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**Comprehensive Justice Systems in the Context of Evolution and SDGs**  
– Through the Lens of Evolutionary Theory and the Latest Technological

ABSTRACT

*The author explores the topic of conflict resolution in depth, through the lens of evolutionary theory and the latest technological advancements. Specifically, the author examines Professor Takeshi Kojima's "Comprehensive Systems of Justice (Comprehensive justice systems)" from the perspective of evolutionary theory and the SDGs. In this context, the works "Creative Evolution" by Henri Bergson and "The General Theory of Evolution" by Matt Ridley are highlighted as key references. Ridley argues that "bottom-up" evolution, resulting from numerous individuals and events, is more effective than the centralized "top-down" approach. The author also brings the "genetic algorithm" from AI research into the discussion, emphasizing its inspiration from Darwin's theory of evolution and its effectiveness in solving complex problems. The author points out that the "Comprehensive Systems of Justice" is evolving against the backdrop of cutting-edge technologies, in particular AI and the "bottom-up" evolution of genetic algorithms. They also highlight the connection to SDGs GOAL 9 (build resilient infrastructure and promote inclusive and sustainable industrialization) and GOAL 16 (promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective and accountable institutions at all levels), signifying the ongoing evolution of conflict resolution systems to achieve sustainable societies.*

**KEYWORDS:** evolutionary theory, technological advancements, Comprehensive Systems of Justice, SDGs, Creative Evolution, bottom-up evolution, top-down approach, genetic algorithm, AI (Artificial Intelligence).

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## Introduction

Previously, the author introduced the comprehensive systems of justice proposed by Professor Takeshi Kojima.<sup>1</sup> This time, the author aims to explore these systems from the perspective of evolutionary theories and the SDGs. Among the evolutionary theories examined are Henri Bergson's theory of creative evolution<sup>2</sup> and Matt Ridley's general theory of evolution.<sup>3</sup> For instance, Ridley posits that top-down decisions made by a limited number of individuals often lead to failures. However, there are numerous bottom-up, unexpected phenomena instigated by countless individuals who did not anticipate significant changes. A commonality in these phenomena is the principle of evolution. So, why was the author drawn to evolutionary theory? The reason lies in his longstanding interest in genetic algorithms (GAs) used in AI research. Genetic algorithms are powerful tools that emulate the process of biological evolution. They allow for the solving of problems that, if approached with a complete solution search, would require vast computing time, even on a supercomputer.<sup>4</sup>

Kazuya Nakamura, an Online Editor at DSE Research Institute, provides a lucid example of implementing Python code to tackle maximum-minimum and knapsack problems using the Python DEAP library.<sup>5</sup> In genetic algorithms, the genetic systems of organisms are represented as (a) organism → individual, chromosomes (solution), (b) viability → fitness, where the solution is assessed by an evaluation function, and (c) reproductive behavior → mating. The genetic algorithm protocol then follows these steps: (1) generation of the initial population (with a loop from (2) to (5) repeated until the termination condition is met) → (2) evaluation of fitness → (3) selection → (4) mating → (5) mutation.<sup>6</sup>

### ※The 17 Global Goals<sup>7</sup>

The 17 Global Goals of the United Nations are listed below. The Japanese translation of the Sustainable Development Goals (SDGs) on the website of the Ministry of Foreign Affairs of Japan is also used as a reference.<sup>8</sup>

- Goal 1: No poverty (Economic growth must be inclusive to create sustainable jobs and promote equality.)
- Goal 2: Zero Hunger (The food and agriculture sector provide key development solutions and is central to hunger and poverty eradication.)
- Goal 3: Good health and well-being (Ensuring healthy lives and promoting well-being for all at all ages is essential for sustainable development.)
- Goal 4: Quality education (Achieving quality education is the foundation for improving people's lives and for sustainable development.)

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<sup>1</sup> Hirata, Hayato: *What Underlies Civil Conciliation*. In *Asahi Law Review*, No.41, 2011. pp. 12-19.

<sup>2</sup> Bergson, Henri (co-translated by Goda, Masato and Matsui, Hisashi): *Creative Evolution*, Chikuma Shobo, Tokyo, 2010.

<sup>3</sup> Ridley, Matt (translated by Ohnishi, Naoko et al.): <translation title> *The Evolution is Everything: The Future of Mankind, Technology and the Universe*, Hayakawa Publishing, Tokyo, 2016.

<sup>4</sup> Nakamura, Kazuya: *How to use the Python DEAP library: Easy-to-understand explanation of genetic algorithms (GA) and solving very simple function maximization/minimization and knapsack problems*. In DSE Research Institute Online Editor, 25 May 2021.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

<sup>7</sup> United Nations 2022a (on the Sustainable Development Goals): <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>, 3 September 2022 (3 September 2022).

<sup>8</sup> Ministry of Foreign Affairs of Japan: <https://www.mofa.go.jp/mofaj/gaiko/oda/sdgs/statistics/index.html>, 13 September 2022 (13 September 2022).

- Goal 5: Gender equality (Gender equality is not only a fundamental human right but also a necessary foundation for a peaceful, prosperous, and sustainable world.)
- Goal 6: Clean water and sanitation (Safe, accessible water for all is an essential part of the world we want to live in.)
- Goal 7: Affordable and clean energy (Energy is at the heart of almost every major challenge and opportunity.)
- Goal 8: Decent work and economic growth (Sustainable economic growth requires societies to create the conditions for people to have quality jobs.)
- Goal 9: Industry, innovation, and infrastructure (Investment in infrastructure is crucial to achieving sustainable development.)
- Goal 10: Reduced inequalities (To reduce inequalities, policies should be universal in principle, considering the needs of disadvantaged and marginalized populations.)
- Goal 11: Sustainable cities and communities (There must be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transport, and more.)
- Goal 12: Responsible consumption and production
- Goal 13: Climate action (Climate change is a global challenge that affects everyone, everywhere.)
- Goal 14: Life Below Water (Careful management of this essential global resource is a key feature of a sustainable future.)
- Goal 15: Life on land (Sustainable management of forests, combating desertification, halting, and reversing land degradation, halting biodiversity loss.)
- Goal 16: Peace, Justice, and Strong Institutions (Ensure access to justice for all and build effective and accountable institutions at all levels.)
- Goal 17: Partnerships (Revitalize the global partnership for sustainable development.)

Of the above 17 Goals, Goal 9, i.e., the goal of creating a foundation for industry and innovation, is important for access to sustainable justice,<sup>9</sup> as it has had an impact on the courts in Covid-19, for example, the development of basic infrastructure, such as information and communication technology, will be an important factor in making sustainable justice high-tech and would even be a driving force in the development of dispute resolution systems.

Goal 16, to promote just, peaceful, and inclusive societies, would also be the basis for providing access to sustainable justice for all and building effective and accountable institutions at all levels. As there is a significant correlation and mutually reinforcing relationship between the rule of law and development, ensuring the rule of law at both national and international levels will lead to the evolution of justice systems toward sustainable development.<sup>10</sup>

## *II. Civil Dispute Resolution System*

First, let's outline the various methods of civil dispute resolution. According to Professor Kojima, the options available to parties in civil disputes include avoidance, negotiation, mediation, litigation, and combat. However, avoidance and combat are excluded for specific reasons. Avoidance is excluded because, despite its significant socio-economic presence, it is

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<sup>9</sup> United Nations 2022b: (United Nations Information Centre) [https://www.unic.or.jp/files/Goal\\_09.pdf](https://www.unic.or.jp/files/Goal_09.pdf), 7 September 2022 (7 September 2022).

<sup>10</sup> United Nations 2022c: (United Nations Information Centre) [https://www.unic.or.jp/files/Goal\\_16.pdf](https://www.unic.or.jp/files/Goal_16.pdf), 7 September 2022 (7 September 2022).

not a proactive method of dispute resolution. On the other hand, combat is contrary to the prohibition of self-help and is deemed illegal as a resolution method.<sup>11</sup>

### *II.1. Negotiation between parties*

Professor Kojima notes that there was a time when informal negotiation was termed 'settlement' and was uniformly considered problematic. However, it should now be recognized as part of rational systems. A comprehensive perspective is now necessary, which encompasses its theoretical development and the enhancement of legal ethics.<sup>12</sup>

### *II.2. ADR (Alternative Dispute Resolution)*

ADR includes civil and domestic conciliation and judicial settlement, while out-of-court ADR includes conciliation, mediation, arbitration, and adjudication by administrative bodies, bar associations, and private bodies.<sup>13</sup>

#### *2.1. Judicial conciliation and mediation by other bodies*

In addition to civil and family conciliation, which takes place in the courts, judicial conciliation also includes the Labor Court, which began operating in 2006.<sup>14</sup>

#### *2.2. Dispute resolution through mediation*

Unlike litigation, arbitration, and judicial mediation, which focus on the surface of the dispute, such as rights, obligations, and legal interests, dispute resolution through mediation takes a holistic view of the dispute, delving into the inner workings of both parties, including the human relationships between them, and aims to repair and better build relationships at the basic level.<sup>15</sup>

### *II.3. Arbitration*

Arbitration is also referred to as a private tribunal established by the parties to resolve their disputes, as the arbitrators hear and decide the legal dispute, and the parties agree to submit to the arbitration award as a final decision.<sup>16</sup>

### *II.4. Judicial Procedure*

Under the Civil Procedure Law, the legal action of the court in the form of a judgment, decision, or order is called a trial, and once the judgment becomes final, it has a prejudicial force and enforceability.<sup>17</sup>

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<sup>11</sup> Kojima, Takeshi: *Civil Procedure Law*, Yuhikaku, Tokyo, 2013. p.3.

<sup>12</sup> Ibid., p.6.

<sup>13</sup> Ibid., p.6.

<sup>14</sup> Ibid., p.8.

<sup>15</sup> Ibid., p.8.

<sup>16</sup> Ibid., p.8.

<sup>17</sup> Ibid., p.8.

### III. Comprehensive systems of justice

#### III.1. Comprehensive systems of justice

Professor Kojima has developed the concept of a comprehensive system of access to justice (universal systems of access to justice), which has been distilled into an important set of coordinates that will help lawyers to be aware of their positioning and role, and provide a theoretical and practical compass. The comprehensive system of access to justice is a fundamental idea of public philosophy in any legal system, and the author once introduced the essentials of the comprehensive system of access to justice. To quote him: "The comprehensive systems of justice aim to achieve universal justice and maximize equity by diversifying and rationalizing methods of dispute resolution and by constantly renewing the law through equity. Dispute resolution is ultimately and at its core conducted through litigation and adjudication by the law, but in the periphery, there are judicial settlements as well as arbitration, conciliation, mediation, grievance redressal, and consultation in various institutions that support autonomous resolution by the parties and voluntary discussions between the parties (relative dispute resolution), negotiations between the parties are conducted daily. Contract negotiations and preventive legal activities also form a broad basis of these systems. Thus, within the entire legal system for disputes, concentric rings of lawsuits and judgments surround each other like an outer ring, mutually exerting the effects of ripple and pump-priming to renew the inner substance of justice = law, and the entire system functions organically and comprehensively to realize the rule of law."<sup>18;19;20</sup>

#### III.2. Evolving Comprehensive System of Justice

Professor Kojima goes on to explain that when considering 21<sup>st</sup>-century dispute resolution systems, evolving comprehensive justice systems should be the author's introduced main points of evolving comprehensive justice systems. To quote him here, "The first pillar of comprehensive justice systems is litigation, while the second pillar is to be sought in activated arbitration". When litigation as a coercive device and truly effective and activated arbitration is established as the two pillars of fairness and become an open forum for various disputes to support the rule of law, it is impossible to think without the theory of comprehensive systems of justice.<sup>2122</sup>

If, as Professor Kojima states, mediation enhances its resolving power centered on litigation and arbitration, the twin towers of the 21<sup>st</sup>-century dispute resolution systems, comprising the two domains of the public and private sectors, will shape its form in ever-changing ways through the choices of the parties who promote their proactive competence.<sup>2324</sup> It is argued that the composition of the Twin Towers of litigation and arbitration will be

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<sup>18</sup> Hirata: op.cit., p.13.

<sup>19</sup> Kojima 1984: *Overall Structure of the Dispute Resolution System*. In K. Shindo Editorial Representative, Course Civil Litigation (1) Civil Disputes and Litigation, Kobundo, Tokyo, 1984. pp. 355-380.

<sup>20</sup> Kojima 1988: *Systems of Justice, Basic Legal Principles of Civil Litigation*, Yuhikaku, Tokyo, 1988. p.115-123.

<sup>21</sup> Hirata: op.cit., p.13.

<sup>22</sup> Kojima 2005: *Prospects for Arbitration ADR Law (Introduction) - Towards a Change of Direction in Basic Legal Principles and Institutional Strategy*. In Arbitration and ADR, Preparatory Issue for the First Edition ,2005. pp.17-18.

<sup>23</sup> Hirata: op.cit., p.13.

<sup>24</sup> Kojima 2005: p.18.

supported by the broad expansion of mediation and conciliation in these two areas, with the vast brownfield of relative negotiation lying below.<sup>25</sup>

The author would like to draw attention to the fact that Professor Kojima considers various methods of conflict resolution from a holistic perspective. Considering Bergson's theory of evolution, Professor Kojima's grasp of the big picture of justice and his description of justice from a holistic perspective, without focusing only on the details, can be seen as outstanding foresight. And, as mentioned above, when Professor Kojima further considers the conflict resolution systems of the 21st century, the essence of the conflict resolution systems can be seen from the perspective of evolutionary theory if we focus on the fact that the comprehensive systems of justice continue to evolve.

### III.3. Universal access to justice.

Comprehensive justice systems are a theory for realizing the constitutional principle of universal access to justice. According to Professor Kojima, the goal is the creation and renewal of pluralistic paths to justice and the realization of a more adequate justice that is constantly changing and growing. Universal access to justice, as it is expressed today, refers to ubiquitous access to justice, i.e., an autonomous access environment. An autonomous access environment is one in which legal services and remedies are readily and easily available to everyone, anytime, anywhere.<sup>2627</sup> It is an environment of ubiquitous access to justice, where people can voluntarily choose what they consider to be the best option, with many options available to them, in a sustainable manner.

This self-sustaining environment of access is a system that has been built up over the long history of humanity. In their early stages, they were, from today's perspective, underdeveloped conflict resolution systems, as exemplified by the Crocodile Trials. However, there have been twists and turns in the evolution of these dispute resolution systems into the highly developed dispute resolution systems of today. The resolution of disputes in which both parties put their lives on the line (the one who was eaten by the crocodile lost the case), as the ancestor of today's dispute resolution systems, shows how seriously people in the past thought about resolving disputes.<sup>2829</sup>

#### III.3.1. Complementary litigation and ADR

The advantages of ADR include (1) simple application procedures, (2) low cost, (3) speed, (4) consensual resolution, (5) non-public, (6) flexibility, (7) professionalism, (8) realistic handling of disputes involving international cross-border transactions, and (9) future-oriented (the parties can choose a solution that also considers the future relationship between the two parties). However, due to system reforms, litigation is no longer inferior to ADR in terms of (3) speed and (7) professionalism, and it is believed that in the future, litigation and ADR should engage in a friendly competition to establish a mutually complementary relationship, which will lead to improved dispute resolution services.<sup>30</sup>

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<sup>25</sup> Ibid., p.18.

<sup>26</sup> Hirata: op.cit., p.14.

<sup>27</sup> Kojima 2003: *Ubiquitous Access to Justice*. In Judicial Reform and Advanced Technology, First Symposium Materials, 2003. <http://www.legaltech.jp/ppt1a.pdf>, 10 January 2004 (10 January 2004).

<sup>28</sup> Calamandrei, Piero (co-translated by Kojima, Takeshi and Mori, Seiichi): *Litigation and Democracy*. Chuo University Press, Tokyo, 1976. p.31.

<sup>29</sup> Kojima 1987: *Prep New Civil Procedure Law*, Kobundo, Tokyo, 1987. pp. 9-10.

<sup>30</sup> Hirata: op.cit., p.14.

### *III.3.2. Arbitration as the keystone*

It is important to recognize that among the various types of ADR, arbitration is the one that can provide truly effective dispute resolution services. Comparing mediation and arbitration, arbitration is a more effective process for resolving disputes that should be resolved by a neutral judge. In addition, arbitration is more effective than mediation in cases where one party has acted in bad faith or is uncooperative in resolving the dispute. In addition to these factors, from the perspective of comprehensive legal systems, we believe that Professor Kojima is correct in recognizing that arbitration is the keystone of the systems, as he points out. At present, private arbitration is said to be the main form of arbitration and judicial arbitration is said to be a shadow of its former self, but according to Professor Kojima, the introduction of judicial arbitration is important in the future.<sup>3132</sup> Furthermore, it has been pointed out that it is useful to define the concept of arbitration in a broad sense and to promote a standardized classification within this extension. The concept of compulsory arbitration in the United States of America, unilateral arbitration in cases of consumer arbitration in the private sector, and non-binding arbitration are emerging,<sup>3334</sup> and arbitration is expected to be a faster, more legally sound, more arbitrary, and more effective means of dispute resolution compared to mediation. Arbitration is expected to be a faster, more legally based, more arbitrary, and more effective means of dispute resolution compared to mediation.

### *III.3.3. Mediation as peripheral*

Professor Kojima envisioned a whole system of dispute resolution with justice at its core, not formal substantive law, but the ultimate law. He rethought the law as made by the courts in a flexible and responsive form. In other words, he positioned mediation as a 'responsive law receptive device'. Professor Kojima also positioned the trial as a 'creative device of flexible law realization' that brings the law closer to justice while constantly drawing on socially relevant rationality. Trial and mediation are at the poles of the legal dialogue process, and the legal standards of the court have 'ripple effects' on the mediation field. Moreover, mediation is a cooperative relationship in which the rules evolve in a win-win direction based on the legal standards in the coordination activities.

As described above, a two-way process with ripple and pump-priming at its core through legal standards operates smoothly in court and mediation. And they form a partnership that is essential for the growth of a body of law. Trial and mediation are the driving forces that propel the growth of the law from their respective angles toward ultimate justice, and the combination of good trial and good mediation works together in an integrated way with its unique appeal.

Comprehensive justice systems have two main pillars (litigation and arbitration) around which mediation sits. Through ripple and pump-priming, mediation contributes to the growth of the sub-systems of public and private dispute resolution and is part of the polycentric expansion of comprehensive systems of Justice.

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<sup>31</sup> Ibid., p.15.

<sup>32</sup> Kojima 2005: p.16.

<sup>33</sup> Hirata: op.cit., p.15.

<sup>34</sup> Kojima 2005: pp.16-17.



Francis Gurry, Director General of the WIPO Mediation and Arbitration Centre<sup>3536</sup> noted that while mediation is not a cornerstone of the theory of comprehensive systems of justice like arbitration, it has the following advantages, despite its long history around the world and the skepticism, it faces in Europe. Pointing to the value of neutral mediation in creating a channel between the parties and facilitating the flow of information, Mr. Gurry notes that in the early stages of dispute resolution, mediation has two advantages over arbitration. The first is that in mediation the parties do not have to accept a mediated solution if they decide there is a more suitable alternative, and the parties have considerable control over both the process of mediation and the content of the solution. Secondly, whereas in arbitration the solution is determined by the applicable law, mediation allows both parties to consider interests other than the applicable law (e.g., the interests of the business on which the parties' legal status is based). Commenting on the importance of mixed methods of mediation and arbitration (med-arb), Mr. Gurry said that to benefit from the advantages of both arbitration and mediation, it is beneficial for parties to try mediation first and then consider arbitration if a settlement cannot be reached through mediation within a certain period. From the perspective of the legal system, this sequential combination of procedures can be understood as facilitating good faith cooperation between the parties in mediation.

#### *IV. Evolutionary theory*

##### *IV. 1. What is a creative evolutionary theory?*

Creative evolution is a term proposed by the French philosopher Henri Bergson in his "L'evolution creatrice" (telle que proposee par Henri Bergson) in 1907. Bergson criticized previous theories of evolution and proposed a new theory of evolution. According to Bergson, the existential whole is an indivisible succession, and the numerous systems cut out of it would, strictly speaking, not be its parts, but partial views of the whole.<sup>37</sup> Bergson sees life activity in two directions, upward and downward development, and states that the energy of upward development lifts lower energy to its level to produce various organizations, whereas downward development is a descent of energy, and the workings of life itself belong to downward development.<sup>38</sup> He states that a world like our solar system seems to take something from the variability it contains at every moment.<sup>39</sup>

##### *IV. 2. Comprehensive system of justice from the perspective of creative evolutionary theory*

Bergson is unique in that he sees things holistically. In general, science tries to understand the existence of things within a specific scope and to discover laws within that

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<sup>35</sup> Hirata: op.cit., p.16.

<sup>36</sup> Gurry, Frasis (translated by Tanabe, Makoto): *Resolution of intellectual property disputes through arbitration and mediation*. In Manuscript of Lecture for the 20th Anniversary Symposium of the Japan Industrial Property Law Association, 1996. <http://www.kclc.or.jp/japanese/law/wipo/gurry.htm>, 5 June 2009 (5 June 2009).

<sup>37</sup> Bergson: op.cit., p.53.

<sup>38</sup> Ibid., p.57.

<sup>39</sup> Ibid., p.311.

limited scope. However, Bergson's position is that looking only at the laws of detail, without grasping the whole picture, does not constitute a correct understanding of things.<sup>40</sup>

It is important to note that Professor Kojima explains comprehensive systems of justice in terms of ripple and pump-priming. In other words, comprehensive justice systems are a creative evolution, and the driving force that moves them towards an even better conflict resolution system is none other than ripple and pump-priming. The reason for taking up the comprehensive systems of justice proposed by Professor Kojima in this paper is that I wanted to take another look at the comprehensive systems of justice from a Bergsonian perspective.

If you look at the actual systems of justice, they change their nature depending on where you stand, which I have felt for more than 20 years in my work as a civil conciliation commissioner in the courts. It is only from the perspective of Professor Kojima, who sees the individual legal systems as a kind of mechanism of justice and part of larger continuous systems, that the true nature of dispute resolution systems can be understood.

### *IV.3. What is a general evolutionary theory?*

On the other hand, Matt Ridley in "The Evolution of Everything: How New Ideas Emerge" states that "for too long we have been obsessed with the idea of designing change from above, underestimating the power of spontaneous, organic, developmental change driven from below."<sup>41</sup> Ridley argues that anything that is the result of top-down decision-making by a relatively small number of people has failed and that evolution has instead been an accidental and unexpected phenomenon, with evolution occurring through bottom-up emergent forces brought about by countless people with no intention of bringing about a major change. In other words, he believes that evolution is a bottom-up emergent phenomenon brought about by countless people who have no intention of making any significant change.<sup>42</sup>

Ridley details the dynamics of bottom-up evolution in a wide range of areas, from the origins of the universe, not just living organisms, to the culture and economy of human society, including space, morality, biology, genes, culture, economics, technology, mind, personality, education, population, leadership, government, religion, currency, the Internet, etc. Ridley analyses the driving forces of bottom-up evolution in a wide range of fields.<sup>43</sup> Through his examination of these diverse fields, Ridley emphasizes the fact that, as mentioned above, the emphasis in all fields has been on a top-down orientation, underestimating the bottom-up orientation, which is a spontaneous, organic, developmental force of change driven from below.<sup>44</sup>

The author notes that Ridley sees the driving force of evolution not as the result of top-down decision-making by a few people but as bottom-up chance, an unexpected phenomenon brought about by countless people who have no intention of making major changes. Ridley's view is commendable in that top-down decision-making should not underestimate the power of bottom-up evolution.

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<sup>40</sup> Mindset Salon: <https://mindsetalon.net/henri-louis-bergson-levolution-creatrice/2866/>, 23 August 2022 (23 August 2022).

<sup>41</sup> Ridley: op.cit., p.420.

<sup>42</sup> Ibid., p.418.

<sup>43</sup> Ibid., pp.19-416.

<sup>44</sup> Ibid., p.420.

#### *IV.4. Comprehensive systems of justice from the perspective of general evolutionary theory*

Looking at comprehensive justice systems from the perspective of Ridley's general evolutionary theory of the ripple (top-down) and pump-priming (bottom-up) processes described by Professor Kojima, the bottom-up orientation should not be underestimated.

If we look at the composition of the comprehensive legal systems, with the trial at the center, mediation, and arbitration at the periphery of the trial in concentric circles, complaint and ombudsman activities around it, settlement (negotiation) around it, and legal philosophy, era, ideology, and residents' movements on the outermost concentric circles, it becomes clear that the legal systems are not only top-down systems but also bottom-up systems. It is a strict fact that, from a legal point of view, there are ripple effects (top-down effects) from the judgment to the outside of the concentric circles. However, when looking at the evolution of dispute resolution systems, as Ridley explains, the seemingly contingent, unplanned, emergent, and gradually evolving things at the outermost concentric circles, such as legal principles, times, ideas, and resident movements, are the things that happen as they evolve from the settlement (negotiation), complaint and ombudsman, arbitration, and mediation, and then the judgment. It is very interesting to note that evolution is a bottom-up process.

#### *V. Conclusion*

In this paper, the comprehensive system of justice proposed by Professor Kojima has been discussed from the perspective of evolutionary theory and the SDGs. The view from Henri Bergson's creative evolution and Matt Ridley's general evolutionary theory proved to be very interesting.

Firstly, from Bergson's perspective of looking at things from a holistic perspective, only looking at the laws of details without grasping the whole picture does not mean that one has a correct understanding of things, and one can understand the true meaning of the terms ripple and pump-priming when Professor Kojima explains the comprehensive systems of justice. In other words, the comprehensive systems of justice are a creative evolution, and the driving force that moves them towards an even better dispute resolution system is nothing but ripple and pump-priming, from the perspective of Professor Kojima, who sees the individual legal systems as a kind of mechanism of justice and a part of larger continuous systems, only then can the true nature of dispute resolution systems be understood.

Next, Ridley notes that while what has been done as a result of top-down decision-making by a relatively small number of people has failed at every turn, there are many bottom-up, serendipitous, and unexpected phenomena brought about by countless people with no intention of causing major change and explains that the principle common to a wide range of phenomena is evolution. It is becoming increasingly real that the dispute resolution systems, the comprehensive systems of justice, are evolving through the bottom-up forces of technological and Internet evolution. Through this evolution, the dispute resolution systems are evolving towards a sustainable society, which is deeply connected to the SDGs GOAL 9 (industry, innovation, and infrastructure) and GOAL 16 (peace, justice, and strong institutions). It can be understood that they are evolving towards the realization of a sustainable society.

Lastly, the author wishes to spotlight a captivating piece of recent research. An interdisciplinary team of scientists from Oxford University, Harvard University, Cambridge

University, Gulf University for Science & Technology (GUST), the Massachusetts Institute of Technology (MIT), Imperial College, and the Alan Turing Institute have published a paper in the "Journal of The Royal Society Interface."<sup>45</sup> This study reveals that genetic mutations are underpinned by mathematical principles. Notably, using the 'sum of digits' function from number theory, the research delineates a mechanism that enables organisms to tolerate specific mutations. This ensures the preservation of their distinctive phenotypes, even amidst unpredictable mutations. Historically, number theory has been seen in mathematics as an exceedingly abstract area with scant real-world applications. Yet, it's intriguing to observe its recent significant contributions to evolutionary genetics. The author contends that such research, in time, will influence the realms of law and political science in a bottom-up evolutionary manner.

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<sup>45</sup> Mohanty, Vaibhav, et al.: *Maximum mutational robustness in genotype–phenotype maps follows a self-similar blancmange-like curve*. In *Journal of The Royal Society Interface*, July 2023. Volume 20, Issue 204. 26 July 2023. <https://doi.org/10.1098/rsif.2023.0169> ,25 September 2023 (25 September 2023).

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