Coopetition in Mearth

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A strategy beyond rivalry to develop the Moon-Earth Ecosystem

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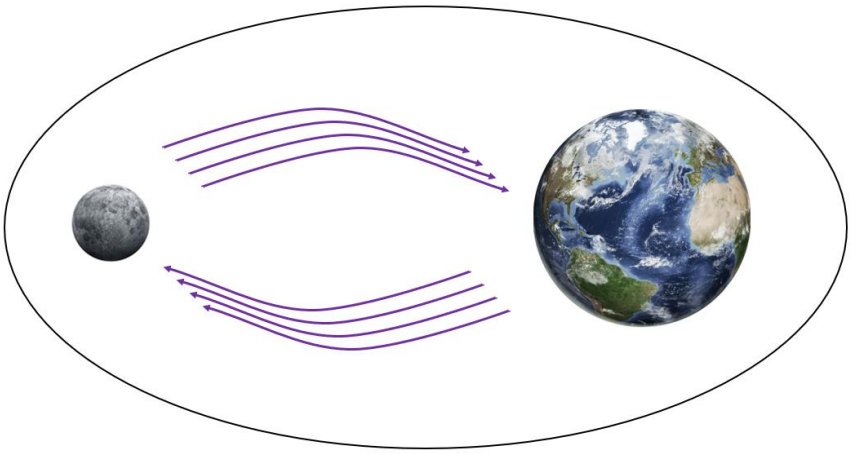

Mearth = Moon + space between the Moon and Earth + Earth

Mearth is the merging of two words into one. The Moon and Earth together represent *Mearth*. The term is defined to represent the geography and the interconnectedness of the Earth and its satellite planet the Moon.

Abstract

The Moon and Earth together represent *Mearth*, a new geographic space. This paper is about the innovations that can contribute to an improved future. To attract investments, produce technologies, build out a new ecosystem within the new geographic space *Mearth*, the coopetition strategy that essentially considers cooperation between competitors may represent the most suitable solution to join efforts to implement *Mearth*'s economic system and its ecosystem.

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Keywords: Mearth, Coopetition, Innovations, Strategy, Space Economy.

Introduction

Space is no longer the sole domain of governments. Recent technological advances in manufacturing, propulsion, and launch have made it much easier and cheaper to venture into space and conduct missions. Most importantly, lower costs have opened the door both to new startups and large established corporations to explore new opportunities that once seemed too expensive. With lower costs and greater technological capabilities, businesses can begin to conduct large-scale activities, pursue emerging opportunities, and potentially gain long-term advantage, and first-mover advantages.

Digital technologies such as artificial intelligence, autonomous robotics, manufacturing sensortech, 3D Printing, and new efforts in R&D are making it possible to make fully reusable low-cost rockets for the first time. In addition, together with the decrease in satellite launching costs, there are new technologies that can be embedded into satellites including higher-resolution sensors to help with advanced weather forecasting, improved precision GPS navigation capabilities, the ability to generate image and video captures, the ability to monitor crops while detecting soil moisture, the ability to look further into the universe while extending their reach to map the ocean floor, etc. Furthermore, the increasing adoption of digital technologies in space leads to costs for things such as information-gathering (i.e., search costs) and the replication of digital goods to approach zero; in addition, the cost of transporting information stored in bits is near zero (Goldfarb, Tucker, 2019).

There are already several important space-for-Earth applications in sectors like agriculture, energy, manufacturing, mining, and insurance. In the not-distant future, a greater number of people may be able to live and work in space. Given the combination of lower costs and more sophisticated technology, increasing beyond-Earth activity is expanding the sphere of human economic activity to one day extend to the Moon. With the establishment of permanent structures on the Moon and regular movement of people, goods and services between the Moon and the Earth, they will together form a unified economic system and ecosystem, which we can call *Mearth.*

With efforts such as by the Project Moon Hut Foundation, organizations are looking to attract investments, produce technologies, to build out a new ecosystem within the new geographic space (*Mearth*: Moon+Earth) and contribute to an improved future through innovations generated within the ecosystem (for instance, CAT scans, solar power, cloud computing, cordless power tools, fire department clothing, air filtration, water

purification, etc. have been created while innovators where working on generating technologies to use in space exploration) to improving the lives of all species on Earth.

1. What is Mearth?

Mearth defines a new geography. The Moon is like a new continent connecting to the Earth through the space between the two celestial bodies. This *Mearth* geography can generate a *Mearth* Economic System and a *Mearth* Ecosystem.

If we consider the *Mearth* Economic System, instead of the economic system of a single planet (for example, the Earth alone), we will have the potential for a much more expansive economic system.

The first implication for economic analysis of this enlargement of the economic system is that there is *a scale-up effect***.** This *scale-up effect* involves several aspects.

First, the *scale-up effect* brings about a larger geographic and economic space, where it is possible to produce and market new goods and services. This expanded geographical space represents a more complex economic system that offers more opportunities in terms of technologies, industries, and trade. However, at the same time, it causes greater challenges with risks and uncertainties.

Second, the *scale-up effect* could determine economies of scale that, in turn, cause diminishing average costs. Thus, suppliers could enjoy more favorable economic conditions (e.g., cost reductions, higher productivity, profits), while customers higher benefits (e.g., new products and services, greater welfare).

Third, this *scale-up effect* has implications concerning resources. We could enjoy more resources, not limited by the dimension and capabilities of Earth. This does not mean the resources automatically become infinite or that their consumption becomes more efficient, but that through the development of the "right" technologies and innovative activities, we could move away from a scarcity mentality and effectively enjoy more resources, potentially "infinite" resources.

The literature on strategy defines a business ecosystem as the network of organizations—including suppliers, distributors, customers, competitors, but also government agencies—involved in the delivery of a specific product or service. The basic idea is that each entity in the ecosystem affects and is affected by the others, creating a constantly evolving relationship in which each entity must be flexible and adaptable to survive.

Being a part of a business ecosystem provides mechanisms to leverage technology, harness creativity and innovation, share insights, skills, expertise, and knowledge, achieve excellence in research and business competence, create improved products, and compete effectively against other companies[1].

To build *Mearth* entails the bringing together of more minds, capital, and resources; therefore, the value to the combined efforts will collectively accelerate the creation of *Mearth* faster. Also, because *Mearth* is expanding the geography of business opportunities that enables the expansion of the business ecosystem, we therefore can imagine the increasing ability of participants to benefit and reach the goals of the business ecosystem.

2. Innovation as strategic tool

The key strategic tool of the new ecosystem is *innovation***.** In building a *Mearth* ecosystem, Project Moon Hut Foundation's work is not focused on science, research, and exploration as NASA and comparable national space agencies are, but rather on the development of the infrastructure and the means to establish a Moon-Earth economy. The action involves the leveraging of innovations that come out of the endeavor, because engaging in the endeavor to establish the "Moon Hut" (a permanent facility on the Moon) generates the ideation needed to solve challenges in a harsh environment with extreme conditions such as on the Moon and in outer space. This, in turn, could enable to address many of the same challenges that we also have on Earth.

More precisely, we create an environment of ideation that might directly impact basic life functions (air/quality, food, water, health, reproduction) and advanced technological functions (energy, engineering, computing), and social interactions (society, science, education). These innovations, in turn, will directly and indirectly impact the next generation of ideation and merge with other ideas to produce a cascading and exponential effect. This perspective might influence, or better yet create, entirely new ideation pipelines that give humanity new means by which to live differently.

For example, the technology we use today within a simple mobile phone – to make calls, to transmit data, to locate things with GPS, and to forecast weather -- *are beyond-Earth technologies* and, in fact, were created and leveraged for the first time for this

[1] In ecosystems, when you build alliances as an engine for progress, make sure to look at the future to identify the intersections that may occur (Goldsmith, 2012).

reason. The underlying tech to make this happen has been the expanded satellite communications industry that makes our lives possible today.

Innovations and new technologies constitute the great lever for advancing the technological frontier and production possibilities not only in the economy of the Earth planet, but also in the *Mearth* economic system. Furthermore, innovations and new technologies in the space domain (i.e., developed for space) such as, for example, robotic arms, miniature cameras and other sophisticated technologies, will enrich not only the capabilities to seize new opportunities in space, but can be useful in our planet, and they can be considered part of the *Mearth* ecosystem.

The fast development of innovation and new technologies is a priority because our world is changing rapidly and so are the challenges. The faster and more effective development of new technological solutions that the construction of *Mearth* ecosystem will involve also have huge spin off benefits including the *potential to change people's behavior.*

The pursuit of establishing *Mearth* ecosystem through the various projects within Project Moon Hut's work is to advance the engineering and sciences, the design and development, the human relations and human behavior, as to how we work and live together so we can solve major challenges. The development of a *Mearth* ecosystem also means changing how we think about ourselves and the world around us, the habits we engage in and what we consider to be valuable as a species and not just having better tools or toys for us to use.

Furthermore, the *Mearth* ecosystem is not just making the innovation equation happen. As a matter of fact, there are many ideas that will not work or be commercialized for beyond Earth. Likely that most innovations won't work - yet people don't often just give up after they have worked on an idea for years. Often inventors, investors, and people in general pivot and redirect their energies, with the same innovations to new areas of use. For example, there may be 23 organizations working water purification systems, if one is selected to be the contract winner for a project the other 22 don't close their doors, they will most likely look to leverage the innovations they've developed and look for other practical applications.

Ben Duval (2023) in his short paper "Using Intellectual Property and Tech Transfer to Align Long-Term Incentives" reminds us that the success of *Mearth* fundamentally depends on spurring innovation and technological development. He discusses the use of innovation as a means for attaining a *self-sustaining Moon-Earth ecosystem*. With clarity we are not defining living on the Moon as self-sustainable because this can be supported by the ecosystem of *Mearth* just as cities in the world today are also not self-sustained. They need resupply. Duval argues that the economic challenge of spurring

any large technological leap lies in the challenge of *aligning the incentives* of these various actors over a long enough period. Bringing together several experts from different fields to solve several complex technical and organizational problems would definitely be a natural generator of innovation. But *getting* to *Mearth*—integrating the Moon and the Earth into a self-sustaining ecosystem—is a much more difficult proposition.

In Duval's view, the simplest way to do this might be to invest massive capital investments over many years, with no guarantee of return. This possibility, which can be called a *centrally-dictated vision*, however, usually belongs to governments and large corporations, as the scale of necessary investment far exceeds the resources of any typical organization. On the other hand, waiting for *a decentralized ecosystem* that can generate the needed innovation would take too long.

The question then becomes: Is it possible to build out a project such as Project Moon Hut by capturing the best aspects of both types of incentive structures? In other words, can we combine a *centrally-dictated vision* with *decentralized actors*?

The answer depends in large part upon the way incentives are structured. If the entire payoff is deferred until the very long term, it becomes effectively impossible to keep efforts aligned. On the other side, if the work performed produces intermediate payoffs, it is theoretically possible to distribute these among contributors in a centralized way as an alternative for a single actor backing a single project.

However, when we talk about incentives, we must identify the stakeholders of the business ecosystem, or, simpler, the market's players. It is important to make the right assumptions about market players' motivations, time horizons and consider incentives in their vision of how market systems can operate in the future.

Designing, structuring, and implementing incentives is necessary:

i) To identify target market players.
ii) To identify interests.
iii) To determine the importance and influence of stakeholders.

The intermediate payoffs to developing a fully self-sustaining *Mearth* ecosystem are the technologies and Intellectual Property developed along the way. Such intermediate payoffs can certainly be an incentive. In the case of Project Moon Hut, it can incentivize various actors to contribute by coordinating the distribution of the benefits of those innovations or to help with the creation of alliances. Furthermore, regarding the identification of interests, market players have often divergent interests. However, they can also have common and converging interests.

The trust and hope we place in innovations and technologies is legitimate and must be cultivated either with appropriate investments, both to improve the efficiency and effectiveness of new available technologies: "an investment-based strategy", according to Acemoglu, Aghion, and Zilibotti, (Distance to Frontier, Selection and Economic Growth, *Journal of the European Economic Association*, 2006), and also by feeding the portfolio of innovations: "an innovation-based strategy", (Acemoglu, Aghion, and Zilibotti, 2006) to advance the world technological frontier, thus creating more opportunities in the new *Mearth* ecosystem.

We already underlined that improving and accelerating innovation is a major goal for the *Mearth* ecosystem. The implementation of Project Moon Hut's aims to drive innovation in order to address what it's defined as the worlds six interconnected Mega-Challenges: Climate Change, Mass Extinction, Ecosystems Collapses, Displacement, Unrest, and Explosive Impact (defined as anything that humans do to such scale that impacts huge global balance, such as overfishing the oceans or poisoning the land and oceans) that can be afforded-created by the expansion of a new geography of *Mearth*. At this point we've already proven that reductionisting (suggesting to people to stop using chemicals, buying excessively, recycling, and reusing products or waste, and limiting their ecological footprint, etc.) approaches to solving many of our challenges has not worked therefore potentially accelerating the right types of innovation gives the chance of creating an alternative future to the one humanity as created.

To create the *Mearth* ecosystem and contribute to addressing the 6 MegaChallenges, *a coopetition framework* could be a useful strategy and effective analytical tool, since it can effectively align the incentives of various actors.

3. Coopetition as a strategy to align the incentives of the various actors of the Mearth ecosystem

Coopetition is a strategy that considers competing and collaborating with competitors at the same time to accomplish a goal that is beyond the resources of any one firm. This strategy helps businesses to achieve their objectives through resource sharing, knowledge transfer and innovation performance.

Brandenburger and Nalebuff (1995, 1996) started from the competitive paradigm by underlining the limit of this paradigm and adopted the notion of coopetition, since competitive and cooperative characteristics similarly shape the interdependencies of firms. They followed an approach to coopetition that applies the game theory perspective, perceiving coopetition as *a win–win relationship* and discussing the

balance between value creation and value appropriation.

According to Brandenburger and Nalebuff (1995, 1996), coopetition is a framework that:

a) mobilizes the resources and technical expertise of entire industries and sectors,
b) allows to get a win-win solution, i.e., a solution that is mutually beneficial and satisfying.
c) creates a competitive environment which incentivizes innovation.

In a more recent article published on *Harvard Business Review*, Brandenburger and Nalebuff (2021, p.1) argue:

«The moon landing just over 50 years ago is remembered as the culmination of a fierce competition between the United States and the USSR. But in fact, space exploration almost started with cooperation. President Kennedy proposed a joint mission to the moon when he met with Khrushchev in 1961 and again when he addressed the United Nations in 1963. It never came to pass, but in 1975 the Cold War rivals began working together on Apollo-Soyuz, and by 1998 the jointly managed International Space Station had ushered in an era of collaboration. Today a number of countries are trying to achieve a presence on the moon, and again there are calls for them to team up. Even the hypercompetitive Jeff Bezos and Elon Musk once met to discuss combining their Blue Origin and SpaceX ventures.

There is a name for the mix of competition and cooperation: *co-opetition.* In 1996, when we wrote a book about this phenomenon in business, instances of it were relatively rare. Now the practice is common in a wide range of industries, having been adopted by rivals such as Apple and Samsung, DHL and UPS, Ford and GM, and Google and Yahoo ».

According to these authors (Brandenburger and Nalebuff, 2021), "there are many reasons for competitors to cooperate. At the simplest level, it can be a way to save costs and avoid duplication of effort. If a project is too big or too risky for one company to manage, collaboration may be the only option".

Bengtsson, Kock (2014) in turn argue that coopetition is different from other interorganizational interactions because of its paradoxical nature. Actually, the key characteristic of coopetition is a relationship that juxtaposes two contradictory although interrelated elements, cooperation, and competition, which are equally important to gain benefits from the relationship. They also maintain that it is not necessary to restrict

coopetition to a relationship between two firms; many firms can be involved simultaneously in cooperation and competition with each other.

Carfì and Schilirò (2012, 2019), in their papers on coopetition, follow the game theory approach. They prove that a strategy based on coopetition that favors the adoption of (low carbon) innovative technologies, that represent the shared (or coopetitive) variable between the players, constitute *a win-win solution* for the agents involved and for the environment. However, splitting the gains (or the payoff) of the shared activity is a zero-sum game, and the results depend very much on the competitive strength of the players. Carfì and Schilirò also argue that agents have a longer-term view, want an economic return from their activities and seek innovation.

After all, Herbert Simon (1972) highlighted that agents have limited rationality due to imperfect knowledge and they make decisions where uncertainty prevails. So, they look for solutions that are "satisfying" (i.e., best solution given constraints on limited information), having a long-term view to achieve positive payoff without bothering too much with short-term issue.

Ritala (2012), who follows Brandenburger and Nalebuff's game theory approach to coopetition where partners are competitors, argue that empirical literature on industry studies provides evidence that the success of a firm's coopetition strategy is heavily affected by the industrial and economic context in which it is embedded.

Within the literature examined by Ritala, some studies highlight that coopetition occurs in knowledge-intensive sectors in which rival firms collaborate in creating interoperable solutions and standards, in R&D, and in sharing risks, while coopetition is not necessarily a successful strategy in sectors that are less knowledge-intensive.

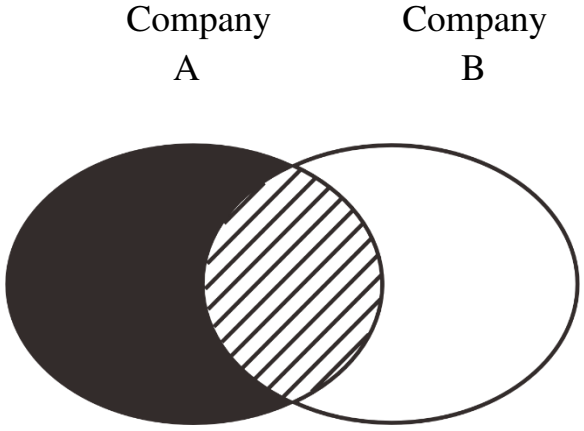
Ritala adopts a portfolio perspective on alliances focusing on the number of rivals in the firm's alliance portfolio (operationalized as *coopetition alignment*) and on the performance implication of this alignment.

Ritala (2012) finds that three distinct contingencies are deemed important for determining the success of a firm's coopetition alignment: *market intensity*, *network externalities* and *competition intensity*. His empirical results show that a coopetition strategy is beneficial under high market uncertainty. Furthermore, under high network externalities, firms that share risks and costs with their competitors are able to increase

their innovation and market performance[2]. Furthermore, a coopetition strategy is beneficial in industries with low competition intensity.

Padula and Dagnino (2007) instead follow a different path about the coopetition construct. They explore the drivers of the intrusion of competitive issues within a cooperative context. Padula and Dagnino (2002) view coopetition as a kind of interfirm strategy which consents the competing firms involved to manage a partially convergent interest and goal structure and to create value by means of coopetitive advantage.
Therefore, these authors (Padula and Dagnino, 2007) view coopetition as a coopetitive game where firms interact among each other on a *partially convergent interest structure*.

The theoretical approach of Padula and Dagnino makes clearer the idea that coopetition leads to a sharing of some activities because there is a relative overlapping of interests. This overlap determines the sharing of investment in research and development, as shown in the figure below in the case of two companies.



The two circles in the figure represent two companies, A and B; while the overlapping area identifies the common interest that can be generated by investment in R&D, the so-called "shared" variable.

Additional literature on coopetition showed that coopetition offers firms certain advantages that stem from the synergies of sharing costs, risks, economies of scale (Luo, 2007; Gnyawali and Park, 2009, 2011; Osarenkhoe, 2010), R&D operations (Walley, 2007), and access to knowledge and external resources (Bengtsson and Kock 2000; Akdoğan and Cingšz, 2012) as reported in Roig-Tierno, Kraus and Cruz (2018), who claim: "Coopetition is more than just a mix of cooperation and competition."

[2] The value of the offerings increases along with the number of users.

Finally, Sun et al. (2022) point out that ecosystems have become a crucial mechanism for corporate value creation and value co-creation among multiple participant actors. However, the participants' interests are not fully aligned, and each is committed to maximizing its own interests while expanding shared values. Most scholars have identified coopetition as a core feature or fundamental premise of ecosystems. In the last decade (2011 to 2021), research on ecosystem coopetition grew rapidly and, with the impact of the digital economy, platform ecosystems have become the most prevalent type of ecosystem.

Ecosystem coopetition research focuses on strategic management, organizational form, and other topics. Scholars are concerned about the coopetitive interaction behaviors of members in the new organizational form of ecosystems, how the coopetitive behaviors will affect organizational performance, and how companies should manage the coopetitive strategies in the ecosystem (Sun et al. (2022, 304). In addition, literature recently began to focus on issues related to multi-level coopetition in ecosystems, with particular attention to the dynamic evolution of coopetition in ecosystems.

Therefore, we believe that to create the *Mearth* ecosystem *a coopetition framework* could be a useful strategy, since it can contribute to align the incentives of various stakeholders. We also believe that due to the sheer size of the project economically, technologically, and plausibility, there needs to be global coopetition to benefit all parties and in doing so create an entirely new economic system and ecosystem on which to expand.

Furthermore, the creation of *Mearth* foresees, within the Project Moon Hut, the need for the development of a multidimensional platform named *MearthLink*. Part of the platform's design would be to help facilitate the acceleration of alliances to leverage coopetition while as a whole platform to enable all forms of innovation. Additionally, within Project Moon Hut Foundation's Mearth Discovery unit there would be teams responsible for the transferring of technology and IP generated by various actors to others that could leverage the technology within Project Moon Hut's own work, inside the beyond Earth ecosystem and outside the ecosystem to adjacent or completely disconnected players.

This view implies that both large corporations and start-ups are incentivized to collaborate and work together. They are able to raise enough capital and set up an incentive structure sufficient to foster innovation.

The advent of the smart economy and the joint efforts of all the innovators create a hyper-innovation environment where the possibilities increase of discovering the next solution. The idea that drives the creation and development of the platform *MearthLink* is not to stop people from doing this or that, but to think about, confront, cooperate, and create a new way of addressing innovation, redefine possibilities that improve life on Earth. *MearthLink* is about cooperation and becomes fundamental in redefining tomorrow.

Conclusion

Lower costs and more sophisticated technology are making the utilization of space more accessible to many actors, creating a more favorable business ecosystem.

By creating the Mearth ecosystem, which requires an incredible amount of innovation, we can increase the possibilities of improving life on Earth. *Project Moon Hut Foundation's work inclusive of the MearthLink* platform, and Mearth Discoveries tech transfer mechanisms, facilitates the mobilization and joining forces of the various players in the ecosystem.

The idea of making technology progressing faster through a coopetitive approach could represent a useful model for the *Mearth* ecosystem. The purpose is to mobilize the resources and technical expertise of entire industries and sectors.

The biggest economics challenge for creating *Mearth* ecosystem is aligning the incentives of various actors. The coopetition framework can help align these incentives.

Incentives are essential if we are to create long-term economic profits. For example, we might assume we are offering participants shares or options in MearthLink that represent long-term value accretion, while trying to be as inclusive as possible. To keep people motivated to act over time, the idea is to enable long-term scenarios with incentives where agents want long-term gains that benefit everyone (win-win), rather than "maximization solutions in the short-term." Such scenarios must lead to long-term satisfactory solutions for profits and earnings. Most likely, coopetitive structures can offer useful solutions.

To conclude, coopetition is a strategy that essentially considers cooperation between competitors and may be most suitable for realizing the *Mearth* ecosystem. In many Boards of Directors this concept of coopetition is accepted as a useful, viable and economic strategy among companies.

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