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Shifting Paradigms: Looking Beyond Traditional Classification to Target Thematic Investments

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"The disruptions of Covid-19 forced us to rethink long-held assumptions and behaviors about the environment, business models and social standards. What has emerged is a dynamic shift in investor preferences, capital markets and opportunities for investors to allocate capital. Aligned with this has come the rise of thematic investing focused on emerging investment paradigms based on forward-looking growth."

"MV Index Solutions (MVIS®) challenges the notion that any top-down analysis will generate investment ideas that fit neatly into traditional standard hierarchical sector classifications. In general, these sectors, or even the hundreds of standard industries or sub-industries, will not provide investors pure exposure to the drivers of their investment thesis."

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Paradigm Shifts

2020 marked the year the term "paradigm shift" suddenly became a part of our everyday speech. The world collectively witnessed radical shifts away from established norms to new ways of thinking across belief systems: the global acceptance of Climate Change, the acceptance of working from home and the acceleration of Thematic Investing. The shared experience of the Covid-19 pandemic, which has touched all aspects of our lives, became an accelerant, allowing us to adopt new paradigms that would normally have taken a lifetime to displace.
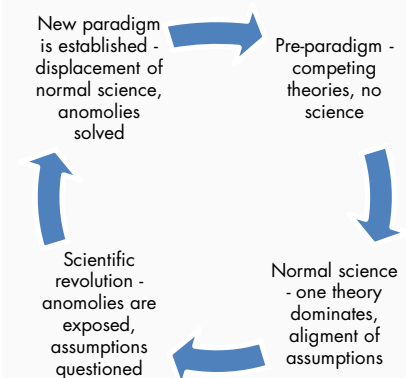
Covid-19's impact in shaping the investment landscape is easy to attribute, but it did not have this impact in a vacuum. Rather, the world had entered into a massive shift, a new Scientific Revolution, one that will forever change our daily lives and how we interact with the world and each other. As the world shifts from one paradigm to another in the investment world, investors must also realign their strategies to capture new market opportunities, manage evolving risk, and design equity investment solutions tailored to provide forward solutions-oriented outcomes.

Anchoring to the Conventional: Traditional Investment Classifications Shifts

Historically, investing has centered around classifications that segmented the investment opportunity set into asset classes, countries, sectors, industries, and security characteristics. These standardized classifications provided investors a framework for asset allocation, portfolio construction and risk management. Traditional hierarchical classification schemes covering countries and sectors and industries are used by the major index providers. The Global Industry Classification Standard (GICS) is an industry taxonomy developed and used by MSCI and Standard & Poor's. The system is similar to ICB (Industry Classification Benchmark), a classification structure maintained by FTSE Russell Indices. These three largest index providers are tracked by approximately $40 trillion of assets across equities and fixed income, for a combined market share of 80% (as of 2017/2018)[1]. How they classify the global opportunity set has significant implications for the allocation of capital.

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Paradigm Shift.

New paradigm is established - displacement of normal science, anomalies solved

Pre-paradigm - competing theories, no science

Scientific revolution - anomolies are exposed, assumptions questioned

Normal science - one theory dominates, aligment of assumptions

Provided In 1962, Thomas Kuhn, introduced the term Paradigm Shift in "The Structure of Scientific Revolutions" to suggest that scientific progress was not a matter of incremental advances, but rather, it involved dramatic "paradigm shifts" where one theory or concept is displaced by a new and different one. We have since taken the term and applied it beyond the context of the natural sciences to describe radical changes in social sciences as well as applied sciences and any belief system.

In 2020, the top five performing long-only equity ETFs (refer to Exhibit 1) did not fall neatly into any single sector, industry, or sub-industry. They were ETFs based on growth themes such as renewable energy or biotechnology that included stocks across multiple traditional sector, industry and sub-industry classifications.

Exhibit 1: Top 5 Performing Equity, Long-only ETFs (ending 31 December 2020[2])

Ticker	Name	1 Year	3 Years Annualized	5 Years Annualized
TAN	INVESCO SOLAR ETF	233.64%	59.91%	27.38%
PBW	INVESCO WILDERHILL CLEAN ENERGY	202.04%	59.75%	34.26%
QCLN	FIRST TRUST NASDAQ CLEAN EDGE ETF	182.16%	51.24%	34.34%
ARKG	ARK GENOMIC REVOLUTION ETF	178.22%	56.16%	34.78%
ARKW	ARK NEXT GENERATION INTERNET ETF	154.14%	47.01%	44.58%

There are many factors that can be attributed to the outperformance above, but one thing is clear, the impact of the Fourth Industrial Revolution ("4IR")[3] – which describes the convergence of the digital, biological, and physical worlds, and the disruption of emerging technologies such as artificial intelligence, cloud computing, robotics, and logistics – is one of the leading triggers. 4IR was poised to challenge the interconnectivity of the world prior to the earth-altering catalysts found in the form of a global pandemic. Thanks to the Coronavirus, additional themes – such as e-healthcare, e-Sports, and e-commerce amongst others – accelerated directly or indirectly by Covid-19, differentiated themselves from their peers in traditional sector classifications – such as healthcare, entertainment, and retail amongst others.

Exhibit 2. Industrial Revolutions (IR) Through Time
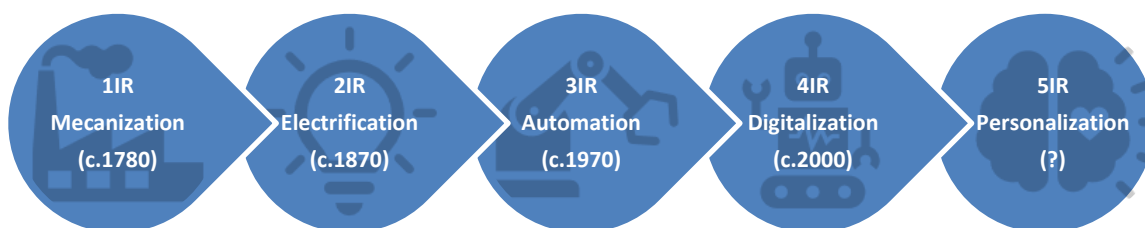
The disruptions of Covid-19 forced us to rethink long-held assumptions and behaviors about the environment, business models and social standards. What has emerged is a dynamic shift in investor preferences, capital markets and opportunities for investors to allocate capital. Aligned with this has come the rise of thematic investing focused on emerging investment paradigms based on
forward-looking growth.

Challenging the Conventional

Country and Industry classifications are the natural starting point for many investment solutions and have a long history of use by institutional investors and financial advisors. Traditional sector and industry classifications have the benefit of neatness: each company fits distinctly into a single sector, industry or even sub-industry. While this approach is convenient, it fails investors seeking to gain exposure to emerging investment paradigms or existing paradigms that are constantly evolving. The point will come to light by exploring a few examples.

For example, the global energy sector is undergoing a massive transformation toward renewable sources of energy. Solar energy is one such source investors may be contemplating and seeking the best way to gain portfolio exposure to. SolarEdge (ticker: SEDG) is the world's fourth largest [renewable energy] company that derives most of its revenue from the solar energy industry by market capitalization as end-January. However, the company is placed in the information technology sector and semiconductor equipment sub-industry by GICS. While it may be technically correct that SolarEdge's solar products use semiconductor materials, a common-sense check would say that SolarEdge is a solar energy company, not a semiconductor company. This is an example of a company that we would argue is miscategorized.

Another example demonstrates that in some instances appropriate traditional classifications simply do not exist. Take, for example, American Tower (ticker: AMT) whose entire business is dedicated to communications-related real estate investments and operations. Further, American Tower's future growth prospects are directly tied to the roll-out of 5G networks. American Tower, according to GICS is a Specialized REIT which is the most granular level of industry classification offered by GICS. Investors seeking to capture REITs that are benefiting from the rollout of 5G networks would not be able to identify American Tower using standard sector classifications.

More complex examples exist when we look at companies that do not derive a certain percentage of revenue from a specific end market. We can look at a company like Cloudera (ticker: CLDR) which is categorized by GICS as an application software company. Once again, while this is an accurate description of Cloudera's main product line, it does not inform investors of any specific use cases or industry trends Cloudera's products are used for or participating in. Cloudera's application software products are specifically focused on big data management and machine learning applications. MVIS places companies whose products are used in such a capacity within the artificial intelligence theme and big data management software sub-theme, while many other traditionally defined application software

companies would not necessarily be an artificial intelligence company. Again, traditional classifications fall short of informing investors of the differences between companies that are neatly grouped into a single sector, industry, or sub-industry.

A Thematic Approach

To properly build a portfolio around investment paradigms, an investor must look beyond traditional sector classifications, which includes investigating broad swaths of the public equity market to properly map companies to investment themes. While traditional sector classifications can provide some guidance, they are only a starting point; most investment themes reach across traditional sectors and, more often than not, attempt to group stocks by their product's end market use cases rather than the nature of their products themselves. MVIS thinks about building thematic indices in two ways: Pure-Play and Paradigm.

Pure-Play Themes

Pure-Play thematic indices are based on singular or relatively easy-to-define industries or market trends. Building on the example of solar energy, we can examine why this theme would be considered pure-play. Solar energy is a tangible and identifiable product or end market. Companies operating in this space typically provide revenue or operating asset exposure derived from solar-related products or activities in annual filings or other investor relations materials. In this case we can build an index that captures companies that derive a majority of their revenue or operating activity to the solar energy industry even if they are not categorized as such by GICS.

However, even in the seemingly simple case of solar, there are additional considerations. For example, in the [BlueStar Solar Energy Industry Index (index ID: BSOLRNTR)](), investors will not only find companies providing equipment and technology that facilitates the harvesting and storage of solar energy, but also power producers that have at least 50% of revenue or energy generation capacity from solar. In this index, investors will find a mix of Technology, Energy, and Utilities companies as defined by GICS.

Paradigm Indices

Paradigm-based thematic indices target companies whose products or services fit into the architecture of a new or emerging concept. Unlike solar energy, 5G networks, for example, is not a product in and of itself, rather a new mobile network architecture. Similarly, one cannot sell "artificial intelligence" on Amazon as one would a video game, rather artificial intelligence is a new paradigm in computing.

Constructing a paradigm-based thematic index requires a great deal of industry-level research to first uncover the important components of a new industry architecture, then to associate products or services with those components. In the case of 5G networks, MVIS identified core networking equipment, real estate, network functions virtualization,

fiber optics solutions, cloud computing, and mobile network operators as they key layers in 5G network architecture. From there we search across traditional sectors to map individual company's products to each layer. American Tower for example, does not sell 5G networks, but their products and services are considered instrumental in the real estate layer of 5G network architecture.

In the paradigm of artificial intelligence, MVIS identified big data management and analytics, embedded machine learning semiconductors, and software that is built on, or incorporates, machine learning (also known as software 2.0) as some of the key technologies that enable artificial intelligence. From this architecture of the artificial intelligence process, we can map the use cases of individual company's products and services and label those companies as artificial intelligence companies (refer to Appendix: MVIS Family of Thematic Indices).

Applying the New Paradigm: Building Thematic Indices

Just as classifying companies into thematic indices is part art and part science, so is the development of an appropriate weighting strategy. There are several key challenges in developing thematic index weighting strategies since many, but not all, thematic indices include companies from several sub-themes, each with unique characteristics such as average size and risk and return profiles necessitating a thoughtful approach to weighting.

Weighting components of a pure-play index is often less challenging since most of the companies are of a similar nature; and, more often than not, a standard market cap or equal weighting strategy will be appropriate. In general, MVIS takes the approach that for indices with highly correlated or relatively few components, an **equal weight strategy** is appropriate. On the other hand, for concepts where components demonstrate lower correlation, a **market cap weighted** approach is often more appropriate. This may seem counter-intuitive to some readers through a risk-management lens. But the rationale is that many thematic indices are capturing growth industries and sometimes nascent ones. In this case, the industry winners and losers are still being determined, so allowing the winning companies to continue to grow in weight allows investors to capture momentum.

Weighting components in a paradigm-based thematic index can be more complicated, as these types of indices are typically built using a composite approach where we include components from various sub-themes each with unique characteristics. For example, in the area of 5G networks, the core networking equipment sub-theme includes communications equipment companies and semiconductor companies which, by and large, have a higher market capitalization than, say, communications real estate companies. If we were to take a standard market-cap weighted approach, then the performance of the index would be driven primarily by the core networking equipment sub-theme since these stocks would dominate the top 10 and 20 index components.

Instead, MVIS often uses a **tiered weighting strategy** where components are weighted by market capitalization within respective tiers. This tiered approach achieves two goals. First, there is a better mix of sub-theme representation in the top 10 and 20 index components. Second, the sub-themes within a paradigm can often have divergent performance; by targeting sub-theme weights within an index, we can capture mean reversion among the sub-themes.
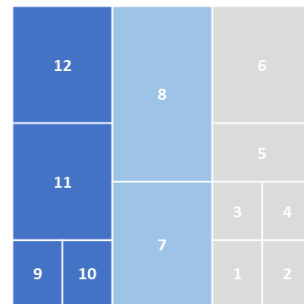
Exhibit 3: Weighting Strategies
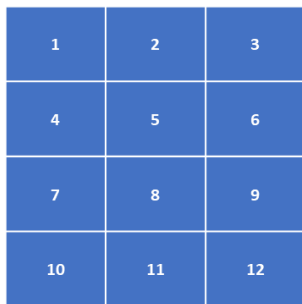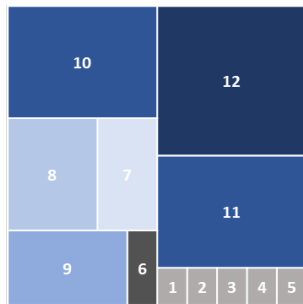
A step beyond the tiered weighting strategy is the inclusion of a proprietary dynamic weighting strategy developed by MVIS which seeks to capture both mean reversion and momentum among the sub-themes of an index through a dynamic trigger-based rebalance approach. The relatively good performing sub-themes are allowed to grow in index weight, while relatively poor performing sub-themes are allowed to diminish in index weight until our proprietary model signals that the forces of mean reversion are expected to outweigh momentum.

Exhibit 4: Dynamic Weighting Strategy
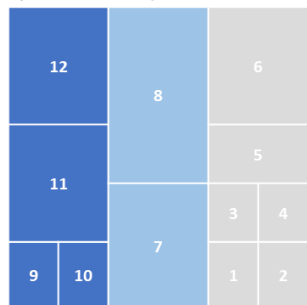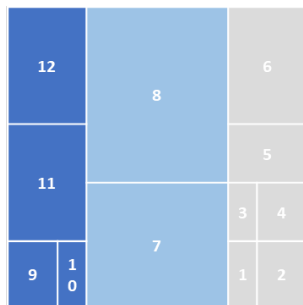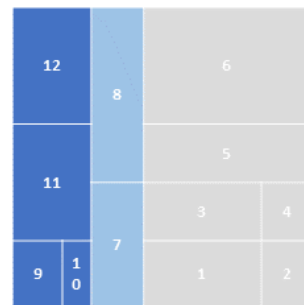
MVIS Index Solutions: Developing Investable Concepts

Given the complexities and opacity of targeting investment themes, investors seeking an efficient low-cost targeted exposure to specific themes can – and increasingly do - invest in exchange traded funds (ETFs) linked to a thematic index. Indices that are precise with respect to a theme, while being truly investable. At MVIS, we are one-step ahead in building investable indices.

"An Index company that thinks like portfolio managers, while developing investable index concepts"

A thematic investment approach based on well-constructed index benchmarks and the ETFs that track them offers investors innovative ways to capture powerful global trends that may drive future stock performance. As we shift into the "Fifth" Industrial Revolution, investors can position and evolve their investment solutions through a dynamic approach.

As we emerge from the global pandemic and progress further into the 2020s, a new way of approaching portfolio construction and sector exposure is not only necessary but imperative. At MVIS we've embraced this new paradigm shift and offer investors unique "pure-play" and paradigm-based" indices to target specific themes (refer to Appendix: MVIS Family of Thematic Indices).

Building the future of thematic indices goes beyond traditional market-cap weighted benchmarks and presents an opportunity to implement structured weighting and rebalancing approaches that are uniquely well-suited to Thematic Indices.

To learn more about MVIS's extended family of innovative indices, please visit www.mvis-indices.com and sign up to join the conversation.

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Josh Kaplan

Joshua Kaplan is the Global Head of Research and Investment Strategy at MV Index Solutions (MVIS). Joshua is involved in MVIS' index design, maintenance and commercialization activities. He is also responsible for producing research and analysis on MVIS indices and investment trends. Josh joined MVIS following the acquisition of Indexes in August 2020 where he served as BlueStar's Director of Research and Finance. Prior to joining BlueStar Indexes in late 2011, Joshua specialized in fundamental equity analysis for an Israel-focused hedge fund which was an affiliate of a leading Israeli private equity fund. Joshua is a CFA Charterholder. He holds the FINRA Series 7 Securities License and is a Registered Representative in the States of New York, New Jersey, and Florida. Joshua graduated from Syracuse University with degrees in Finance, Entrepreneurship, and Economics.

Joy Yang

Joy Yang is Global Head of Index Product Management at MV Index Solutions (MVIS). She is responsible for managing MVIS products and services to accelerate innovation in financial index design and adoption. Joy brings more than 25 years of investment experience to MVIS, having led teams delivering index and quantitative-active investment solutions at Arabesque Asset Management, Dimensional Fund Advisors, Vanguard, Aberdeen Standard Investments, AXA Rosenberg and Blackrock. Joy has an MBA from the University of Chicago Booth School of Business, and a BS in Electrical Engineering from Cooper Union's Albert Nerken School of Engineering.

Appendix: MVIS Family of Thematic Indices and licensed Products[4]

For full review of MVIS's extended family of innovative indices, please visit www.mvis-indices.com

PARADIGM INDICES	Launch Date	Licensed
BlueStar 5G Communications	2019-01-10	Y
BlueStar Israel Global Technology	2018-03-26	Y
BlueStar Machine Learning and Quantum Computing	2018-05-10	Y
BlueStar Global 5G Connectivity	2021-03-09	
BlueStar Artificial Intelligence	2021-03-01	
BlueStar Robotics	2019-08-29	
BlueStar Autonomous Driving	2019-07-26	Y
BlueStar Total Security	2020-07-06	Y
BlueStar Blockchain Technology	2014-01-31	Y
BlueStar Food and Agriculture Sustainability	2018-06-07	Y
BlueStar Global GreenTech	2018-01-29	Y
BlueStar Internet of Things	2019-07-08	Y
BlueStar Junior Applied AI	2021-03-08	
BlueStar Junior Robotics	2021-03-08	
BlueStar Stay Home	2021-02-23	

PURE-PLAY INDICES	Launch Date	Licensed
BlueStar Asia Technology	2018-08-13	Y
BlueStar China Internet Software	2018-08-13	Y
BlueStar Data Center and Logistics Real Estate	2019-08-05	Y
BlueStar E-Commerce US Leaders	2018-09-11	Y
BlueStar E-Games	2018-10-05	Y
BlueStar E-Healthcare	2021-01-22	
BlueStar Electric Vehicle Industry	2021-01-19	
BlueStar Fintech	2017-11-07	Y
BlueStar Genomic Health Care	2020-05-22	Y
BlueStar Global Logistics	2020-10-23	
BlueStar Global Logistics Benchmark	2020-10-23	
BlueStar Hydrogen and NextGen Fuel Cell	2021-03-09	Y
BlueStar NextGen Video Gaming	2018-06-06	
BlueStar Solar Energy Industry	2020-03-09	Y
BlueStar Top 10 US Banks	2020-07-20	Y
BlueStar Travel and Vacation	2019-05-13	Y
MVIS Australia A-REITs (AUD)	2012-12-21	Y
MVIS Australia Banks (AUD)	2012-12-21	Y
MVIS Global Gaming	2012-05-08	Y
MVIS Global Hydrogen Economy	2020-12-22	
MVIS Global Video Gaming & eSports	2018-07-16	Y
MVIS US Business Development Companies	2011-08-04	Y
MVIS US Listed Biotech 25	2011-08-12	Y
MVIS US Listed Pharmaceutical 25	2011-08-12	Y
MVIS US Listed Retail 25	2011-08-12	Y
MVIS US Listed Semiconductor 10% Capped	2020-08-13	Y
MVIS US Listed Semiconductor 25	2011-08-12	Y
MVIS US Mortgage REITs	2011-08-04	Y

1 Johannes Petry, Jan Fichtner & Eelke Heemskerk (2019): "Steering capital: the growing private authority of index providers in the age of passive asset management", Review of International Political Economy, DOI: 10.1080/09692290.2019.1699147. https://doi.org/10.1080/09692290.2019.1699147

2 Bloomberg

3 Klaus Schwab, founder, and executive chairman of the Geneva-based World Economic Forum, published a book in 2016 titled "The Fourth Industrial Revolution" and coined the term at Davos that year. An "industrial revolution" (IR) describes the transformative economic change triggered by new innovative technology. The First IR described how the invention of the steam engine mechanized production. Since then, we have seen transformations brought about by other inventions: electricity creating mass production (1870), electronic technology automating production (1970), and now the fusion of the digital, biological, and physical world launching the digital economy (c.2000). The fifth IR is yet to come, but many have already predicted that it will involve collaborative interactions between humans, machines, processes, and systems for maximum productivity optimization

4 Data as of 31 December 2020. AUM for Licensed Products with publicly available assets under management

IMPORTANT DEFINITIONS AND DISCLOSURES