

Tracking space enterprises will change accounting, professor says

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It's not too early to begin examining how space-based businesses will keep track of everything, according to Dr. Hank Alewine of the UAH College of Business. Credit: NASA

Emerging space businesses will drive new innovations in the accounting needed to provide an accurate picture of operations, says an associate professor of accounting at The University of Alabama in Huntsville (UAH) who has written a paper examining commerce in space.

Dr. Hank Alewine of the UAH College of Business says a permanent human presence on the moon and space tourism activities are on the horizon in the 2020s, with human activities on Mars scheduled for the 2030s. Right now, the business of space is an incredibly risky and costly deep-pocket billionaires' game, with the likes of Elon Musk's SpaceX and Jeff Bezos' Blue Origin among those companies with the financial heft to play the long game with return on investment.

"The biggest hurdle to space economic development currently is overcoming substantial costs to launch," Dr. Alewine says. "Once launch costs reduce due to competition and technological advancements, then the overall risk model for a firm's entry into the space economy will fundamentally change due to lower barrier costs."

That's why he thinks it's not too early to begin examining how space-based businesses will keep track of everything. Near-future space accounting adaptations will be subtle, yet Dr. Alewine says they still will be very interesting. Longer term changes will be more substantial.

"For example, how will auditors independently assess space asset values or conduct tests of internal controls for certain space operations from Earth? Will auditors eventually fly into space as part of an audit? Talk about an exciting career opportunity for future UAH accounting graduates!"

His research suggests three challenge categories that will impact how much innovation the new space accounting methods will require.

First, Dr. Alewine says that some space accounting issues will not be unique to a space setting but may grow in importance because of it.

"For example, we have been dealing with electronic commerce issues on Earth for years, and we will certainly need to address these issues when

they appear along with increased space commercial activity."

Second, Dr. Alewine says that some space accounting challenges will have similarly occurred on Earth but will require major adaptations for a solution to be successful in space.

"For example, we already have capacity cost management models on Earth for terrestrial businesses, but researchers believe these models are not useable in their current form for unique space settings and will have to be overhauled to be effective," he says.

Finally, he thinks some issues in space will require accounting methods developed from scratch.

"For example, NASA has projected asteroid belt resources at \$700 quintillion dollars," Dr. Alewine says. "Mining these resources and returning them to Earth could vastly destabilize supply-demand dynamics, so management accountants would have to fundamentally reconsider how to apply concepts such as breakeven analysis and pricing strategies."

The path forward may take hints from accounting's past, which traces from early crop and animal accounting methods in Ancient Mesopotamia. Accounting history includes methods adapted to the rise of mercantilism and the vast expansion of global trade routes in the Age of Discovery. New methodologies were developed in the rise of the American Industrial Revolution, where the emergence of corporations and expansion of the railroad infrastructure helped accounting to morph from primarily a bookkeeping task to a profession.

One of the chief drivers of future space accounting will be distance.

"Taking the distance factor for example, the distance from Earth to Mars

at their closest alignment is 33.9 million miles; the distance from Earth to the Jupiter moon Europa, which may contain water, is over 10 times that amount," Dr. Alewine says. "With current technology, these distances mean time delays in sending and receiving accounting information that may be very time sensitive for complex supply chains to succeed."

Currently, the emergence of private sector competition in space is driving greater efficiency that will make larger scales possible in the future, he says.

"The whole space economy benefits from this healthy competition. Once some methods emerge as more effective and efficient, then the duplication of such processes may be a good thing, while experimentation can then shift to other elements of the space economy."

As the development process continues, accounting will be needed to provide a variety of performance feedback information, and Dr. Alewine says performance measurements may be needed that haven't been invented yet.

"The key to what information needs to be captured is, what would management like to know in order to assess success for an entity's space objectives?" he says. "Once this is determined, can the current accounting information system capture, record, compile and report such information to management? If not, what will it take to capture and process the information? Is it cost-beneficial to do so?"

Many space companies will struggle with determining how much it costs to actually manufacture a product or provide a service, especially when overhead costs need to be assigned to a product, Dr. Alewine says. Accounting can help clarify the costs incurred to produce, which can greatly impact pricing decisions.

In [capital markets](#), the rise of high-risk capital competition in space is going to place new demands on accountants to convey the truthful financial condition of an entity regardless of how the truth makes that entity look, Dr. Alewine says, noting that there are concerns about too many "unicorn valuations" being used in investment decisions where valuations are inappropriately inflated.

"No doubt massive capital will be required to operate with space-related strategic objectives," he says. "As a result, there will be immense pressure on accountants to paint a favorable picture of a company's financial condition in order to attract investors. Trust in our economic system hinges on accountants being consistently faithful in presenting the financial truth to all stakeholders."

Ownership of resources is another evolving area of space business in which accounting has a role. The 1967 Outer Space Treaty currently governs international space law and under it no person or entity can claim a celestial body. The United States and Luxembourg have suggested that the treaty is silent on companies extracting and selling resources from the mining of space objects, so they have passed legislation to help incentivize companies to engage in these types of space operations.

"Accountants will need to closely monitor developments in international space law, because when a resource is considered owned will have impacts on asset valuation and its related tax treatment," Dr. Alewine says.

Likewise, space business will drive innovations in corporate liability, risk mitigation, relative pricing strategies and the national legal protections needed to allow corporations to compete as market entrants in the growing space economy. The leap of capital into space leaves many questions yet to be answered.

"Companies may be interested in producing items in space to avoid negative gravity impacts on manufacturing certain items, and it also may simply be cheaper to produce items in space that will be used in space, to avoid launch costs," Dr. Alewine says.

"If a sales transaction takes place in space, who has tax jurisdiction for determining a sales or a value-added tax? If a multi-national company is doing an intracompany transaction, what transfer pricing consequences will exist when part of the supply chain is in space?"

All those challenges provide opportunities for accountants.

"High quality career paths within the accounting profession have really diversified and proliferated in the past few years, and space accounting possibilities represent yet another exciting avenue for UAH accounting graduates," Dr. Alewine says.

"Space accounting research will involve a multi-discipline approach both among accounting disciplines—such as audit, tax, management accounting and accounting information systems—and with other disciplines such as operations management," he says. "I'm excited to be a part of a new [space accounting](#) research field. Our research is on the final frontier with the next great economic revolution!"

More information: Hank C. Alewine. Space accounting, *Accounting, Auditing & Accountability Journal* (2020). [DOI: 10.1108/AAAJ-06-2019-4040](https://doi.org/10.1108/AAAJ-06-2019-4040)

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