...We read a lot about Chile wanting to be lower cost in order to increase competitiveness. When we talk about automation, artificial intelligence and robotics, there really is not an option to not participate. Businesses will have to accept adoption as a cost of being in the marketplace.”

DATA AND ANALYTICS
Coupled with development in autonomous mining, data analytics is also quickly becoming an essential tool for operators. Precise maintenance solutions that address problems before they occur are one of the biggest benefits that digital technologies can offer the mining industry. Maintenance in mining often occurs on a time-based schedule, rather than as needed, leading to a lot of wasted time and money.

Dale Clayton, managing director of equipment manufacturer Liebherr, spoke about the company’s approach to data and innovation: “Our LMS system allows us to monitor critical information on trucks remotely and manage maintenance accordingly.”

In Chile, companies such as Emerson, Siemens, Molen Metric, Hexagon Mining and ELCO all specialize in helping customers to leverage their use of data through software. Although data and analytics tools are still in their infancy in Chile, they represent a significant opportunity, because data has the potential to unlock value in nearly every aspect of the mining process.

BEYOND BLASTING
The market for blasting services is highly competitive in Chile, and this competition is producing some of the most cutting-edge technology in the business. Maxam, Enaex, Dyne Nobel and Orcla all are all developing products that make blasting safer, more efficient and more environmentally friendly. By investing in the appropriate explosives, the way these explosives are positioned and stabilized, the accuracy of the blasts are improved, and the overall quality of the finished product is increased.

Angelo Passalacqua, business manager of Dyne Nobel Chile, sums up this realization in saying: “Great benefits can be obtained by adopting new technologies especially given the increase in the cost of labor, inputs and the variability in the price of commodities.” He continued: “There is a huge opportunity to improve the drilling and fragmentation processes, minimize exposure of people involved and reduce the amount of equipment used. Optimization of the process of blasting, fragmentation, transport, grinding, and supply of the plant can lead to huge cost savings.”

This savings opportunity was the driving force behind the development of Dyne Nobel’s differential energy technology, which ensures customers deliver the right amount of energy to different layers of rock within a blast. This produces better fragmentation, thus reducing the overall mining cost for the customer.

While some companies are focused on optimizing the results of blasting, Plasma 4th, a subsidiary of Enaex, is focused on eliminating the need for blasting altogether, by using advanced rock fracturing techniques. Francisco Portilla, general manager of Plasma 4th, noted that the benefits of plasma are far reaching. Blasting is often unpopular with nearby communities and is also considered harmful to the environment. Portilla said: “If we develop a project near a community, you need technologies that are minimally invasive. Blasting creates a lot of pollution, a lot of noise and a lot of vibration. Often this can lead to resistance from communities and the risk of a project being blocked.”

In order for any new technology to be adopted, however, the product must be cost-effective. Portilla noted that one kilogram of plasma is more expensive than one kilogram of explosives. However, there are other costs to consider. There are also community resistance to blasting and the high cost of evacuating the mining site when blasts occur. With Plasma 4th technology, only time within a 50 meter radius of the fracture are required to be evacuated. This guarantees operational continuity and limits downtime.

IMPACT OF TECHNOLOGY ON LABOR
As a byproduct of the push to modernize operations through automation, data and robotics, jobs will inevitably be impacted, both in number and in function. Many of the new jobs created by automation will require different levels of education and skills. This has raised concerns among communities as to how their people will continue to participate in the industry as the automation trend persists. Companies like Liebherr are cognizant of these concerns and feel an obligation to continue hiring and training local workers. Dale Clayton, managing director at Liebherr, explained: “We believe that autonomous mining will employ the same amount of people but with a different skillset. The challenge will be finding and training local communities to take these positions.”

SANHANNET VALLEY?
With so much focus on technology development in mining, Santiago has become an important regional hub for many of the leading global technology firms. According to Pascal Veige, president of APMM: “Chile is being used as a laboratory for experiments with new technology because it offers great diversity and variation in style of operations, height of mines and rock types.”

Another reason technology companies find Santiago appealing is because the city has some of the most well educated and well trained workers, an entrepreneurial culture and a good climate for investors—characteristics the city shares with other international hubs for the development of disruptive technology such as Silicon Valley.