Greensill

BUILDING THE FUTURE:

TRANSFORMING CONSTRUCTION FINANCE WITH BIG DATA AND AI

As much as $100 billion of cash is locked up at any one time in the construction sector of the United States alone.

Unlocked and properly distributed among the contractors and subcontractors to whom it is owed, that cash would, in turn, create tremendous economic opportunity for tens of thousands of businesses all over America.

Today, for the first time, releasing that logjam of capital is possible.

Artificial Intelligence, the accumulation and interrogation of Big Data and the startling computational advances in Machine Learning are revolutionising the very building blocks of business and society. The construction sector is no exception.

There is up to $1.5 trillion of spending on construction in the US in a single year, according to data compiled by Greensill, a leading provider of working capital to companies globally.

Working on those projects are as many as 1 million subcontractors who submit billions of dollars in payments every year. The total value of all invoices outstanding in the US construction sector at any one time is an even greater sum, however, as long-term projects and overhangs result in even more locked up cash – around $100 billion in total, according to Greensill research. Waiting for those payments is perhaps the greatest strain faced by the thousands of businesses working across the sector.

Constantly having to walk this financial tightrope inhibits subcontractors' ability to grow and, in some cases, poses a real existential threat. The result is that perfectly sound companies are facing untold hardship due to an inability to access capital based on an often inaccurate assessment of their credit worthiness.

$100bn
locked up in US supply chain

It seems an intractable problem. Yet early experiments with Artificial Intelligence (AI) undertaken by Greensill have provided encouraging evidence that a variety of new tools, all based on spectacularly fast big data crunching, may break the old payment cycles that have dogged the construction sector and usher in a new era of efficiency.
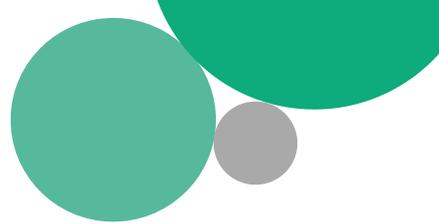
What's more, the early adopters are both large and small contractors. Finding themselves unexpectedly on the same side, they are all spotting significant benefits in terms of increased accuracy in budget planning, more robust cost control and better productivity and efficiency on site.

An unparalleled sharing of knowledge is under way. For an industry more typically associated with brawn, it is brain power – the brain power of machines – that is offering the prospect of a more profitable and harmonious future.

The potential for customer facing applications using AI is already being realised. In 2016, almost $8 billion was spent globally on cognitive systems and artificial intelligence – led by the financial services industry – and that amount will explode to around $50 billion by 2020, according to research group IDC. That is a compound annual growth rate of more than 55%.

Oracle's deep knowledge of the construction space extends beyond the needs of contractors today and deep into the future, thanks in part to the Oracle Construction and Engineering Innovation Lab in Deerfield, Illinois. There, it gives developers and contractors hands-on experience working with connected devices, autonomous vehicles, drones, augmented reality, data visualisation, and artificial intelligence tools, allowing them to see how they can deliver enhanced efficiencies while reducing costs.

55%
annual growth rate in AI spending

AI SPEND IN 2016
$8bn

AI SPEND IN 2020
$50bn
Source: IDC

The Oracle Construction and Engineering Innovation Lab is a simulated "worksite of tomorrow," helping organizations navigate a rapidly changing construction industry driven by technological advances.

Work-arounds for thorny design issues can also be tested within virtual reality environments, with answers coming back within minutes rather than requiring hours, if not weeks, of head scratching by architects and engineers.

While design techniques are evolving, the financing of major construction and infrastructure projects remains largely unchanged.

That situation cannot continue, says Lex Greensill, founder and CEO of Greensill. "There are going to be a bunch of very significant changes that take place over the next few years and the broader finance industry, frankly, isn't really keeping up with the things that are changing."

That is one of the drivers behind a partnership between Greensill and technology giant Oracle that has produced Subcontractor Direct Finance, also known as Sub Direct, a product that leverages a massive amount of anonymized, aggregated data to assess the creditworthiness of legions of small suppliers in a way that paints an accurate picture of their current capabilities, strengths and weaknesses.

This is increasingly important because small suppliers are likely to feel the full force of the technological revolution about to impact on the building process.

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Lex Greensill

According to Oracle, the construction sites of the not-too-distant future may look very different, and it has just opened a Construction and Engineering Innovation Lab in Deerfield, Illinois, to drive digital transformation.

It will give developers and contractors hands-on experience of working with connected devices, autonomous vehicles, drones, augmented reality, data visualisation and artificial intelligence tools to see how they can deliver enhanced efficiencies and reduce costs.

"We are reaching a very important point now, things are changing," says Burcin Kaplanoglu, exeutive director and innovation officer, Oracle Construction and Engineering.

He believes large infrastructure projects often cost more than they should to construct and insure because engineers have to build in a large margin of error. "Structural engineers have done a great job over 100 years to define very strict rules. If you design a bridge you make certain assumptions about the number of vehicles that will travel on it every day, for instance. However, we do not collect the field data in real time so we don't really know if the bridge was over-designed, or under-designed."

AI can analyse that crucial 'field data' and give an accurate picture about the impact of different loads on a structure, the integrity of the building materials over time, the effect of weather and other critical factors.

That kind of data is particularly valuable in times of uncertainty. Recent data from the Construction Financial Management Association shows that financial experts in the construction space are growing wary of a potential downturn.

"After a decade of strong growth, confidence among CFOs in the construction industry have slipped, hinting at weakened optimism," says Stuart Binstock, President & CEO of the CFMA. "Construction CFOs represent an important group of decision makers in an industry that is an essential element of the US economy. The trends illustrated in CFMA's CONFINDEX index reveal that construction CFO confidence is at its lowest levels since 2010."

"For the next generation one of the issues is figuring out how humans can complement robotic equipment."

Burcin Kaplanoglu, Oracle

As for the future, Burcin Kaplanoglu believes many of the advances in AI will centre around automating repetitive processes, maybe even down to laying the bricks in the walls. "For the next generation one of the issues is figuring out how humans can complement robotic equipment."

In construction, autonomous drones costing as little as $500 are being used to map out construction sites digitally. A single fly-over amasses a vast amount of data which can then be transformed into highly detailed schematics and 3D models that are accurate to within millimetres.

Building information modelling is already being used to create digital representations of physical places. The next step is to predict how the functions, fixtures and fittings of a building will evolve over its lifetime. That, in turn, will help property managers develop more efficient maintenance and service programmes as well as identify potential equipment failures well in advance.

CONFIDENCE IN CONSTRUCTION TUMBLES

Construction industry CFOs confidence level at lowest since September 2010

Source: CFMA Confindex

Sept 18
123
↑3.4%
from previous quarter

Dec 18
114
↓7.3%
from previous quarter

March 19
109
↓4.4%
from previous quarter

Smart devices, often allied to virtual reality, are becoming commonplace on site as apps log all the details of projects, as well the faults and minor adjustments that always require attention. This vast bank of data is logged to create a detailed record of the 'life' of a building that can be accessed from anywhere at any time.

Oracle's Burcin Kaplanoglu foresees command and control of projects being undertaken from virtual reality control centres many miles away, "almost like a video game".

The common theme is each technology works by generating and analysing vast pools of data: more data than a human being could ever hope to properly interrogate.

"We struggle to recognise patterns – algorithms can actually look for patterns that we don't even realise might be out there."

Bart Ras, UK managing director of Greensill

"We struggle to recognise patterns," says Bart Ras, UK managing director of Greensill. "The obvious ones, we can get by observation. But the not so obvious ones are missed by human beings nine times out of ten. Algorithms can actually look for patterns that we don't even realise might be out there."

However, it is not only the physical construction of buildings that will benefit from the adoption of AI, it can also address the systemic weaknesses of traditional funding models and client- contractor tensions.

These longstanding challenges drove the creation of Sub Direct, developed by Greensill and Oracle. This new approach will help unlock much of the $100 billion currently clogged in the supply chain and be a welcome lifeline for many cash-strapped contractors.

$1.5tn
in spending on construction in the US in one year

"We would not be able to offer the Sub Direct solution without Big Data," says Pat Allin, chairman of Greensill US and global head of construction.

"Very few subcontractors are investment grade in the construction industry, even the larger companies. What you do have is a very large number of sub investment grade companies that are very reliable, very good at what they do and very successful. If we pool all of them together and analyse all of their historic performance and payment data, we can show very easily that they are creditworthy.

"As this gets deployed and used more widely throughout the industry, I think the experience that we have will result in lower insurance and funding costs."

Sub Direct makes use of the Oracle Textura Payment Management Cloud Service. Greensill has a long relationship with Textura, a construction payments business bought by Oracle in 2016.

Greensill assesses the subcontractors using a number of criteria. Once accepted, they simply submit invoices electronically which are paid almost instantly.

Oracle's payment management solution produces an approved invoice and the reason for that is the technology used by subcontractors to do their invoicing," explains Allin. "In the construction world, that's a comprehensive set of legal documents."

Greensill's systems speed up the approval process, so it can be completed in seconds. "The approval by the general contractors is captured on Oracle Textura Payment Management. Lien waivers are collected in advance of payment, and the platform will facilitate payment on approval by the general contractor."

The Oracle Textura Payment Management system handles more than $72 billion in subcontractor payments each year. With Sub Direct, the entire pool of subcontractors will have the ability to access the system – and the benefits of early payment.

"Insurers have concluded the risk of loss is small, therefore it is insurable. And because it's insurable, it's also fundable."

Pat Allin, chairman of Greensill US

"This has never been done before because we never had the data that we have today and we never had the capability to analyse it," says Pat Allin. "Today, we have access to a large amount of aggregated and anonymized data on payment outcomes. We can measure the historical invoicing and payment perfromance of the system and what the expected losses might be."

"So insurers can look at this portfolio of risk and assess it based on history. And they have concluded the risk of loss is small, therefore it is insurable. And because it's insurable, it's also fundable."

Greensill can then take this portfolio of subcontractor payments to investors as a tradable capital market product, just as it has done with scores of other supplier finance products which has made it one of the most active, and reliable, issuers of tradable investments in global markets.

This potential for creating sophisticated financial instruments becomes even more compelling when the next phase of AI development moves into the mainstream: servitisation.

It is not unlike the trend in consumer products away from outright ownership to monthly subscriptions for access to a range of services from cars to a full music collection on a mobile.

In this brave new world, the funding priorities of major building projects become less about the upfront construction costs and more about the lifetime maintenance and upgrade costs. The price of these services can be spread over many years on long contracts that could, themselves, be packaged as investment grade entities and sold to mutual funds and other long-term investors that require a steady and transparent level of return.

Of course, these circumstances exist in many other sectors and the lessons learned – literally, by machines – in construction can be applied across a wide spectrum of industries. "There is an opportunity to deploy this solution outside construction in any industry where we can find similar data sets to analyse," says Greensill's Pat Allin. "These are very exciting times, and all made possible by big data."

It is a clear example of cause and effect: how changing financial models can change the world.

Changing financial models can change the world.

ACTION POINTS

Spending on AI is expected to rise from $8 billion in 2016 to £50 billion by 2020

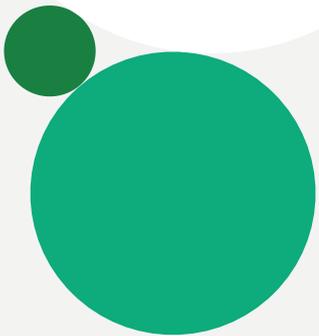Big Data is changing construction, offering prosperity and stability to businesses large and small

$100 billion of cash is locked up in US construction sector at any one time

$1.5 trillion in cash flows through this industry in a single year

Sub Direct exploits Big Data to help unlock capital and pay contractors at the click of a mouse

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