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Transitioning from LIBOR to a Replacement Rate Index: What Steps Should Lenders Take Now?

By Andrew Kalgreen

Lenders and borrowers alike are wondering when and how they will adapt to a market in which LIBOR is no longer the preferred interest rate benchmark, a development likely to occur at year-end 2021. Clearly lenders must consider the many effects of replacing LIBOR with another floating rate index. This article discusses the steps lenders should take now, and why.

Financing Robotics: Scoping the Opportunity

By Paul Bent, Shawn Halladay and Andrew G. Mesches

Will the growth of robotics increase financing volume? The jury is out, but niche players with asset management skills will likely discover opportunities. As this article points out, most risks are no different from those faced in any technology-driven asset class: managing residual risk and associated soft costs in a fluid environment.

Analyzing U.S. Cannabis Laws and Their Impact on Financial Services

By Gregory D. Omer

As state cannabis laws become more commonplace, indirect connections to cannabis-related businesses are increasingly harder to avoid. Significant legal risk surrounds deposit services, loans, and commercial finance leases. Here is an overview of the complicated web of state and federal cannabis statutes, rules, and government policies.

A Valentine's Day Massacre of Liquidated Damages: *In re Republic Airways Holdings Inc.*

By Arlene N. Gelman and Edward K. Gross

A bankruptcy court ruling in New York this year could be problematic for lessors when enforcing certain typical acceleration and collection remedies against defaulting customers. Specifically, *In re Republic Airways Holdings Inc.* may impair the reliability of SLV-based liquidated damages provisions even in hell-or-high-water leases and guaranties of those obligations under unconditional and absolute guaranties. The authors will explain why they believe that the court erred, and discuss the enforcement and transactional implications to lessors.



Financing Robotics: Scoping the Opportunity

By Paul Bent, Shawn Halladay and Andrew G. Mesches

Will the growth of robotics increase financing volume? The jury is out, but niche players with asset management skills will likely discover opportunities. As this article points out, most risks are no different from those faced in any technology-driven asset class: managing residual risk and associated soft costs in a fluid environment.

The burgeoning growth of autonomous vehicles has captured the attention of not only the public but also the equipment leasing and finance industry. The field of robotics also is experiencing rapid growth and change. Together, these technologically accelerating industries are creating concerns about their technological and societal impact. This article, a byproduct of an Equipment Leasing & Finance Foundation study, examines the robotics industry and identifies related financing opportunities and challenges.

ROBOTICS AND AUTOMATION

Automation is the technology by which a process or procedure is performed without human assistance.¹ Robotics, on the other hand, concerns

itself with devices that act on the world in which they function (devices often referred to as *robots*), which in turn exhibit characteristics of autonomy. Thus, robotics is the study and science of devices that may often be, but are not always, guided or propelled by automation.

The degree of robotic autonomy, along with a robot's ability to mimic human-like activities, may require sophisticated, multiple components such as:

- Hardware – effectors, sensors, cameras, the robot framework and CPU, enterprise network, server, and storage
- Software – command and control, network infrastructure software, and specific applications

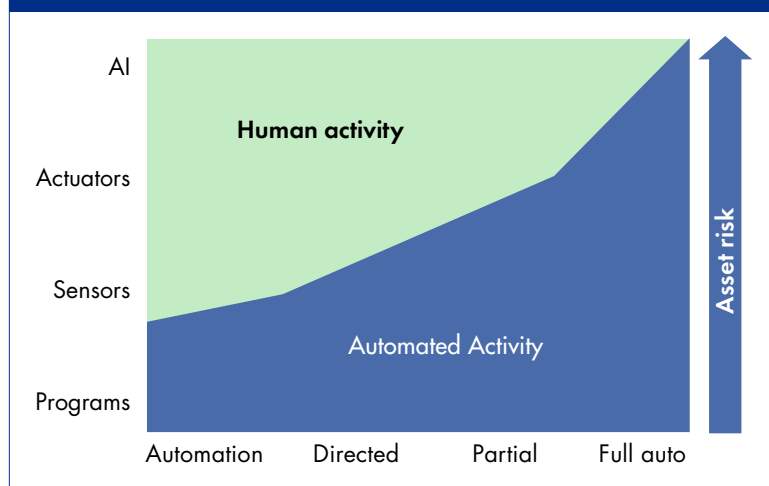
- Services – application management, education and training, facility modification, hardware deployment and support, network consulting, management and integration, operations and technology consulting, and systems integration

Because development of the technology behind many of these components is increasing at a rapid pace, the more sophisticated or autonomous the robot becomes, the more technology and soft costs play a role in how it functions. Consequently, although neither artificial intelligence (AI) nor complete autonomy is a required feature of robotics (think of the robotic welder), the level of robotic autonomy directly impacts how, and to what extent, these assets may be financed.

Financiers must be cognizant of these factors when choosing to pursue an equipment sector because, as illustrated in Figure 1, the closer to full autonomy a robot or robotic system becomes, the greater the asset risk undertaken by an equipment financier.

Machine learning is being incorporated into robotic activities to increase efficiency and reduce waste. Predictive analytics, or the analysis of current and historical data to predict future behavior — which has been used in truck, auto, and forklift fleet financing for some time now — is being applied in robotics to gather and track data on performance and usage. All these new, additive elements to the basic machine architecture increase the asset risk, as they require signifi-

Editor's note: This article is based on an Equipment Leasing & Finance Foundation report by The Alta Group titled Robots, Cobots, and Finance, published in February 2019. The study is available at www.leasefoundation.org.

Figure 1. Autonomy Curve

cant software and computing capabilities.

There also are potential safety risks as the interactions between humans and robots continue to increase. Third parties (including financing companies) increasingly risk exposure to vicarious liability, or claims in which disinterested owners/financiers

are substituted for actual operators or users of robotic devices. These risks are particularly high with the rapidly growing class of robots known as *cobots*. A *cobot* (a portmanteau of *collaborative* and *robot*) is a robot intended to physically interact with humans in a shared workspace.

Human safety always will be an issue, but new techniques are enabling safer and more enhanced physical collaboration between robots and humans in unpredictable environments, such as construction and agriculture.

Given the many disparate parts and revenue sources in a robot-

ics application, it is not difficult to draw parallels between the more advanced robotics and managed solutions transactions (MSTs). Many MSTs, for example, depend on the Internet of Things (IoT) for data collection, robust analysis of the data, and AI to make the transaction work. The same elements are required for higher forms of autonomous robotics to function.

Market Size

There are many questions surrounding the market potential of robotics, including the size and scope of any opportunities and their attendant risks.

Current State

IDC's *Worldwide Semiannual Commercial Robotics and Drones Spending Guide* predicts that worldwide purchases of robotics and robotics-related software and services will continue to rise at a compound annual growth rate of 22.8%, reaching total spending of \$230.7 billion in 2021. This IDC report includes drones (essentially flying robots, which currently account for approximately 37% of robotics spending). ABI Research predicts that the number of industrial robots sold in the United States will

jump nearly 300% in less than a decade.

Currently, more than half of all robotics spending is for robotics hardware. Other categories of the robotic spend include applications management, education and training, hardware deployment, systems integration and consulting, network infrastructure, and command and control applications.

According to IDC's research, the discrete manufacturing and process manufacturing industries continue to be the largest purchasers of robotics products and services, accounting for more than half of all robotics spending throughout IDC's five-year forecast.² The automated production industries, such as manufacturing and wholesale, will be the second largest sector, followed by the resources industries of mining, oil and gas extraction, and agriculture.

Growth Potential

Future growth is not a given, of course, but the experts' projections of the future are positive. This is not to say that achieving that growth will be obstacle-free, as there are challenges to be overcome, such as

new materials and fabrication methods, better power sources, the navigation of unmapped environments, and ethical considerations.

These challenges also can be viewed as valuable portents of the future, not just impediments to growth, as their solutions represent future, not current, technologies and capabilities. When rationalizing future opportunities in robotics, therefore, the potential that automation/autonomy can be applied to any given activity has to be assessed in terms of currently demonstrated technologies. In other words, we ask, What is the state of development and commercialization of the essential technologies required for significant future growth in any given industry or application?

Some sectors, such as farming, forestry, and construction, are less susceptible to automation because most of the environments in which their activities are performed are unpredictable. Consequently, they are not growing as rapidly as other sectors. Examples in which the factors comprising the environment keep changing include operating a construction crane

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or providing emergency care as a first responder.

Societal Factors

Other sectors have less potential for automation due to factors unrelated to the unpredictability of the environment. Activities in some of these industries require high levels of knowledge work or complex human interactions, such as the healthcare and education sectors.

Societal perceptions are factors that also may influence the potential growth of automation, fueled by headlines such as *Job-Stealing Robots are Steadily Taking Over America*, that referenced National Economic Research Bureau findings that, for every new industrial robot introduced into the workforce, six jobs were eliminated.³

Pablos Holman of Bill Gates Intellectual Ventures brings a different perspective, however:

We're good at imagining how a robot is going to take a job and it [the job] will disappear. We're bad at imagining the new kinds of jobs we will create. Our parents could never imagine the type of job experiences we have today.⁴

Machines taking over some human activities in an occupa-

tion does not necessarily spell the end of the jobs in that line of work. On the contrary, their numbers at times increase in occupations that have been partly automated, because overall demand for their remaining activities has continued to grow.

Much of this activity does not represent job loss but, instead, a shift in the value cycle as people performing repetitive tasks are now becoming data-enabled decision-makers or are working collaboratively with cobots to improve overall efficiency, productivity, and throughput.

CHALLENGES OF FINANCING ROBOTICS

Table 1 identifies the risks in equipment finance transactions (credit, residual, legal and regulatory), along with an assessment of robotics' impact on the applicable risk in the transaction.

Credit Risk

Credit risk remains a central element in any financing transaction, and robotics is no different. The question that needs to be answered, however, is whether robotics transactions require a

different, or added focus on, customer credit adjudication.

The answer is that, overall, the introduction of robotics into the credit decision does not, by itself, increase the credit risk in the transaction. This is not to say that there will not be changes in credit risk in certain areas. For example, credit risk may change if prices drop with technological advances and smaller firms are able to take advantage of

newer equipment. This is the case with any technology asset, however, and is not unique to robots.

Credit issues and underwriting risks also will change if robotics is included in managed solutions. These changes are more a function of the characteristics of managed solution transactions than the robotic equipment embedded in the solution, however, and such changes

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are similar to those facing leasing and finance companies in other equipment sectors of the economy.

Table 1. Risk Map

Risk	Impact	Comments
Credit		Potential expanded credit profile due to lower cost
Residual		
▪ Valuation		Increased risk due to technology and software
▪ Realization		Disposition expertise/effect on existing assets
Accounting		Possible friction as deals approach MST models
Income tax		Special-use equipment may be problematic
Legal		
▪ Vicarious liability		Risk from proximity to humans and property
▪ Documentation		Will follow standard industry practices
Operational		No new operational challenges introduced
Regulatory		New safety and social issues created
Funding		Will follow standard industry practices
Pricing		Will follow standard industry practices
Investment		No new issues raised

More risk

Less Risk

Least Risk

The importance placed on asset and residual value risk is dependent on at least two factors: the specific underlying assets and the ratio of assets to soft costs.

An entity financing robotics, therefore, should not need to adjust its credit policies and processes merely because it is financing robotic equipment. A relatively low impact, accordingly, has been assigned to the area of credit risk in the risk map in Table 1.

Residuals

The residual aspects of new generation equipment invariably create angst for the risk and upper-management teams, and financing robotics is no different. When it comes to setting residual values, though, is robotic equipment any different from other high-technology and software-rich equipment?

It is not likely to be, as virtually all industrial, transportation, agricultural, and medical assets

– indeed, the entire Internet of Things – are incorporating increasingly high levels of automation, software (programmability), and “intelligence.” The fact is that the equipment leasing and financing industry has been addressing changing technology when valuing assets almost since its inception.

The importance placed on asset and residual value risk is dependent on at least two factors: the specific underlying assets and the ratio of assets to soft costs. Key, albeit not new, considerations in residual valuation for robotics are the cutting-edge technology and high reliance on the software that is becoming commonplace in many robotic applications.

New technologies always require the continuing development of specialist knowledge to assess and realize residuals, knowledge that may initially be difficult to obtain on a timely basis. New technologies also have the potential to disrupt current used equipment markets, so residual realization on lessors’ current portfolios will be affected, particularly if prices on new, more effective equipment start to drop.

Although the risks of residual valuation and realization for robotic assets remain important considerations, the development and acquisition of the underlying data upon which to base such determinations are not seen as being materially different from those for traditional equipment. Therefore, the increased risk for robotic assets has been rated as moderate relative to similar high-technology assets.

Legal

Lessors have coped with vicarious liability issues for quite some time and there is a substantial amount of case law on the subject, ranging from motor vehicles to aircraft. In fact, a federal statute⁵ provides that companies that lease or rent vehicles to others may not, merely because of their ownership, be held vicariously liable when those to whom their vehicles are leased or rented behave negligently.

Although the thought of driverless over-the-road trucks running amok among the civilian population may certainly raise in some minds the unwanted specter of huge vicarious liability claims, the bottom line is that the underlying issues remain

essentially the same as for other equipment.

There will no doubt be litigation in this area, and there may be a period of learning to deal with new technologies. Nevertheless, the applicable law and overall risk exposure for equipment financing companies is likely not to change significantly from the framework currently faced by financiers in this segment of the market.

Mitigating factors for vicarious liability risk might include more focus on the manufacturers for recompense, as operation of this complex equipment becomes more reliant on embedded robotic performance and controls. Lessors will need to continue to be diligent in their UCC 2-A finance lease efforts, therefore, to maintain their status as passive investors and to avoid any hint of agency between themselves and the suppliers of robotic equipment. Elements to the regulatory structure applicable to robotics, such as national standards, also may be introduced.

It can be argued that robotics, particularly autonomous classes such as vehicles, may increase

the likelihood of claims against deep-pocketed lessors. Aside from the emotional component of “no one in control,” though, if there are adequate regulatory safeguards in place (some of which are already beginning to take shape),⁶ lessors are likely to protect themselves in the same manner as before, even with the possibility of increased claims. Consequently, the increase in vicarious liability risk has been categorized as moderate.

Regulations

There are continuing state and federal efforts to regulate the financing industry, but any regulations that arise related to financing robotics are more likely to be driven by the robotics themselves, rather than the associated financing. Since fencing off a robot to protect humans severely limits its autonomy and, hence, utility, safety will be front of mind with many regulators.

Additions to the regulatory structure might include national robotic safety and licensing standards or, perhaps, universal, no-fault insurance. At some point, these licensing restrictions may have to extend beyond operators to include repair and

Robots have been used and financed commercially for over 50 years, so the industry already is involved in financing this equipment, with the operative word being *equipment*.

maintenance providers due to the sophistication and complexity of the equipment.

Regulations intended to advance social policies also are likely, as efforts are made to protect jobs and general feelings of well-being. Many of these policies could be based on the premise behind science fiction author Isaac Asimov's Three Laws of Robotics, the first of which states that, "A robot may not injure a human being or, through inaction, allow a human being to come to harm." Any adverse change to the human condition caused by robots, therefore, may be considered antithetical to this law, however unenforceable it may be.

There is likely to be increased regulation of robotic equipment

over time, and these regulations may impact the growth of robot utilization. Any impediments to equipment growth always affect financing opportunities, but for the various reasons discussed in this article, the overall increased regulatory risk of financing robotics has been deemed moderate.

CONCLUSION

Robots have been used and financed commercially for over 50 years, so the industry already is involved in financing this equipment, with the operative word being *equipment*. It must be recognized, therefore, that no matter how elaborate or complex a robot becomes, it still is a piece of equipment with many of the same risks and opportunities of other equipment classes.

The robotics industry is growing, so a portion of the growth in robotics financing will certainly come by virtue of general economic expansion. The potential for significant growth, however, will come from financing robots capable of operating in unpredictable environments.

These robots will incorporate

the advanced technology, sensors, AI, data analytics, and the change in delivery and business models of what is referred to as Industry 4.0, which is an emerging industrial revolution that encompasses multiple components, including IOT, autonomous robots, the cloud and big data (see Figure 2).

Although this article has referenced linkages between robotics and MSTs, it is important to make a clear distinction between them, as robot financings are not necessarily MSTs.⁷ Even though robots can be an element of a managed solution, and although there may be convergence occurring between them, one does not create the other and vice versa: the critical aspect of MSTs is the underlying subscription pricing model, not the nature of the equipment involved. The above comment notwithstanding, increasing growth in robotic financing opportunities is probable through MSTs.

There are risks in financing robotics, just as there are risks in financing many other types of equipment. Some of these risks are inherent in the transaction, while others are created by the

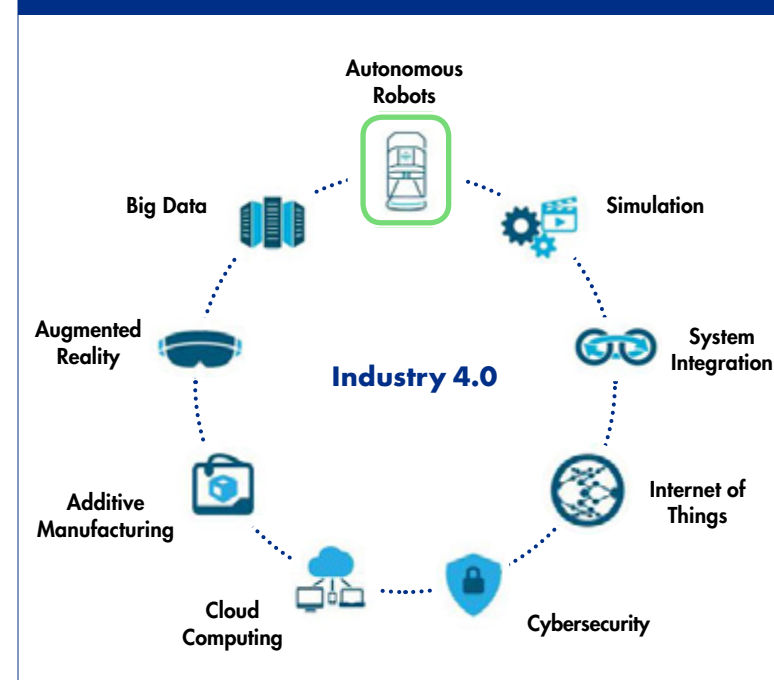
trends occurring within robotics and convergence with MSTs. Most risks, however, are no different from those faced in any technology-driven asset class – managing residual risk and associated soft costs in a fluid environment.

At the end of the day, the real question is whether or not robotics will increase financing volume, and if so will these gains be offset elsewhere as robots replace standard equipment operated by human workers? The jury is still out on this issue;

but research indicates that, although robots may lead to changes in job demographics, increased robotics utilization will not be dilutive, as the new jobs and businesses being generated through adopting robots will generate more, rather than fewer, financing opportunities.

Robotics will create opportunities for those willing to get in front of it, and niche players with asset management skills will lead the pack in this regard. Robotics is going to be a part of the change in how business

Figure 2. Elements of Industry 4.0



is conducted in the future, as manufacturers and end-users certainly are discovering. Consequently, the equipment leasing and finance industry must embrace this trend if it is to creatively continue to meet the needs of its customers.

Endnotes

1. Groover, Mikell P. *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems*, 5th ed. New York: Wiley, 2014.

2. The automotive industry accounts for a substantial portion of this volume.

3. Glaser, April, and Molla, Rani. "The number of robots sold in the U.S. will jump nearly 300 percent in nine years," Vox, April 3, 2017 (originally on Recode.net). <https://www.vox.com/2017/4/3/15123006/robots-sold-america-growth-300-percent-jobs-automation>.

4. Garwood, Rita. "Innovate or Die: Lenders Must Partner with Tech Providers ... or Face Disruption," *Monitor*, July/August 2018.

5. Transportation Equity Act (49 USC Sec. 30106), often referred to as the Graves Amendment.

6. As of March 2019, 29 states have enacted some form of legislation related to autonomous vehicles, according to the National Conference of State Legislatures, Autonomous Vehicles Database, March 12, 2019.

7. For further insights into this area, refer to the Foundation study *Managed Solutions: Evolutionary or Revolutionary?* available at www.leasefoundation.org.



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