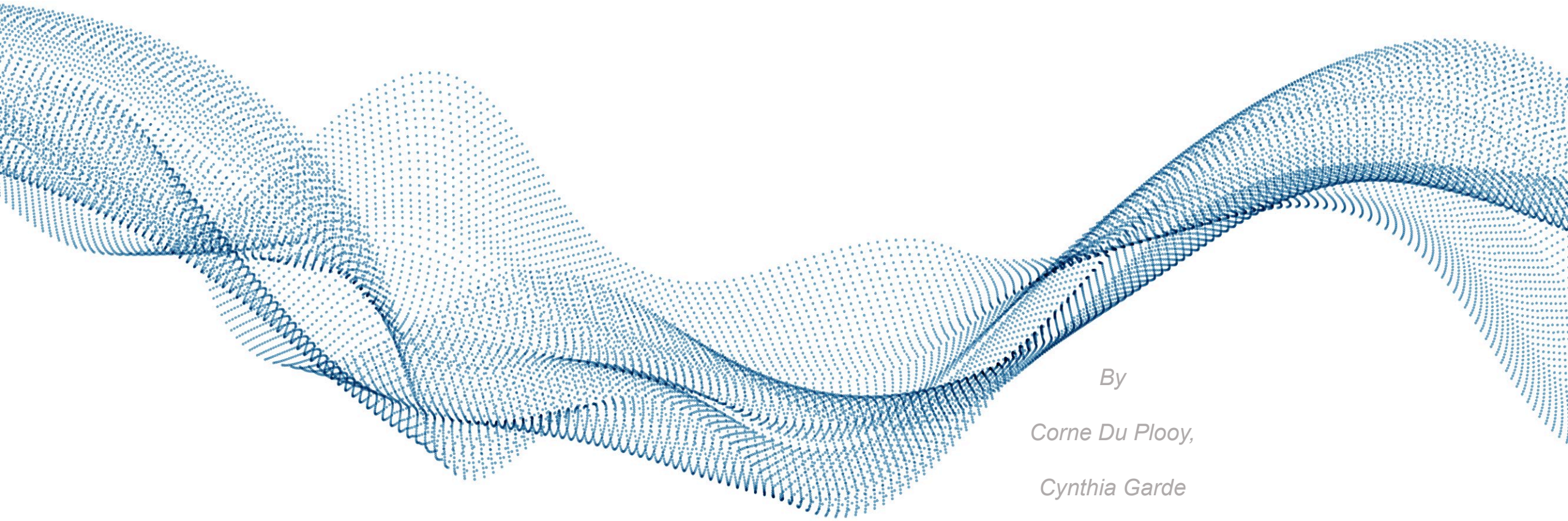


EXPLORING EMERGING ARCHETYPES



By

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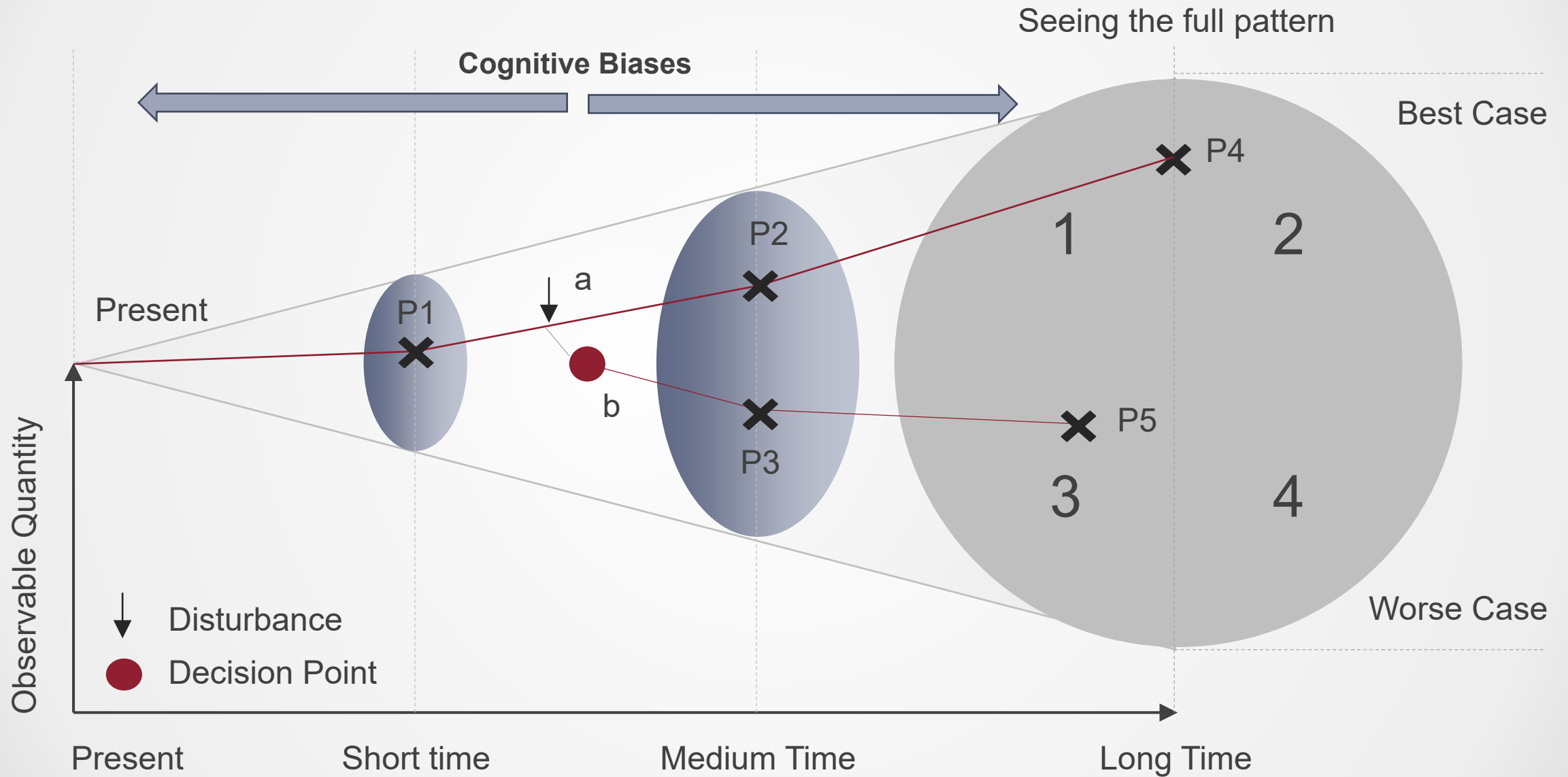
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Work in Progress

From worldly catastrophic events to stock market success, unpredictability underlines phenomena. When we don't understand the dynamics enough at play, the problem becomes generalized and categorized as a wicked problem. Systems thinking, mathematics, and experienced system dynamics' modeling aim at understanding behaviors behind problems that contribute to unforeseeable systemic actions. System dynamics literature identifies 8 archetypes that, through system thinking, can see patterns in the most complex systems. From causal analysis to simulation runs, archetypes provide valuable insight and support identifying prominent leverage points. Human cognitive biases contribute to not seeing system patterns and accelerating or regressing their impact. This paper explores archetype structures and devises a framework for identifying emerging system patterns beyond the known 8.

Abstract

Recognizing System Patterns



Emerging Framework

#	Property	Description
1	Counter Intuitive	The general actions taken within the archetype has an opposite intended effect (Meadows, 2008)
2	Dynamic	Visualized as a static image, yet it is dynamic due to the simultaneous causalities and feedback
3	Reinforces Behavior	The archetypes has the ability to reinforce undesired behaviors
4	Patterns	The behaviors often repeat in patterns. Patterns might decline or incline, yet they become recurring cycles.
5	Deductive and Inductive	Deduction: identifying archetypes in real world Induction: Archetype can be created within in system

The 8 Known Archetypes

#	Existing Archetype	Counter Intuitive	Dynamic	Reinforces Behavior	Patterns	Deductive & Inductive
1	Limits to Growth	Working harder will not always give more returns	Exponential growth and equilibrium or decay	Increased efforts with no gain	Cycles of life and death	Deductive: Population Growth Inductive: Create system that can reproduce itself
2	Tragedy of the Commons	Freedom requires regulation	Exponential growth of capacity and decay of resources	Resource depletion	Cycles of favor and famine	Deductive: Fisheries Inductive: Create a system with strong dependencies on one resource
3	Escalation	In a fight, it is better to turn the other cheek	Exponential growth or decay with both parties	Destruction on both parties	Cycles of generational arguments/violence	Deductive: War Inductive: Create a system where people live by an 'eye for an eye'
4	Eroding Goals	Reducing your goals destroys your success	Goals slowly decreasing	Decreasing performance	Cyclical performance	Deductive: Climate Change Counters Inductive: Create a system that allows goals to be easily adjusted
5	Addiction	Help can become toxic	Exponential dependency growth	Increasing dependency	Cycles of remission and relapse	Deductive: Drug dependency Inductive: Create a system where power of self-belief or self-help is discouraged
6	Fixes that Fail	Quick fixes worsens problems	Frequent fixes, with exponential problems	Increasing problems	Cyclical return of problems	Deductive: Test cheating Inductive: Create a system where shortcuts are praised and longterm patterns ignored
7	Growth and underinvestment	Keep investing independent of performance	Bullwhip effect (exponential growth and decay)	Decreasing performance/capacity	Cyclical story of startup boom and bust	Deductive: Blackberry Cellphones Inductive: Create a system where profits are the major focus
8	Success to the Successful	Good and bad performance are due to initial conditions	Exponential growth on one side, and decay on other	Rich become richer, poor becomes poorer	Cyclical patterns of poverty and greed	Deductive: Apartheid System Inductive: Create a system which defines the value of something only by its performance

REFERENCES

No.	Source	Type	Description
1	Forming a General System Dynamics Transition Method Between System Archetypes and Simulations	MSc Thesis	Master's Thesis submitted to University of Witwatersrand, South Africa, 2021
2	Senge P. (1990). "The Fifth Discipline: the art and practise of the learning organization", Currency Doubleday, United States of America, ISBN: 0-385-26095-4	Book	The first book to coin the name, System Archetypes and explains each with examples in management of business and self
3	Kim D.H. & Anderson V. (1998). "System Archetype Basics: from Story to Structure", Pegasus Communications, Inc, First Printing May 1998, ISBN 10: 1-	Publication	A detailed guide on the 8 system archetypes with complete worksheets, examples and refernces
4	http://humanhow.com/list-of-cognitive-biases-with-examples/	Article	A long and great list of cognitive biases. Useful link to explore possible new archetypes in the mind
5	http://web.mit.edu/curhan/www/docs/Articles/15341_Readings/Social_Cognition/Ross_Intuitive_Psychologist_in_Adv_Experiment_Soc_Psych_vol10_p173.pdf	Book Chapter	Source from MIT, Lee Ross, cited 6774 times
6	https://ethicsunwrapped.utexas.edu/glossary/fundamental-attribution-error	Ethics Article	The article gives some easy to understand examples with a study's data
7	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7499761/	Article	COVID 19 Shocks on the supply and demand dynamics
8	Vonderembse M.A. & White G.P. (1991). "Operations Management: Concepts, Methods, and Strategies", West, ISBN: 9780314781482, 857 pages	Book	Reason for using models as projection and analysis tools
9	Jackson, Tim & Webster, Robin. (2016). Limits Revisited—A review of the limits to growth debate. A report to the All-Party Parliamentary Group on Limits to Growth.. 10.13140/RG.2.2.21095.91045.	Report	A report written in 2016 which discusses that Llimits to Growth was correct and it is still very prominent
10	Snowden D. (2011). "Cynefin, A Sense of Time and Place: an Ecological Approach to Sense Making and Learning in Formal and Informal Communities", conference proceedings of KMAC at the University of Aston, July 2000, available at: http://www.governica.com/Cynefin#ref-6 .	Conference Proceedings	Cynefin is a framework to make sense of complexity. Snowden states that as complexity increases, it becomes more difficult to identify connections and relationships. The most complex is chaos
11	Yin L, Huang Z, Dong W, He C, Duan H. Utilizing Electronic Medical Records to Discover Changing Trends of Medical Behaviors Over Time. Methods Inf Med. 2017;56(S 01):e49-e66. Published 2017 May 5. doi:10.3414/ME16-01-0047	Research Article	Medical research article where they used histsorical data to analyse new trends and discover new and valuable behaviours
12	https://www.frontiersin.org/articles/10.3389/fspor.2019.00049/full	Research ARticle	The System Archetypes applied to understand Sport Injuries
13	Wolstenholme, Eric. (2004). Using generic system archetypes to support thinking and modeling. System Dynamics Review. 20. 341 - 356. 10.1002/sdr.302.	Research Article	This is a great reference for using System Archetypes as a modelling instrument that supports my MSc research too
	Learning through System Dynamics as Preparation for the 21st Century	Paper	http://web.mit.edu/sysdyn/sd-intro/D-4434-1.pdf