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The Natural Pattern-based Fuzzy Investment System

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Abstract

The underlying research problem concerns simplifying nature's infinite sustaina-bility pattern into a usable system to prove self-care in the financial field. Many disciplines have discovered self-sustaining systems, implying one should also exist in the portfolio- or asset management field. This paper models and applies a self-sustaining invest-ment system based on nature's sustainability pattern to present a usable and easi-ly adaptable financial self-care model that can contribute to societal and individ-ual well-being.This interdisciplinary research incorporates fractal patterns from na-ture and integrates these into an innovative investment decision system via a working and utilizable model. The article approaches the problem in three ways. First, it applies an unprecedented, proprietary fuzzy heuristic approach to parse the Mandelbrot set hiding nature's growth code. Second, it subjects the resulting model system to static, dynamic, and iterative methods. Finally, it tests the above in practice in a focus group research project based on individual decisions in a portfolio collision. The paper brings manageable order to investment deci-sion processes using a specific econophysics approach to provide a complex whole of frames, alternatives, and dynamic wealth management functions. The paper attempts to demonstrate the self-sustaining power of the natural order in investment portfolio returns, behavioral finance, and wealth management deci-sions. The theory of an efficient, well-functioning, self-sustaining investment decision system based on heuristic criteria is developable and has been proven. The study made the organizational dominance measurable and – through fuzzy logic – simplified the complexity of the Mandelbrot set. The research also shows the scalability of the fuzzy symmetry framework, implying that it is transferable to other disciplines.

Keywords: *Entropy, Mandelbrot Set, Portfolio Management, Self-Preservation, Systems Sci-Ence.*

JEL Classifications: A11; A14; B16

Introduction

Many disciplines have discovered self-sustaining systems, implying that such systems are also inherent in the portfolio or wealth management field. This study perceives the portfolio as a system that can reveal self-sustainability. Studying complex systems requires the principle of correct simplification. This research paper is based on the Mandelbrot set, one of the most complex two-dimensional sets in mathematics and commonly called God's fingerprint or the hidden pattern behind everything in existence. If systems have a self-sustaining property, the form behind each system should result in self-sustainability when reduced to an investment portfolio. This article starts from assumptions that interpret the otherwise fuzzy approach (set theory simplification) of interdisciplinary research methodology in the individual and organizational self-care fields. General System Theory allows the system results transformation between different disciplines. Thus, the self-sufficiency sample from the Mandelbrot set, whose active and passive patterns support the current study's models to discover the various paths and enhancements of self-sufficiency in the complex investment decision-making system.

The Mandelbrot set is a simulation of the dynamic growth encoded in nature. It is an infinite form that

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does not allow for simplifications, so simplifying it to an applicable model is certainly not the issue. The code of self-development has also been called "The fingerprint of God" (Kreiner, 2005) and a universal phenomenon (McMullen, 1997), giving form to growth without concrete direction. This study utilizes a model statement in the financial investment field from this dynamic feedback of natural self-care to detect self-sufficiency. Each system is based on a specific set (Brunnberg and Kiehne, 1969). The presented investment scheme takes the infinite Mandelbrot set to system building. A few simple rules explain the emergence of self-organized patterns (Caratozzolo et al., 2008), so a relatively simple, manageable set of rules is sufficient to understand complex systems (Rizzo, 2021). Through the correct simplification and fuzzy logic (Zadeh, 1965), nature's complex growth model is adaptable as a usable pattern and investment system in financial self-care (Zhou et al., 2022). Fuzzy-based investment portfolio management is increasingly popular because it improves portfolio optimization performance (Pandey et al., 2019; Hegedűs et al., 2020). Modern portfolio theory uses stability management techniques of dynamic chaos theory (Ledenyov – Ledenyov, 2013). Our research also approaches systematizing investment decisions in this manner. Thus, the synthesis of the classical literature was not collocated for discussion, nor were the isolated findings assembled into a coherent framework. As part of an interdisciplinary research study, we also provide a practical example of this literature synthesis – since facilitating the transfer between disciplines through appropriate model concepts marks the essence of systems thinking.

The motivation for writing this publication is to simplify a sustainable pattern of nature on a human scale, thus offering an investment toolkit for all those involved in self-care. We aim to demonstrate that natural resources can be transferred into a wealth management pattern through systems science transfer. The main objective of the research is to derive the complexity of the Mandelbrot set using a heuristic procedure and to investigate it employing a collision analysis. Such research has not been attempted, and we approach it from a new perspective to fill the research gap.

Our ultimate goal is to critique the symmetry system of the discovery we have made and inform contemporary investors of our findings. We seek answers to recommendations for simplification, diversification, active and passive wealth management, and short- and long-term investments.

The potential application of the research lies in individual asset management because it provides institutional asset managers with a comprehensible example. We will also explore the importance of automation as a passively profitable source of tapping the capital market. In more detail, we look at the optimal number of elements to use in a portfolio, focus size, rebalancing possibilities, the potential of different investment types and the power of free choice as a decision factor.

Literature Review

Analytical Framework

Portfolio management is a complex decision-making process that includes portfolio analysis, selection, oversight, reallocation, and risk analysis (Spaseski, 2017). Behavioral economics emphasizes the importance of decision planning without restricting freedom of choice (Thaler – Sunstein, 2008). Using fewer model levels often achieves better results in decision-making. Investment uses a variety of management strategies, including diversification to exclude risk or the rebalancing method to respond to the market environment. Thinking and deciding in systems requires heuristic procedures (Carmines – D'amico, 2015), so the research focuses on the correct simplification to discover a wealth management model and method with adequate decision-making alternatives. The world of fuzzy thinking is on the rise and awaiting classification by discipline (Takács, 2012). Our research provides another adaptive approach.

The developed model represents decision-making alternatives that strive to adapt to a changing environment. The model establishes a ratio between system components to reveal order in complex decision processes. This ratio is used to build an investment portfolio and analyze it from a holistic perspective.

In chaos, science rules the sensitivity to the initial conditions in the same way the initial distribution of

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individuals in a population determines the ultimate choice of strategy (Kareva et al., 2013). The initial condition assumes that setting optimal proportions in portfolio building allows a portfolio to function independently as a system. Nevertheless, the portfolio is not independent because it creates manageable order and develops best-practice solutions via sustainable finance. Science has always valued order, but chaos can lend other benefits to science (Gleick, 1987). A chaotic system responds to external events quicker and with less effort than a non-chaotic one (Stewart, 1995).

Portfolio management is a chaotic system of complex decision-making processes (Pagdin – Hardin, 2018). The major schools of portfolio management are distinguished according to focusing (Carnegie, 1889; Hagstrom, 2001) or diversifying institutions (Tobin, 1977; Swensen, 2009). Diversification reduces risk and involves re-weighting and profit realization functions of active and passive investment management (Glaser, 2019). The present paper recommends offering simple possible alternatives at the static (diversification) and dynamic levels (sufficient alternatives) of investment decisions. The decision-making system is divisible into a successive decision set (Nasserddine – Arid, 2022), playing a vital role in self-sufficiency in today's world, where everyone who does not use the passive profitability of the capital markets is at a competitive disadvantage compared to those who take advantage of it (Zhu, 2018). The presented methodology provides a self-organizing system framework (Guerin – Kunkle, 2004), providing heuristics for investment decision-making procedures. The methodology can be applied in all three phases of strategic management – planning, organization, and feedback. Examining complex systems requires the application of correct simplifications (Ashby, 1991), just as rational behavior requires simplified models (Mann, 2021). The research goal is to demonstrate the feasibility of the natural, sustainable sample in the financial self-care field.

Holistic Approach

General Systems Theory is interdisciplinary in nature. It is the theory of open systems with the following tasks: developing theoretical foundations for non-physical fields of knowledge. The holistic theory inspects the isomorphism of models and concepts in different places and transfers between disciplines, and it supports the development of appropriate models in disciplines where they are incomplete (Karajz – Toth, 2011). General Systems Theory performs a heuristic function, allowing the application between formally isomorphic systems (von Bertalanffy, 1953).

The exploration of homology makes it possible to formulate general structural principles, and the transfer can be subjected to mathematical analysis (Rapoport, 1966). Setting up isomorphism requires empirical investigation and plays a crucial heuristic role in system transfers: the isomorphism of two systems makes it possible to define any model solution.

The Specific Systems Theory proposes a system definition describing the sufficient and necessary elements for some real entity to be a system (Durán, 2023). To control systems, it uses boundaries and principles to manage chaos and complexity (Gharajedaghi, 2011). Efficient investment management ensures business sustainability (Kopitov, 2013). The filters of random matrix have been reported to improve the optimisation of financial portfolios (Daly et al., 2010); thus, the boundaries yearn for discovery.

Natural pattern-based research has found answers in organizational development because we must consider human organizations a formal counterpart of a living organism (Laketic – Tufte, 2009). Organizations are more than their static structures. They are learnable, organic, living systems that can adapt and grow (Wheatley, 2001). According to the theory of learning organizations, strategy cannot be predicted because environmental changes are unpredictable (Hamel – Prahalad, 1989). Learning organizations are also limited, so the most effective strategy building starts with chaos and new system building (Nonaka – Takeuchi, 1995). The holistic approach contrasts these by revealing disorder as an integral part of organizations and catalysing creativity (Stacey, 2001). The deliberate process of systems thinking can empower people and organizations to recognize the power of self-determination (Voulvoulis et al., 2022). This research attempts to demonstrate the financial passive profitability of this approach.

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Self-Care

The synthesised Rolling Nuts method (Cziraki, 2016) presented in the paper aims to prove the self-sustaining power of system structures in investment management and financial self-care. Self-organizing systems never come into equilibrium but move from one state (metastable) to another (Guillemin – Stumpf, 2020). The homeostatic model plays a vital role in natural sciences where the internal balance of the system is constantly restored by various imposed environmental changes.

Because the holistic approach also requires interdisciplinary thinking in economics (Boulding, 1953), this study seeks a natural self-sufficiency order (Barnsley, 1988) for a complex investment decision-making system. Other disciplines have discovered self-organizing systems (von Bertalanffy, 1957; Neumann, 1947; Reichholf, 1988), implying that such a self-sustaining system also exists in the investment field. Since systems are value-oriented, self-creating, and self-sustaining (Laszlo, 2001), we seek to demonstrate a self-sustaining portfolio system variant by synthesizing different disciplines.

The present paper deals with a system tailored for an investment portfolio and transferred through formal isomorphism. It aims to find the self-caring force inherent in the fuzzy system (Curry – Dagli, 2017).

The systemic interpretation of economic phenomena is not new (Keynes, 1936), but a holistic approach has not revealed solutions in the wealth management field. The limitations of natural resources should not cause worry if self-sustaining mechanisms are used (Mayumi, 2018). Investment systems are designed through an iterated spiral methodology (Kumiega – Van Vliet, 2008) to exclude constantly changing risks. The latest research deals with sustainability risks to be managed by the sufficiency economy philosophy (García-Benau et al., 2021).

This interdisciplinary research utilizes patterns from the fractal world of nature, forms a usable system for it, and integrates it into a usable investment decision sample through a model setup. However, since the Mandelbrot set is an infinitely complex natural phenomenon, understanding its full complexity is unnecessary.

Nevertheless, through fuzzy logic, this study does simplify the Mandelbrot set and reduces its complexity into a manageable pattern. The present paper demonstrates the self-sustaining power of natural entropy (Manríquez-Zepeda et al., 2023) in return-on-investment portfolio distributions, behavioral finance, and feedback. The entropy framework works effectively for portfolio performance (Cheng, 2006). Our research localizes the ordering pattern observed in nature's sustainability to investing.

Research Methods

The research model synthesis combines Mintzberg's organizational development (1991) with the Mandelbrot set (Mandelbrot, 1982) to create a new structure that is fuzzy in its quality. The "Structure of Organizations" defines 5+2 forces for all organizations, of which nature dominates one force. However, the dominance is not quantified, signifying a major weakness of the model. Under imprecise or vague conditions like the global investment field, fuzzification allows the analysis of complex systems such as the Mandelbrot set (Yu et al., 2021; Simon, 1972). A pentagon could be drawn around the set, which gives the distortion missing from Mintzberg's interpretation (magnitude and direction). This exploration of systemic analogies and fuzzy logic issues a new model (*Figure 1*) that offers proof for the self-sufficiency functioning of investment systems.

The Rolling Nuts Model clearly shows the distortion extending in one peak direction. The pentagon is divided into (regular) triangles to calculate the system ratios. We obtained four such triangles; one was much larger than the others. *Figure 2* allocates the model into triangles, where the dominant force responsible for the distortion is calculable: 1.73 (√3).

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If we deal with triangle areas, the area of the large triangle is exactly four times that of the small triangles. The Rolling Nuts Model can also show dominance based on the area calculation (left in *Figure 2*). We can apply this ratio of system elements for portfolio allocation, entailing a four-item portfolio with the ratio of investment items 1/7, 1/7, 1/7 and 4/7.

"It is much more informative to model a real system with a system of perfect symmetry and to remember that such a system has many possible states, only one of which is realised in practice" (Stewart, 1995:78). The constructed model offers multiple focuses as alternatives, which has a dynamic relevance in the static symmetry system. Reducing the fractal structure has localized a set of frameworks in wealth management. In most cases, theoretical models containing mathematically correct derivatives are so far removed from reality in their system of conditions that the results are unrelated to the real world because constant coefficients cannot model reality (Moczar, 2008). Since money does not make people happy (Kahneman – Deaton, 2010), the destination of an investment portfolio – as a passive source of income – should not be defined by return maximization, not a sufficient but sustained return. The limited rationality of human behavior needs an applicable approach to attain satisfactory decisions, which can lead towards appropriate recommendations (Miller, 2006). The above does not require particularly active asset management. For example, the globally observable trend reveals that capital increasingly flows from active to passive asset management funds (Lovas-Romvary, 2018). Therefore, the research methodology focuses on passive portfolio management and covers activation and automation possibilities of the developed investment decision system.

Results

Static Model Analysis

We are investigating the behavior of portfolios as a system, i.e. an investment portfolio comprising local and global components according to the sustainable systems of chaos theory. The four-element Rolling Nuts model produces noticeable results by diversifying between basic asset classes (equity, currency, commodities, stocks).

The validity of the methodology is provable by comparing similar layout principles based on real market portfolios (Bernstein, 2017; Green, 2010; Faber – Richardson, 2009). The four-element static structure of the Rolling Nuts model allows choice in focus for investments – a focus that can be utilized like a thermometer. The static model analysis compares all four focus alternatives with yields of real market participants (Burns, 2017; Schultheis, 2013; Swensen, 2005), and the focus variants serve as an alternative to investment decision-making on all three levels of management practices: strategic, tactical, and operational decisions. Choosing the most effective method is vital for investors (Nedorezova, 2021) who make their own wealth maximization or cost-effective investment decisions, particularly over a long-term investment horizon, ensuring that investment strategies based on environmental, social, and corporate governance (ESG) are self-sustaining and profitable (Boumda et al., 2021) to meet the demands of today's investment world.

Figure 3 shows similarly constructed and passively (lazy) managed investment portfolio returns over the past ten years compared with the RN 4 average (all-focus) yield. When selecting data, we focused on comparing our results with the returns of real market participants, which are similar in the number of items and treatments. Our model produced an 11.80% yearly average yield even though we spread the investments across only four asset classes. The yearly rebalanced real market portfolios are profitable. Even the static fuzzy symmetry system had higher returns. The research has proved that even the diversification between simple asset classes can yield double-digit annual returns if we use the discovered natural entropy. This research result reinforces the theories that emphasize the importance of different types of investments in reducing portfolio risk (Banyai et al., 2024).

Active Wealth Management

The research also concentrates on strategic decision processes like dynamic lifecycle management. They hide a rearrangement option without disrupting the original symmetry of the system, which is inherent in the Rolling Nuts model. Four focuses can construct four different Rolling Nuts portfolios. This flexibility offers

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decision alternatives, saving time in investment portfolio reorganization decisions. The determined 4:1:1:1 proportion of the model is suitable for active management, with ready-made solutions in the distribution field. Determined, active management is one simplification solution of the model by complex decision-making, and it allows for the development of dynamic lifecycle models (Figure 4). In this case, natural distribution serves as the thermometer that regulates the portfolio in much the same way the Earth self-regulates (Lovelock, 2000).

Active testing of the model at different intervals allowed for the design of rearranged life cycles using the possible focuses as alternatives. Our investigation found that life cycle management increases portfolio returns only by staying diversified between asset classes. Even automatically programmed reorganization decisions increase portfolio returns by more than 300% over a twenty-year investment horizon. This study also found that the developed investment system symmetry is suitable for active wealth management. *Figure 5* illustrates the difference between static and dynamically managed Rolling Nuts portfolios, where lifecycle management outperformed passive management by return and yield.

Iteration

Repetitive patterns are advancing in an increasing number of disciplines. The fractals themselves are self-repeating shapes. The research question becomes self-evident: Can some factors be enhanced by repeating the sample? It should be an indirect demonstration of establishing order in the complex investment decision-making system. The iteration testing of the model means that we restore the original symmetry of the portfolio once a year, independent of stock exchange rates. Symbolically, the calculation is like activating a robot to sell all the portfolio assets on the same calendar day in twenty years and repurchase them at the same price – iterating the original symmetry. Transaction costs are included in the reallocation to model reality more accurately. The research question that is raised is: Will the sample repeat self-sufficient effect causes or not? We assume that using automated trading, up-flashing the original symmetry of the model – even with transaction costs – is a self-sufficient mechanism, which the reweighting can capture. This is an interesting perspective because a portfolio can be constructed in any way, but due to daily or hourly exchange rate fluctuations, the structure will change. Restoring the original mathematical model and regular portfolio rebalancing should have a bifurcating effect.

Figure 6 reports an average 58.67% overperformance from simple-repeated management over the passive static model strategy. Every portfolio rearranged into its focus outperformed the portfolios left passive in the same focus. Pattern repetition frequency increases its inherent system effects, causing a self-stimulating inertia system (Lesnik, 2018).

Set of Decision Alternatives

The research does not stop at static and dynamic analysis; it must also criticize the model. The fuzzy symmetry system allows for several interpretations of the division of the synthesised pentagon (*Figure 7*). In addition to the four-element distribution already discussed, the symmetry scheme can be valid for five elements. This appears in two solutions: the RN 5 and the RN 5 Forces model.

Perhaps the dominant force is the key to focusing. The RN 5 Forces model investigates this when it determines symmetry, not by area but by internal forces. The resulting symmetry scheme also applies to seven investment elements, satisfying those seeking an equal distribution.

The fuzzy decision set is also valid for equally distributed elements; however, in this case, the methodology requires seven investments. These four approaches represent four different interpretations of the same symmetry system. The current study explores which interpretation might be the more expedient strategy when considering financial self-care.

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At this point in the research, the model is compared to itself to discover the correct simulation. Comparing the model to itself makes it possible to assess the role of the different focuses and provides answers regarding the desired number of investment elements. The focuses are dominant to varying degrees in the model variants. In order, the four-element version with a 4/7 ratio is dominant, followed by the 5 Forces model, where we find a 30% dominance, then, in the RN 5 variant, we can choose two different focuses with an equal ratio of 2/7. Finally, there is no dominance at all in the RN 7 model because it is equally distributed. One or more focus? Stronger or weaker dominance? Which is the most desirable asset management strategy? These are the questions we can answer at this point in the analysis. The number of elements also differs between the investment decision alternatives on offer: there are four, five and seven-element versions of the symmetry system. In this way, the research can also reflect on the dilemma of a few or many investment elements by internally colliding with the investment system model. The focus and the item number are some of the decision alternatives that an investor always faces from the first step.

The research found a surprising similarity when comparing winning portfolios and returns (*Figure 8*). In an empirical study of 462 portfolios and 539 investment components based on a survey of 77 respondents, we examined differences in the distribution of Rolling Nuts symmetry. The data source is a survey of university students from varying majors and cohort years. We determined the portfolio proportions in the survey but left the participants free to make investment decisions. We included the four and five-element equally distributed permanent portfolios (P4 and P5) as benchmarks in the analysis.

We examined both the long and short term to place the applicability of the model alternatives in both space and time. A particular similarity emerges in time horizons when looking at returns and winning portfolios over long and short investment periods. The same order of profitability and winning rate emerges over the ten-year and quarterly horizons, even though that should not necessarily be the case. Of the 77 individual return winning portfolios, we were curious to see how the ratio varies between the four variants of the fuzzy symmetry scheme. The research found that RN 4 or RN 7 emerged as the winners in both analyzed time horizons in two-thirds of the cases.

These two distributions prove to be the best choice, with a decisive dominant share, while the other four portfolio distributions included in the study constitute only the remaining one-third of the cases. The RN 4 portfolio wins with a high share of over 44% across both divergent investment horizons and also outperforms its rivals in returns.

RN4 is a winner and the most profitable formula in total returns. It outperforms the rest of the palette included in the analysis, where the order of profitability is strangely similar to the proportion of winning portfolios. In descending order, the RN 4 portfolio is the most profitable, followed by the two five-element RN distributions, ending with nearly equal returns for equally distributed portfolios.

The research shows that focused portfolios produce higher returns than permanently allocated investment portfolios. Other research studies have concluded that increasing the number of elements worsens the return results (Bera – Park, 2008). Minimizing the number of elements (Ormos – Zibriczky, 2014) to incorporate entropy into portfolio management is recommended. However, an interesting finding is that while the seven-element portfolio is the least profitable, it is the best diversification choice in a quarter of cases. Investors who desire safety tend to diversify into more elements, but this part of the present research suggests that safety can also be attained through a well-focused portfolio containing fewer elements.

The current study also explored the human factor when comparing investment decision alternatives. We formed two groups within focus group research. One group had to diversify internationally, and the other had a completely free choice of investment components. We chose these two groups because international diversification has the highest acceptance in portfolio management (Painoli et al., 2024), and we wanted to compare this with the power of free choice. Our research found that the free choice outperforms the constrained choice alternatives by an average of 35% in terms of annual returns – for each portfolio construction included in the analysis (*Figure 9*). Thus, we modelled the behaviors of the behavioral investor versus the planning (perfect) investor. The free choice of elements proved more profitable than geographical risk exclusion, even though professionals did not make the investment decisions. The influence of investment

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knowledge in investment decisions (Yulianto, 2023) is expected to boost returns only to a certain extent, while the behavioral investor makes his own bifurcating decisions. The research summarises three decision alternative sets: the elements chosen for investment, the number of elements invested and the role of (any) focus. The results lead to clear and even dominant answers for all three questions. The power of free choice is bifurcating, and a strong focus is recommended, preferably one associated with fewer investment elements. The Rolling Nuts Model offers such decision planning alternatives, which leaves freedom of different parameters but inherently forms a variety of diversification, planning, and active investment management.

Discussion

Our research is novel and somewhat contradicts previous research. The Mandelbrot set is usually considered only in its complexity (Mahmood – Ali, 2022), whereas we have made it interpretable at a level consistent with bounded human rationality via a heuristic procedure. However, we agree with the state of the art that locally interrelated parts can only form a self-functioning system (Ince – Ersoy, 2022); therefore, it is recommended that any applicator combine local investment elements within the presented methodology. In our research summary, we have to conclude that the heuristic decision alternative system we have explored belongs mostly to the multi-objective fuzzy systems (Ojha et al., 2019), implying that its long-term research contribution and application interface seem applicable in this field.

Our empirical results have confirmed that portfolio diversification can have many practical benefits for managing risk and maximizing returns even in turbulent market conditions (Attia et al., 2023). One of our chief research results shows the degree of dominance missing in Mintzberg's definition of organizational development. However, we do not call it only the $\sqrt{3}$ value we found since organizations constantly change due to the dynamically alternating state of flux equilibrium. Because we have not proven that a portfolio allocated in this way would be the most efficient, we will instead adhere to the statement that this value can be understood as a kind of optimum around which fluctuations seem desirable. The research can declare that it has defined the boundary issues of a system based on critical heuristics (Ulrich, 1995), legitimated it as static and dynamic, identified the power from inner forces, and accumulated financial knowledge.

Our research disproved the prevailing thesis that many elements or portfolios are necessary to build an effective investment portfolio (Theron et al., 2018) and succeeded in modelling actual investment decision-making rather than purely intention-driven theoretical research (Sengupta et al., 2021). Through the internal crosschecking of the model system, our study demonstrated the success of the behavioral investor free of emotions (Howard, 2014).

The paper also contradicts mainstream research on financial knowledge (Sobaih – Elshaer, 2023) because it identifies free opinion on investing, not the surplus of such knowledge, as the driving force. The research also confirmed the population's collective ability to construct a mean-variance portfolio that considers the structure of transaction costs (Lachapelle – Challet, 2010).

We have proved that market-neutral fractal portfolio optimisation (Kamenshchikov, 2017) and exchange rate-independent trading caused a bifurcation effect, which can be used as an automatism (Zhou, 2022) in the investment systems field. The paper found the basis for such a possible automatism (Feigenbaum, 1976) by replicating the investment portfolio allocation offered by the symmetry system of the methodological model. Finally, one of the most important research findings is the discovered similarity throughout the analyzed investment horizon, confirming the scalability (Parisi, 2021) of the fuzzy investment system.

Conclusions

The interdisciplinary research synthesis is based on system theory and uses fuzzy logic to discover an investment system pattern with a self-sufficiency function. Our research searched for order in the complex system of the investment decision-making process. The paper demonstrates the self-sustaining power of natural order in investment portfolio returns, behavioral finance, and wealth management decisions. We have discovered a sufficient number of symmetry schemes with a bifurcating effect on investment systems. This

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contradicts statements assuming that implementing sustainable development technologies is difficult and time-consuming (Turek et al., 2023). The research made the organizational dominance measurable – and with fuzzy logic – simplified the complexity of the Mandelbrot set. The methodology has proved the static, dynamic, iterated, and alternative results of the discovered investment symmetry system. The bifurcation effect was detected by repeating the original symmetry, which demonstrates the scalability of the Rolling Nuts symmetry system. This study found self-sustainability and presented a thermometer system for decision-making in the complex field of investment. This is advantageous because, on the one hand, financial management has the greatest impact on the sustainability of an organization (Belas et al., 2024) and, on the other hand, in the banking sector, non-interest income has a statistically significant positive impact on profitability (Kozak – Wierzbowska, 2022). The research explored how well-defined decision sets offer a sufficient number of alternatives for profitable investment decisions. The paper presents an easy, adaptable self-care sample on the wide spectrum of wealth management, investment, and savings decision alternatives. The research has factually confirmed: the passive earning power of the capital market, the buoyancy of focal diversification, the success of the behavioral investor and the bifurcating power of pattern replication.

The main limitations of our research are that the focus groups could be extended, other time series could be examined, and the behavior of portfolios of pure equity, bond or other types of diversification could be analyzed separately. Limitations also arise from the fact that the cyclicality of life cycles and the sequence of restructuring could be extended, and the role of active management could be illuminated in different ways, as in the example in the research. Finally, the methodology presented here can be used under uncertainty; however, a degree of certainty can be achieved in investment practice, for which a sensitivity analysis can find the payback point(s) from which it is worthwhile to reorganize a portfolio.

The Mandelbrot set is just one of nature's sustainable patterns that the current research has managed to forge into a system in the complex area of investment decision-making. This study has proven that static and dynamic management are more profitable than benchmarks and has found a thermostat function by reorienting the focus offered by the model system. It has shown the bifurcating, self-sustaining power of pattern repetition and provides a sufficient number of portfolio diversification alternatives for developing system automatism, for even lifecycle management according to the symmetry system. At the end of this research, we have a decision set that can be used in wealth management and incorporated into humanity's investment systems as a self-sustaining pattern.

In practice, we recommended fewer elements of the portfolio structures presented for both short and long-term investments. As an unexpected result, the research has shown the scalability of the fuzzy symmetry framework, which implies that it is transferable to other disciplines, even though it is now adapted to investment economics. Our research has transformed the underlying Mandelbrot set into a system, but we must remember that every system is surrounded by an environment. In the present case, the set is the result of the mapping, and the points that escape from the set (yielding another result of the iterated processes) give rise to a new shape called Buddhabrot (Navas-López, 2019) – because of its formal similarity. Future research may reveal the relationship between the system and its environment (Katina et al., 2021), hiding metaphysical significance in the exploration. Further possible future research directions are emerging in the area of promising automation. Another research area could be the frequency and pattern of rebalancing, which could lead to increased passive profitability and the investigation of a practical investment system that users can use according to their investment policy.

To summarise, we can conclude that the theory has been proven. An efficient, well-functioning, self-sustaining investment decision system can be developed based on heuristic criteria. Finally, our paper tries to bring manageable order to investment decision processes using a specific approach of econophysics (Rosser, 2021) to provide a complex whole of frames, alternatives, and dynamic functions of wealth management.

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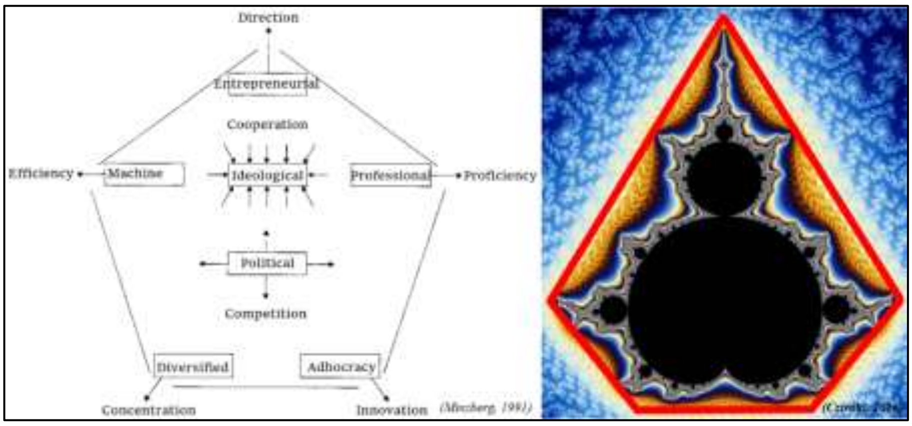
Annex

Figure 1. The Pentagon of System of Forces and Forms in Organisations and the Rolling Nuts Model.



Source: Mintzberg (1991), Cziráki (2016)

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Figure 2. Different Assessment of the Degree of Dominance in the Rolling Nuts Model.

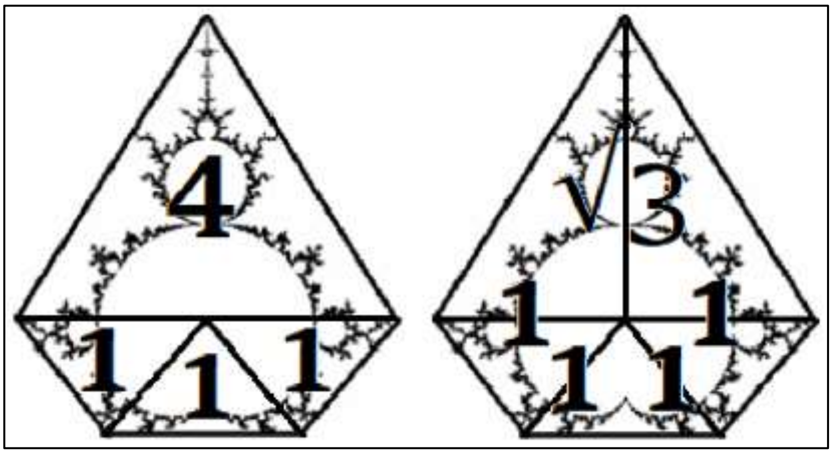
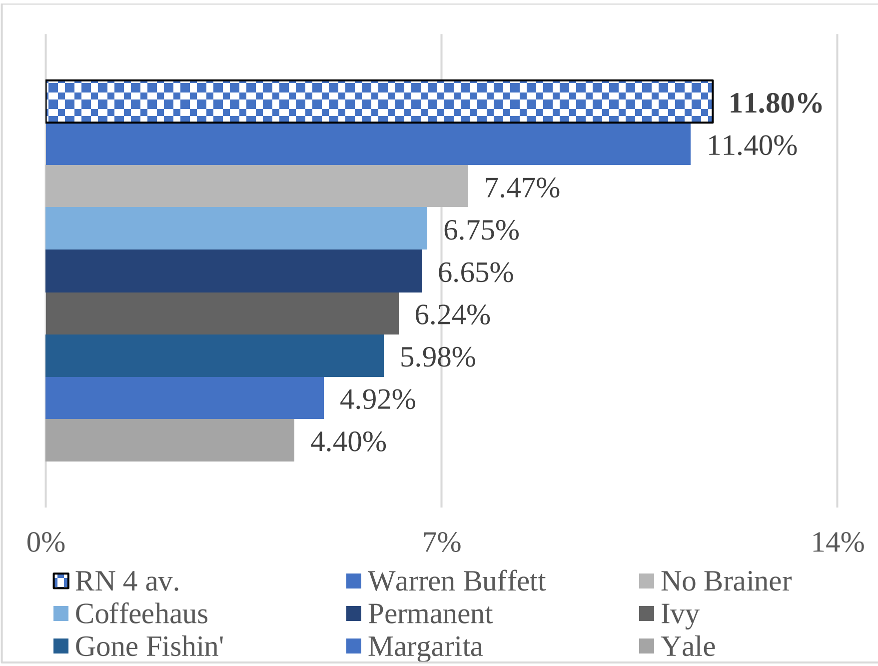


Figure 3. Annual Yield of Lazy Portfolios (2012 – 2022).



Source: own research and https://www.lazyportfolioetf.com

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Figure 4. Possible Portfolio Lifecycle by Diversification Between Asset Classes, on the Four Focuses of Rolling Nuts Model.

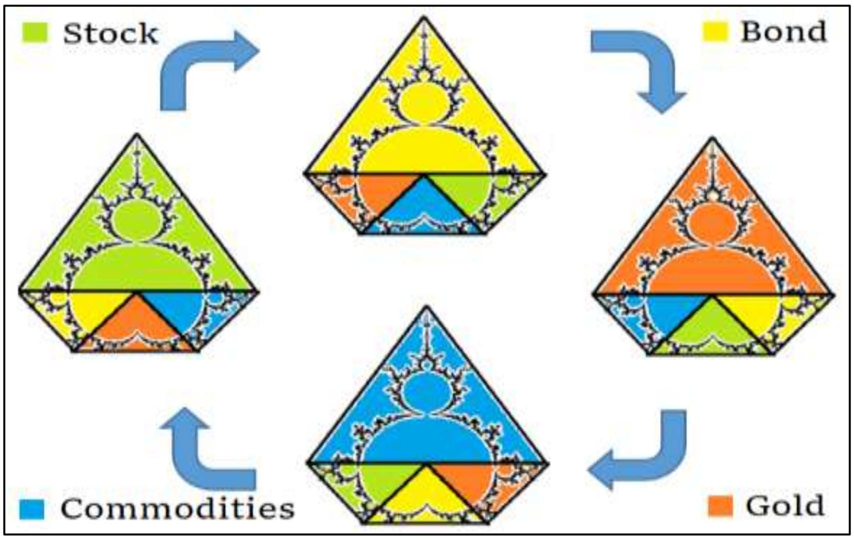

Figure 5. Yield, Return, And Volatility of Rolling Nuts & RN Lifecycle Portfolios.

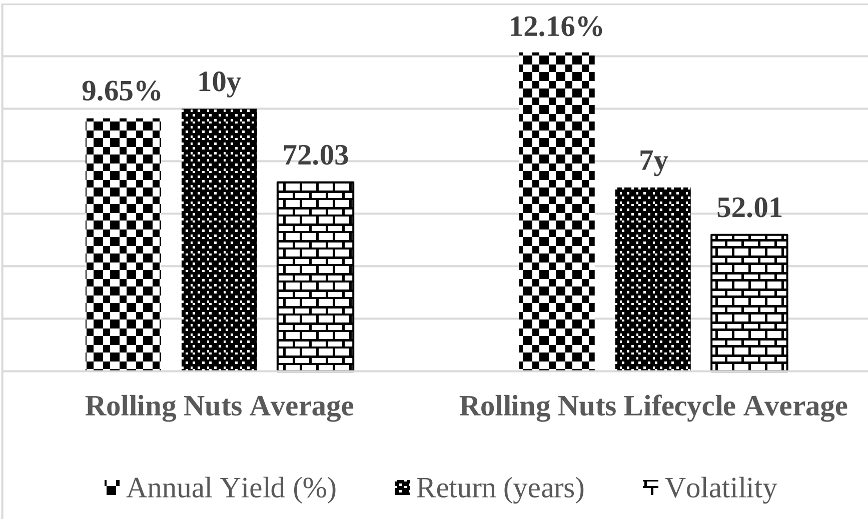

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Figure 6. The 20-Year Returns on Passively and Pattern Pop-Up Managed RN4 Portfolios.

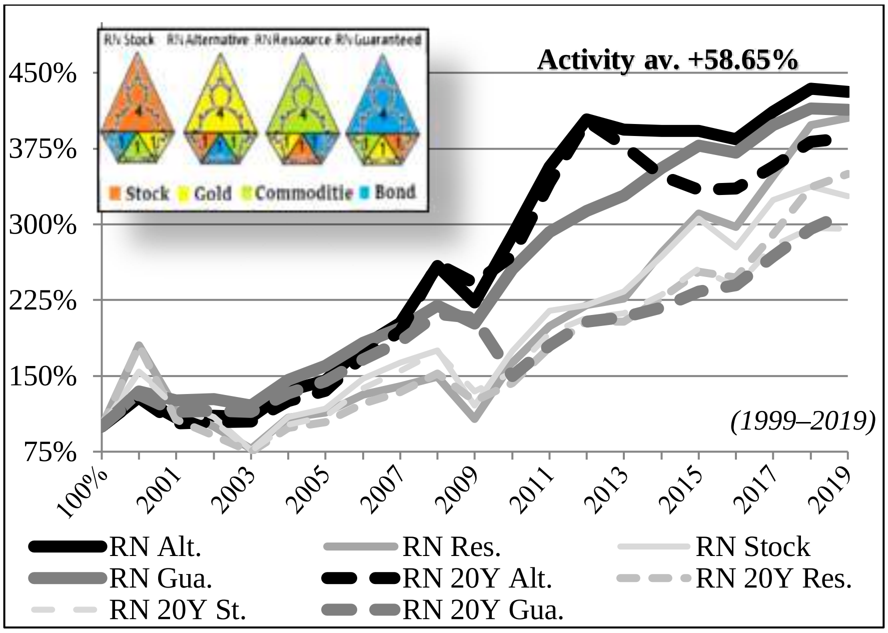

Figure 7. Different Interpretations of The Rolling Nuts Model.

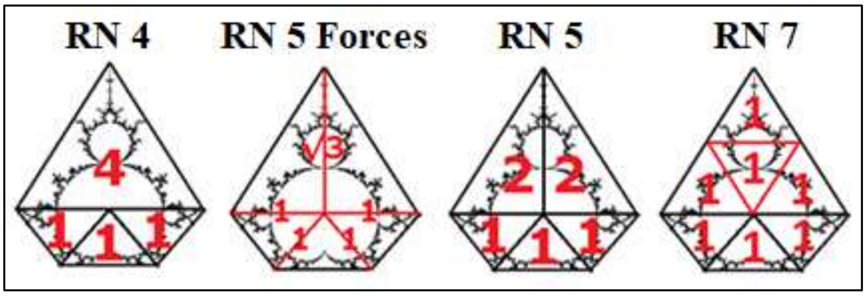

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Figure 8. Similar Dimensions of Empirical Analysis: Winner Distribution and Annual Return; %.

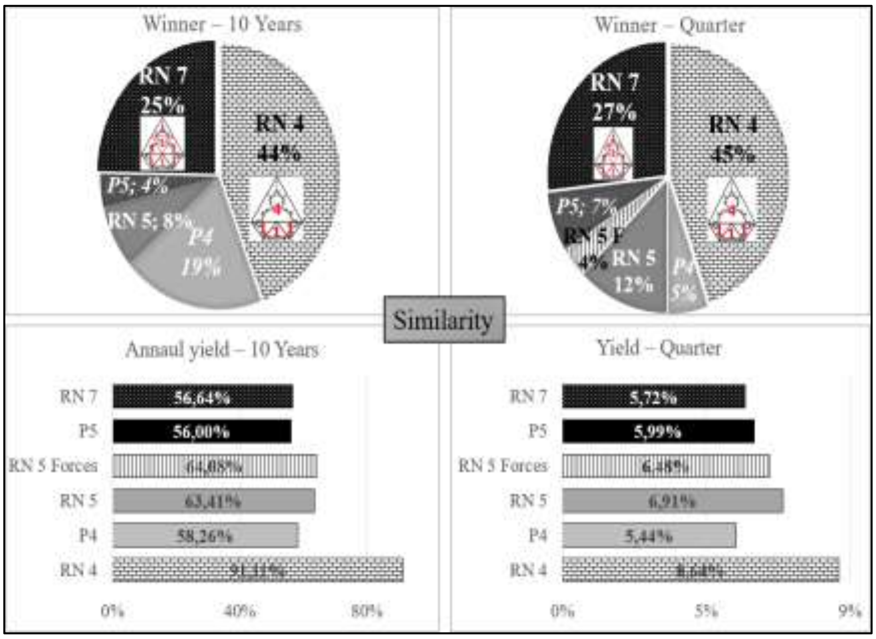

Figure 9. Portfolio Returns Free Choice of Items Versus International Diversification.