

## Additional Materials for Reviewers

This document provides supplementary information supporting the Practitioner Application submission. It outlines the conceptual motivation, theoretical background, and practical implementation of the Chain of Happiness idea.

The document is organized as follows. First, an extended abstract summarizes the core concept and objectives of the project. Second, a background section introduces the problem that motivates the work, along with key observations from its practical implementation. Third, a literature review situates the idea within existing research on charitable systems, trust, and prosocial behavior. Fourth, the model design section presents the conceptual structure of the Forward Chain system from a system dynamics perspective. Finally, the document introduces the prototype web application used to demonstrate and explore the concept, followed by a discussion of its limitations and directions for future work.

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### **Extended Abstract — Chain of Happiness**

Traditional charitable systems often operate as one-directional transfers with limited feedback, which can constrain participation, trust, and the continuation of helping behavior. The *Chain of Happiness* proposes a trust-based, participatory model of charitable interaction in which acts of help are organized as sequential links between individuals. In this system, a person who receives help is encouraged to later extend help to another person, creating a continuing chain of support. Rather than treating charitable giving as a one-time transfer, the model frames each act of help as part of an evolving process in which generosity propagates through social connections.

From a systems perspective, the model can be understood as a reinforcing social feedback structure. When individuals perceive that their contribution can extend beyond a single recipient and potentially benefit multiple people over time, their willingness to help may increase. At the same time, recipients are not positioned as passive beneficiaries; rather, they are expected to become future contributors by continuing the chain, potentially adding value based on their own capacity. This structure may reduce the social and self-esteem pressures often associated with receiving help, making assistance more acceptable and participatory.

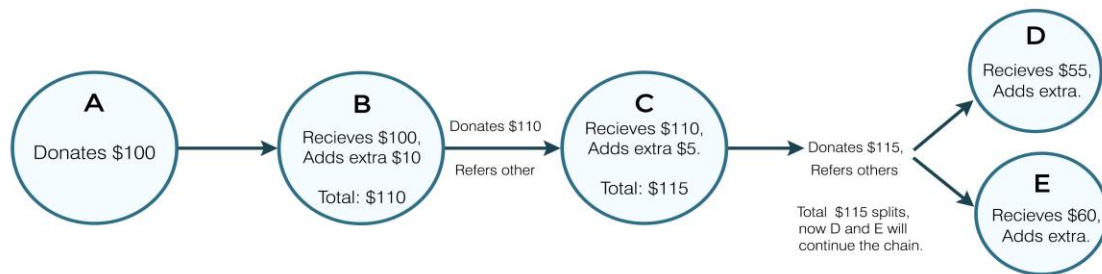
The model is based on forward trust, where each recipient selects the next participant in the chain, creating a decentralized and evolving network of support. As chains develop over time, they may expand or branch into multiple chains, further increasing the reach of helping behavior. Overall, the system is designed to strengthen reinforcing feedback loops in which willingness to help leads to further acts of helping, ultimately forming expanding networks of generosity. This process can amplify the impact of individual contributions while reducing the psychological asymmetry between donors and recipients by positioning participants as both beneficiaries and future contributors.

Since initial donors act as the primary drivers of the system by triggering each chain, two structural mechanisms are incorporated to enhance both initiation and continuity. While these mechanisms can be applied at any stage of the chain, they are particularly important during the early phases. The first is a crowdfunding-based approach, which facilitates the formation of new chains by aggregating smaller contributions from multiple participants. The second is a backward-step mechanism, designed to maintain system flow in situations where the amount required by a recipient exceeds the initial contribution of the donor. In such cases, the initiating donor may temporarily transition into a partial recipient role for the remaining amount, enabling chain initiation and sustaining system flow while preserving the underlying participatory structure. These mechanisms are described in greater detail in the model section.

The concept has been informally implemented since 2017, supporting 341 individuals across 19 active chains. Observations suggest that structuring help as a chain increases willingness to participate, reduces barriers to accepting help, and enables continuation beyond single transactions. This work highlights how redesigning system structure can transform charitable interactions from linear transfers into decentralized, reinforcing, and participatory processes, with potential implications for increasing engagement and amplifying social impact.

To support the practical exploration of this concept, a prototype web application has been developed. Reviewers are invited to visit [ChainofHappiness.com](https://ChainofHappiness.com) to explore the implementation. For the purposes of the ISDC 2026 submission and to maintain anonymity, identifying information such as the “About” section has been intentionally removed.

## Graphical Abstract



## Background and Problem Context

The concept of the *Chain of Happiness* originated from the corresponding author's early experience as a volunteer at Raad Charity during his teenage years. As a teenager, he did not have the financial capacity to contribute significant donations and instead engaged in volunteer work. This experience offered firsthand insight into several structural characteristics of traditional charitable systems.

First, a portion of donations is typically reduced through administrative costs, processing, and fundraising activities. Second, the flow of resources is generally one-directional, where a donation impacts a recipient only once, without a built-in mechanism for continuation. Third, participation in charitable giving is often concentrated among wealthier segments of society, while middle-income individuals—despite their willingness to contribute—may feel that their limited resources make their contributions less meaningful. Finally, on the recipient side, accepting help can sometimes be associated with psychological barriers, including concerns related to dignity and self-esteem.

During this period, the concept of the *Wall of Kindness* was gaining attention in Iran. This initiative encouraged individuals to “leave what they do not need and take what they need,” primarily providing clothing for those in need during winter. Figure 1 illustrates of the first *Wall of Kindness*. The simplicity and directness of this idea highlighted the potential of decentralized and community-driven forms of support. At the same time, the rapid growth of informal financial (Ponzi) schemes in the region led the author to reflect on how chain-based structures, typically associated with financial systems, could be reinterpreted in a positive and ethical way for charitable purposes. This reflection led to the early conceptualization of a “chain-based” model of giving, later developed into the *Chain of Happiness*.



Fig. 1. A “Wall of Kindness” installation at a school in Iran (2017).

The primary objective was to redesign the flow of donations in a way that would both extend their impact over time and increase participation from a broader segment of the population. In contrast to conventional charity models that often emphasize wealthier donors supporting recipients, this model sought to engage individuals across different socioeconomic levels by enabling each act of help to become part of a continuing chain.

This concept was first implemented informally in Iran starting in 2017. Over time, the system supported 341 individuals across 19 active chains. The process was manually tracked using spreadsheet tools; however, as the number of participants grew and chains began to expand and

branch, managing and tracking these interactions became increasingly complex. This challenge ultimately motivated the development of a web-based platform to facilitate scalability, transparency, and broader participation.

## Literature review

### Conventional Charity

Many traditional charitable systems operate through a centralized organization that collect resources from donors and distribute them to recipients<sup>1</sup>. While charitable institutions play a vital and often indispensable role in addressing social needs, several systemic challenges persist within conventional models of philanthropy. One key issue is the gradual decline in public trust toward institutions, particularly in contexts where donors have limited visibility of how their donations are utilized. This is closely related to another challenge which is the lack of transparent and easily understandable information regarding the allocation and impact of donated resources. Even when reporting mechanisms exist, they are often aggregated, indirect, or difficult for donors to interpret meaningfully<sup>2 3</sup>.

In addition, administrative and operational overhead, while vital for organizational operation, can reduce the proportion of resources that directly reach beneficiaries, which may further influence donor perceptions and willingness to contribute<sup>4 5</sup>. More importantly, there is often a weak feedback connection between donors and outcomes of their donation. Donors typically do not observe the continuation or longer-term effects of their contributions, and recipients are rarely integrated into a process that connects them back into the system as active participants.

From a systems perspective, these structures can be understood as primarily linear transfer systems, in which resources flow in a single direction:

Donor → Organization → Recipient

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<sup>1</sup> Coffman L.C. (2017) Fundraising intermediaries inhibit quality-driven charitable donations, *Economic Inquiry*, 55, 409–24.

<sup>2</sup> Ghoorah, U., Mariyani-Squire, E. & Zoha Amin, S. Relationships between financial transparency, trust, and performance: an examination of donors' perceptions. *Humanit Soc Sci Commun* **12**, 315 (2025). <https://doi.org/10.1057/s41599-025-04640-2>

<sup>3</sup> Nadine Chlaß, Lata Gangadharan, Kristy Jones, Charitable giving and intermediation: a principal agent problem with hidden prices, *Oxford Economic Papers*, Volume 75, Issue 4, October 2023, Pages 941–961, <https://doi.org/10.1093/oeq/gpad023>

<sup>4</sup> Gneezy, U., Keenan, E. A., & Gneezy, A. (2014). Avoiding overhead aversion in charity. *Science*, 346(6209), 632–635. DOI: [10.1126/science.1253932](https://doi.org/10.1126/science.1253932)

<sup>5</sup> Uri Gneezy et al. ,Avoiding overhead aversion in charity.*Science***346**,632-635(2014).DOI:[10.1126/science.1253932](https://doi.org/10.1126/science.1253932)

In such systems, the interaction is normally completed once the transfer occurs, with limited mechanisms for continuation or feedback. As a result, the process of helping remains largely transactional rather than dynamic. These linear structures do not inherently generate a strong reinforcing participation dynamic, meaning that each act of giving is treated as an isolated event rather than part of an evolving social process. Consequently, the potential for generosity to propagate through networks of individuals is constrained, and opportunities to amplify impact through feedback-driven participation remain underutilized.

This challenge becomes particularly pronounced in today's context, especially in countries such as Iran, where economic pressures have led to a growing proportion of the population requiring assistance while the relative capacity of wealthier donors has diminished. Recent estimates suggest that a significant share of the population is experiencing economic hardship, with roughly 30% living in conditions of absolute poverty <sup>6</sup>. At the same time, structural and economic challenges can limit the effectiveness and participation of donors, further constraining the overall capacity of charitable systems. This imbalance between increasing need and constrained donor capacity places additional strain on conventional charity capacity and highlights the importance of exploring alternative structures that can widen participation and amplify the impact of individual contributions.

### **Trust and Transparency in Philanthropy**

Trust is central to philanthropy, especially in contexts where donors cannot directly observe how contributions are used. Recent works show that perceived financial transparency is positively associated with donor trust and with perceived nonprofit performance. In the 2025 study by Ghoorah and colleagues <sup>7</sup>, donors who perceived a nonprofit as more financially transparent were more likely to trust it and to evaluate it as more effective. Importantly, the study suggests that transparency operates through both an informational mechanism, by helping donors understand resource use, and a performative mechanism, by showing legitimacy and accountability.

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<sup>6</sup> <https://iranwire.com/en/news/145969-iranian-parliamentary-researcher-says-30-of-population-lives-in-absolute-poverty/>

<sup>7</sup> Ghoorah, U., Mariyani-Squire, E. & Zoha Amin, S. Relationships between financial transparency, trust, and performance: an examination of donors' perceptions. *Humanit Soc Sci Commun* **12**, 315 (2025). <https://doi.org/10.1057/s41599-025-04640-2>

This point is especially relevant because transparency is not only a matter of disclosure, but also of intelligibility. Even when organizations provide reports, those reports may be aggregated, technical, or difficult for donors to interpret meaningfully. Related research <sup>8</sup> on nonprofit transparency and accountability has shown that trust, accreditation, and impact reporting are connected, but that the broad existence of disclosure does not guarantee strong public understanding or engagement. The practical implication is that charitable systems benefit not only from being transparent, but from making that transparency visible and interpretable to participants <sup>9</sup>.

Drawing on the literature, trust emerges as a fundamental structural component supporting the effectiveness and sustainability of the Chain of Happiness model. The model responds to the trust problem not simply by asking institutions to increase reporting, but by redesigning the donation process so that the continuation of help becomes directly observable. In this sense, it complements traditional institutional transparency with relational transparency: participants can follow how support moves forward through the chain. Trust is therefore built incrementally, as each participant forwards help to a personally trusted individual, making each step easier to accept than reliance on a distant institution.

### **The Hidden Participation Barrier**

A less visible but highly important challenge in charitable systems is under-participation among individuals who are willing to help but perceive their own contributions as too small to matter. Research on charitable giving shows that donation decisions are influenced not only by altruistic intent, but also by framing, perceived effectiveness, and beliefs about the personal impact of one's contribution. Andreoni's work <sup>10</sup> on warm-glow giving and the later review by Bekkers and Wiepking <sup>11</sup> both show that giving is driven by multiple mechanisms, including awareness of

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<sup>8</sup> Pilon, M., & Brouard, F. (2023). Accountability theory in nonprofit research: Using governance theories to categorize dichotomies. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 34(3), 585-599. <https://doi.org/10.1007/s11266-022-00482-7>

<sup>9</sup> Dougherty, C. N. (2019). Trust and transparency: Accreditation and impact reporting by Canadian charities. *Canadian journal of nonprofit and social economy research*, 10(1). <https://doi.org/10.22230/cjnser.2019v10n1a273>

<sup>10</sup> Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *The Economic Journal*, 100(401), 464-477.

<sup>11</sup> Bekkers, R., & Wiepking, P. (2011). A literature review of empirical studies of philanthropy: Eight mechanisms that drive charitable giving. *Nonprofit and Voluntary Sector Quarterly*, 40(5), 924-973.

need, solicitation, costs and benefits, altruism, reputation, and psychological rewards. Perceived effectiveness is therefore a key determinant of participation <sup>12</sup>.

This helps explain why many middle-income individuals may participate less than they otherwise would. If a small contribution is perceived as producing only marginal or isolated impact, the motivation to give can weaken. By contrast, studies on donation framing and perceived impact suggest that willingness to give increases when people believe their contribution forms part of a larger, collectively meaningful process. The same logic underlies many crowdfunding systems, where aggregation increases the perceived efficacy of small contributions <sup>13</sup>. Furthermore, participation in charitable systems is often uneven, with middle-income individuals contributing less than their willingness might suggest. This can be partly explained by the perception that small individual contributions have limited impact, reducing motivation to participate.

The Chain of Happiness model builds directly on this insight. Instead of framing a contribution as a single endpoint transfer, it frames it as the beginning of a potentially expanding chain. This can increase the perceived leverage of individual participation: even a modest initial contribution may matter more if it helps trigger a sequence of subsequent helping acts. In this sense, the model addresses a hidden participation barrier by altering how contributors perceive the possible downstream effects of their actions.

### **Psychological Experience of Receiving Help**

The literature often pays more attention to donors than recipients, yet the experience of receiving help can be psychologically complex. Research on aid design shows that dignity, autonomy, and perceived social meaning matter substantially for recipients. Thomas and colleagues <sup>14</sup> argue for “delivering aid with dignity”, showing that aid systems perform better when they account for recipients’ psychological and sociocultural realities rather than focusing only on material transfer. Their study emphasizes that recipients are affected not only by what they receive, but by how the aid relationship is structured and narrated.

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<sup>12</sup> Fehr, E., & Schmidt, K. M. (2006). The economics of fairness, reciprocity and altruism—experimental evidence and new theories. *Handbook of the economics of giving, altruism and reciprocity*, 1, 615-691.

<sup>13</sup> Chandler, J. A., Dushnitsky, G., Elitzur, R., Hopp, C., Kincaid, P. A., & Short, J. C. (2022). Reviewing recent crowdfunding research: Collective findings from the Journal of Business Venturing Insights. *Journal of Business Venturing Insights*, 18, e00354. <https://doi.org/10.1016/j.jbvi.2022.e00354>

<sup>14</sup> Thomas, C. C., Otis, N. G., Abraham, J. R., Markus, H. R., & Walton, G. M. (2020). Toward a science of delivering aid with dignity: Experimental evidence and local forecasts from Kenya. *Proceedings of the National Academy of Sciences*, 117(27), 15546-15553.

Related evidence suggests that some forms of aid are easier to accept than others because of how they interact with shame, humiliation, and self-worth. Recent work <sup>15</sup> found that people may be less willing to accept money than food aid because monetary assistance can feel more shameful, even when it is materially more useful. More broadly, studies on cash and dignity show that autonomy-supportive forms of assistance can improve recipients' sense of self-worth and dignity <sup>16</sup>.

This claim is especially important for the Chain of Happiness model because the model is not only about moving resources; it is also about redefining the social role of the recipient. In conventional one-directional systems, recipients may remain positioned as passive beneficiaries. In the Chain of Happiness, by contrast, recipients are expected to become future contributors when able. This role transition can reduce the self-esteem barrier associated with accepting help by framing assistance not as a terminal act of dependence, but as participation in an ongoing chain of support. In other terms, the model attempts to counter a balancing loop of shame or dependency with a reinforcing loop based on dignity, mutual benefit, and future assistance. Therefore, systems that enable recipients to transition into future contributors may reduce psychological asymmetry and promote more participatory forms of support.

### **Prosocial Behavior and Pay-it-Forward Dynamics**

A growing body of research supports the idea that prosocial behavior can spread from one person to another. Studies of upstream reciprocity and pay-it-forward behavior show that individuals who receive help may become more likely to help unrelated third parties, rather than only reciprocating directly to the original helper. Experimental work on pay-it-forward tendencies and upstream reciprocity suggests that gratitude-like mechanisms can motivate subsequent helping behavior, making prosocial transmissible rather than purely binary <sup>17 18</sup>.

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<sup>15</sup> Haushofer, J., & Shapiro, J. (2016). The short-term impact of unconditional cash transfers to the poor: experimental evidence from Kenya. *The Quarterly Journal of Economics*, 131(4), 1973-2042. <https://doi.org/10.1093/qje/qjw025>

<sup>16</sup> Shapiro, J. (2019). The impact of recipient choice on aid effectiveness. *World development*, 116, 137-149. <https://doi.org/10.1016/j.worlddev.2018.10.010>

<sup>17</sup> Tsvetkova, M., & Macy, M. W. (2014). The social contagion of generosity. *PloS one*, 9(2), e87275.

<sup>18</sup> Iwagami, A., & Masuda, N. (2010). Upstream reciprocity in heterogeneous networks. *Journal of theoretical biology*, 265(3), 297-305. <https://doi.org/10.1016/j.jtbi.2010.05.010>

Network research strengthens this point further. Fowler and Christakis<sup>19</sup> showed experimentally that cooperative behavior can cascade through social networks, affecting not only direct interaction partners but also more distant participants. Their findings imply that helping and cooperation are not merely individual choices; they can diffuse through interconnected social structures. This is especially relevant to the Chain of Happiness, because the model explicitly seeks to make such propagation visible and participatory.

The practical implication is that charitable systems need not be designed only around one-time transfers. They can also be designed to cultivate and propagate prosocial dynamics. The Chain of Happiness can therefore be understood as an attempt to formalize pay-it-forward behavior as a system structure: recipients are not just encouraged to feel gratitude, but are given a visible mechanism through which that gratitude can be translated into subsequent helping behavior.

### **System Dynamics Perspective on Social Systems**

System dynamics provides a useful framework for understanding why the preceding literatures belong together<sup>20 21 22</sup>. Rather than treating charitable behavior as a sequence of isolated decisions, system dynamics emphasizes feedback, accumulation, delays, and endogenous structure. Work in behavioral system dynamics argues that human judgment, perception, and behavioral responses can be integrated directly into feedback-based models of complex social systems. This is particularly useful when outcomes depend not only on resources, but on how people interpret, respond to, and learn from the system in which they participate.

This perspective is well suited to the Chain of Happiness model. The model is built around reinforcing loops linking trust, successful helping experiences, willingness to participate, and onward helping behavior. At the same time, it also contains balancing processes, such as resource constraints, mismatch between need and contribution, saturation of participant pools, and self-esteem barriers in accepting help. System dynamics is appropriate here not because the model is complex, but because the problem itself is dynamically complex as the participation

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<sup>19</sup> Fowler, J. H., & Christakis, N. A. (2010). Cooperative behavior cascades in human social networks. *Proceedings of the National Academy of Sciences*, 107(12), 5334–5338.

<sup>20</sup> Sterman, J. D. (2000). *Business Dynamics: Systems thinking and modeling for a complex world*. MacGraw-Hill Company.

<sup>21</sup> Moxnes, E. (2000). Not only the tragedy of the commons: misperceptions of feedback and policies for sustainable development. *System Dynamics Review: The Journal of the System Dynamics Society*, 16(4), 325-348.

<sup>22</sup> Rahmandad, H., & Sterman, J. (2008). Heterogeneity and network structure in the dynamics of diffusion: Comparing agent-based and differential equation models. *Management science*, 54(5), 998-1014.

today influences trust of tomorrow, trust influences chain continuation, and successful continuation influences future participation.

Reflecting in this way, the Chain of Happiness is not simply a charitable platform; it is a proposed redesign of the feedback structure of charitable interaction. Traditional models tend to emphasize transfer. The present model emphasizes propagation and continuation. That distinction is the systems perspective contribution of this work.

## **Model Design: The Chain of Happiness**

### **Conceptual Overview of the Model**

The *Chain of Happiness* is conceptualized as a feedback-driven social system in which charitable interactions are structured as sequential and interconnected acts of helping behavior. Rather than treating donations as isolated transfers, the model organizes them into chains, where each participant both receives and potentially contributes to subsequent acts of support. This design shifts the system from a predominantly linear structure toward a dynamic process characterized by feedback, accumulation, and propagation.

The model emphasizes endogenous behavior: participation, trust, and continuation emerge from the structure of interactions rather than being externally imposed. This aligns with the broader system dynamics principle that system structure drives behavior over time<sup>23</sup>. By embedding helping behavior within a chain structure, the model enables feedback loops that influence participation, trust formation, and the diffusion of prosocial actions.

### **Core Mechanism: Chain-Based Helping**

At the core of the model is the concept of chain-based helping, in which each act of assistance becomes a link in a continuing sequence. A participant (A) provides help to another individual (B), who is then encouraged to extend help to a third individual (C), and so on. This creates a directed sequence of interactions that can evolve over time.

This mechanism is closely related to the concept of upstream reciprocity, where individuals who receive help are more likely to help others rather than directly reciprocating to the original donor

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<sup>23</sup> Sterman, J. D. (2000). *Business dynamics: Systems thinking and modeling for a complex world*. McGraw-Hill.

<sup>24</sup> <sup>25</sup>. Empirical research shows that such behaviors can propagate through social networks, forming cascades of cooperation. The Chain of Happiness operationalizes this concept by making the continuation of helping behavior explicit and structurally embedded. Unlike traditional models, where the interaction ends after a single transfer, the chain-based mechanism introduces continuity as a defining feature of the system.

### **Reinforcing Feedback Structure**

The model is built around several reinforcing feedback loops that enable the propagation of helping behavior.

A central reinforcing loop can be described as follows:

Helping → Trust → Willingness to Help → Continued Chains → More Helping

In this loop, successful experiences increase trust, which increases participation, leading to more helping events and further reinforcing trust. This aligns with findings in social network research showing that cooperative behavior can spread through repeated interactions <sup>26</sup>.

Additional reinforcing mechanisms identified in the CLD include:

- Trust Loops (R1 and R2): Accumulated successful chain(s) increase total system reputation, further enhancing trust and participation.
- Social Loop (R3): Increased visibility of helping behavior strengthens perceived social norms, which increases willingness to participate <sup>27</sup>.

These reinforcing loops collectively transform helping behavior from a one-time action into a self-reinforcing process.

### **Trust-Based Participant Selection**

A key structural feature of the model is forward trust-based selection, in which each participant selects the next recipient in the chain. This decentralizes decision-making and reduces reliance on centralized institutions.

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<sup>24</sup> Nowak, M. A., & Roch, S. (2007). Upstream reciprocity and the evolution of gratitude. *Proceedings of the Royal Society B: Biological Sciences*, 274(1610), 605–610.

<sup>25</sup> Tsvetkova, M., & Macy, M. (2014). The social contagion of generosity. *PLOS ONE*.

<sup>26</sup> Fowler, J. H., & Christakis, N. A. (2010). Cooperative behavior cascades in human social networks. *Proceedings of the National Academy of Sciences*, 107(12), 5334–5338.

<sup>27</sup> Shang, J., & Croson, R. (2009). A field experiment in charitable contribution: The impact of social information. *The Economic Journal*, 119(540), 1422–1439.

Trust plays a central role in this process. As shown in the literature, trust is strongly influenced by perceived transparency, accountability, and prior successful interactions<sup>28</sup>. In the Chain of Happiness, trust is built endogenously through:

- visibility of past successful chains
- participant-driven selection
- continuity of interactions

At the same time, the model incorporates balancing mechanisms related to trust erosion: (B1)

Chain Breaks (+) → Perceived Unreliability (+) → Trust (−) → Participation (−)

This ensures that trust is not assumed but dynamically evolves based on system performance.

### **Participation and Role Transition (Recipient → Contributor)**

A defining feature of the model is the role transition mechanism, in which recipients are expected to become future contributors when possible. This transforms participants from passive beneficiaries into active agents within the system.

From a behavioral perspective, this mechanism addresses psychological barriers associated with receiving help. Research shows that dignity, autonomy, and perceived fairness significantly influence how individuals experience aid<sup>29</sup>. In traditional systems, receiving help may activate a balancing loop driven by self-esteem concerns:

Receiving Help (+) → Perceived Dependency (+) → Willingness to Accept Help (−)

The Chain of Happiness introduces a counteracting reinforcing loop (R10):

Role Transition Expectation (+) → Perceived Dignity (+) → Willingness to Accept Help (+) → Participation (+)

By positioning recipients as future contributors, the model reduces stigma and increases acceptance of help. This creates a more participatory and psychologically sustainable system.

### **Supporting Mechanisms**

To enhance system initiation, continuity, and scalability, several supporting mechanisms are incorporated into the model.

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<sup>28</sup> Ghoorah, K., Lodhia, S., & others. (2025). Financial transparency, trust, and performance in nonprofit organizations. *Humanities and Social Sciences Communications*, 12.

<sup>29</sup> Thomas, M., et al. (2020). Delivering aid with dignity: The importance of psychological considerations in humanitarian assistance. *Proceedings of the National Academy of Sciences*.

### **Crowdfunding for Chain Initiation (B4 and R8)**

Crowdfunding is introduced as a mechanism to address situations where a single donor cannot meet the required level of support for next receiver.

Gap Between Need and Contribution (+) → Crowdfunding Participation (+) → Aggregated Contributions (− Gap)

This forms a balancing loop that reduces the initiation barrier. At the same time, successful crowdfunding campaigns (R8) increase visibility and trust, contributing to reinforcing participation dynamics. This is consistent with research showing that aggregation of small contributions increases perceived impact and participation <sup>30</sup>.

### **Backward-Step Mechanism (B6)**

The backward-step mechanism addresses mismatches between required and available contributions by allowing the initiating donor to partially assume a recipient role for the unmet portion. This creates a balancing loop:

Gap Between Need and Contribution (+) → Backward-Step Activation (+) → Gap Reduction (−)

By enabling flexible role adjustment, this mechanism maintains system flow and allows chains to be initiated even under resource constraints. It also reinforces the participatory nature of the system by blurring rigid donor–recipient distinctions.

### **Chain Branching and Expansion (R7 and R5)**

As chains evolve, they may branch into multiple chains, increasing system reach and impact.

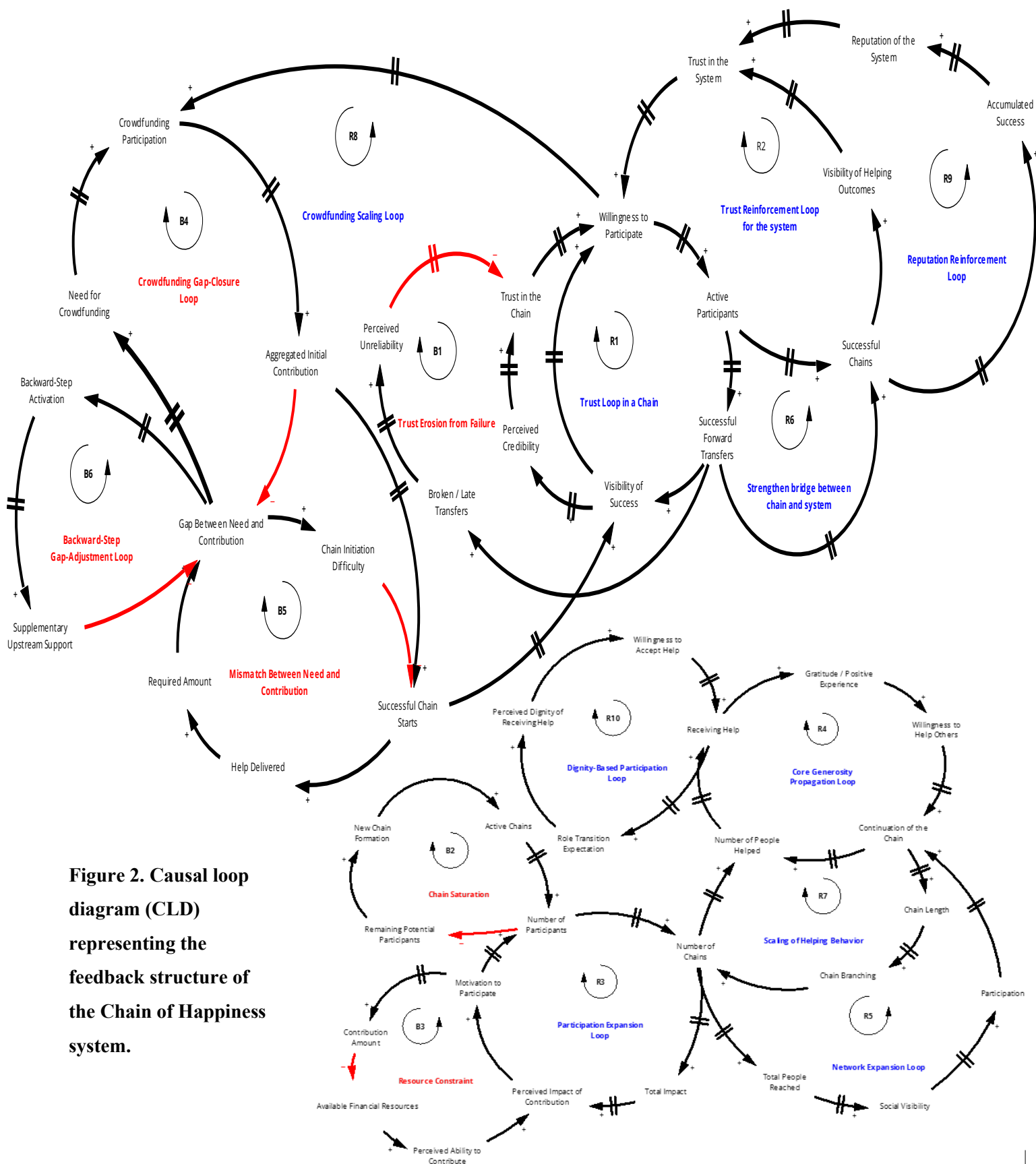
Successful Chains (+) → Chain Branching (+) → Number of Chains (+) → Successful Chains

This mechanism introduces a reinforcing loop that enables nonlinear growth in helping behavior. As chains expand and branch, they form interconnected networks that diffuse generosity, reinforce trust, and amplify impact beyond direct interactions. These reinforcing dynamics are moderated by balancing constraints, such as resource limitations (B3), participant saturation (B2), and quality degradation—ensuring realistic system behavior over time.

Figure 2 represents causal loop diagram of the Chain of Happiness and furthermore all loops are titled as below.

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<sup>30</sup> Bekkers, R., & Wiepking, P. (2011). A literature review of empirical studies of philanthropy: Eight mechanisms that drive charitable giving. *Nonprofit and Voluntary Sector Quarterly*, 40(5), 924–973.



**Figure 2. Causal loop diagram (CLD) representing the feedback structure of the Chain of Happiness system.**

## **Reinforcing Loops:**

### **R1: Trust Loop in a Chain (Core Micro Loop)**

Successful Forward Transfers (+) → Visibility of Success (+) → Trust in the Chain (+) → Willingness to Participate (+) → Active Participants (+) → Successful Forward Transfers  
At the chain level, success builds trust, which sustains participation and continuation.

### **R2: Trust Reinforcement Loop for the System**

Visibility of Helping Outcomes (+) → Trust in the System (+) → Willingness to Participate (+) → Active Participants (+) → Successful Chains (+) → Visibility of Helping Outcomes  
System-wide trust grows through visible outcomes and feeds participation.

### **R3: Participation Expansion Loop**

Number of Participants (+) → Motivation to Participate (+) → Contribution Amount (+) → Perceived Impact of Contribution (+) → Number of Participants  
Participation increases perceived impact → attracting more participants.

### **R4: Core Generosity Propagation Loop**

Receiving Help (+) → Gratitude / Positive Experience (+) → Willingness to Help Others (+) → Continuation of the Chain (+) → Number of People Helped (+) → Receiving Help  
Helping behavior reinforces itself through gratitude and continuation.

### **R5: Network Expansion Loop**

Participation (+) → Chain Length (+) → Chain Branching (+) → Number of Chains (+) → Total People Reached (+) → Social Visibility (+) → Participation  
The system grows as a network through visibility and branching.

### **R6: Chain–System Bridge Loop**

Successful Forward Transfers (+) → Successful Chains (+) → Visibility of Helping Outcomes (+) → Trust in the System (+) → Willingness to Participate (+) → Active Participants (+) → Successful Forward Transfers  
Bridges micro (chain) success with macro (system) trust and growth.

### **R7: Scaling of Helping Behavior Loop**

Number of Chains (+) → Number of People Helped (+) → Continuation of the Chain (+) → Chain Length (+) → Chain Branching (+) → Number of Chains  
Helping scales nonlinearly through chain expansion.

### **R8: Crowdfunding Scaling Loop**

Crowdfunding Participation (+) → Aggregated Initial Contribution (+) → Perceived Viability (+) → Willingness to Participate (+) → Crowdfunding Participation  
Small contributions aggregate → making chains feasible → attracting more contributors.

**R9: Reputation Reinforcement Loop**

Successful Chains (+) → Accumulated Success (+) → Reputation of the System (+) → Trust in the System (+) → Successful Chains

Reputation compounds over time and strengthens system-level trust.

**R10: Dignity-Based Participation Loop**

Receiving Help (+) → Role Transition Expectation (+) → Perceived Dignity of Receiving Help (+) → Willingness to Accept Help (+) → Receiving Help

Reducing stigma increases acceptance → enabling system participation.

**Balancing Loops****B1: Trust Erosion from Failure**

Broken / Late Transfers (+) → Reduced Trust in Chain (-) → Willingness to Participate (-) → Active Participants (-) → Successful Forward Transfers (-) → Broken / Late Transfers

Failures erode trust and reduce participation.

**B2: Chain Saturation Loop**

Number of Participants (+) → Remaining Potential Participants (-) → New Chain Formation (+) → Active Chains (+) → Number of Participants

Limited population constrains growth.

**B3: Resource Constraint Loop**

Contribution Amount (+) → Available Financial Resources (-) → Perceived Ability to Contribute (+) → Contribution Amount

Financial limits constrain participation and contributions.

**B4: Crowdfunding Gap-Closure Loop**

Need for Crowdfunding (+) → Crowdfunding Participation (+) → Aggregated Initial Contribution (+) → Gap Between Need and Contribution (-) → Need for Crowdfunding

Crowdfunding reduces funding gaps and stabilizes initiation.

**B5: Mismatch Between Need and Contribution**

Required Amount (+) → Gap Between Need and Contribution (+) → Chain Initiation Difficulty (+) → Successful Chain Starts (-) → Help Delivered (-) → Gap Between Need and Contribution

Mismatch prevents chains from starting.

**B6: Backward-Step Gap Adjustment Loop**

Gap Between Need and Contribution (+) → Backward-Step Activation (+) → Supplementary Upstream Support (+) → Gap Between Need and Contribution (-)

Backward-step mechanism compensates for insufficient initial funding.

## Implementation and Results

### Practical Implementation (2017–Present)

The Chain of Happiness model was first implemented informally in Iran in 2017 as a small-scale, manually coordinated system of chain-based charitable interactions. The implementation relied on direct communication between participants and was initially managed using spreadsheet tools to record transactions, participants, and chain progression. Over time, the system evolved into multiple active chains, each representing a sequence of helping interactions in which recipients were encouraged to become future contributors. Participants were responsible for selecting the next recipient based on personal knowledge and trust, reflecting the decentralized and trust-based nature of the model. As the number of participants increased and chains began to expand and branch, manual tracking became increasingly complex. This operational challenge motivated the development of a prototype web application to support scalability, improve transparency, and facilitate the management of chains, participants, and financial flows.

Furthermore, although the initial implementation of this system was conducted within a single country, its structure is not geographically constrained. Research on network theory shows that social systems often exhibit “small-world” properties, where individuals are connected through short paths despite large network sizes. This suggests that chain-based helping mechanisms have the potential to extend beyond local contexts and propagate across broader social networks.<sup>31 32</sup>

### Data Overview and Summary Statistics

From 2017 to the present, the system has supported 341 individuals across 19 active chains, spanning more than 18 provinces in Iran. These chains represent independent but structurally similar instances of the Chain of Happiness mechanism. The data reflects a range of financial support cases, addressing both immediate needs (e.g., rent, health-related expenses) and enabling investments (e.g., education, digital access). The diversity of support types highlights the flexibility of the model in responding to different forms of need.

In addition to basic chain progression, several structural mechanisms were utilized in practice:

- Crowdfunding
- Backward-step adjustments

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<sup>31</sup> Watts, D., Strogatz, S. Collective dynamics of ‘small-world’ networks. *Nature* **393**, 440–442 (1998). <https://doi.org/10.1038/30918>

<sup>32</sup> Milgram, S. (1967). The small world problem. *Psychology today*, 2(1), 60-67.

- Chain branching

These mechanisms played an important role in enabling continuity and scaling within the system.

### **Distribution of Support**

The distribution of support across categories is summarized in Table 1.

Table 1. Distribution of Support Across Categories

| Type of Support         | Number of Cases | Percentage (%) |
|-------------------------|-----------------|----------------|
| Smartphones             | 98              | 28.7%          |
| Debt Repayment          | 75              | 22.0%          |
| Other / Not Specified   | 57              | 16.7%          |
| University Tuition      | 48              | 14.1%          |
| Rent                    | 41              | 12.0%          |
| Laptops                 | 13              | 3.8%           |
| Health-Related Expenses | 9               | 2.6%           |
| Total                   | 341             | 100%           |

The results indicate that a significant portion of support was directed toward digital access (smartphones, laptops) and financial obligations (debt, rent, tuition). This suggests that the system not only addresses immediate needs but also supports participants in maintaining or improving their socioeconomic conditions.

### **Observations and Insights**

Several key insights emerged from the implementation of the chain of happiness in Iran:

- Increased Participation Through Structure

Structuring help as a chain appeared to increase participation, particularly among individuals who might otherwise perceive their contributions as too small to be meaningful. This supports the idea that perceived impact plays a critical role in participation decisions.

- Reduction in Psychological Barriers

Participants demonstrated a greater willingness to accept help when they were positioned as future contributors. This suggests that the role transition mechanism reduces self-esteem-related resistance and reframes receiving help as part of a participatory process rather than a one-sided transaction.

- Trust as a Central Driver

Successful chains contributed to increased trust in the system, which in turn supported continued participation and chain expansion. Trust was built primarily through visibility of outcomes and participant-driven interactions rather than formal institutional guarantees.

- Importance of Supporting Mechanisms

Crowdfunding and backward-step mechanisms were critical in overcoming initiation barriers, particularly in cases where the required support exceeded individual contribution capacity. These mechanisms enabled chains to form and continue under resource constraints.

- Emergence of Network Effects

As chains grew and branched, helping behavior began to exhibit network-like characteristics, where the impact of individual contributions extended beyond direct interactions. This reflects the potential for prosocial behavior to propagate through structured social systems.

- Operational Challenges and Need for Digital Infrastructure

The increasing complexity of tracking participants, chains, financial flows, and the essentiality transparency highlighted the need for a structured platform. The development of the web application addressed these challenges by enabling:

- ❖ improved traceability
- ❖ better visibility of chain progression
- ❖ scalability of interactions

## Prototype Web Application

### Purpose and Design of the Platform

To support the practical implementation and exploration of the Chain of Happiness model, a prototype web application was developed and deployed at **chainofhappiness.com**. The primary purpose of the platform is to operationalize the conceptual model by enabling users to participate in chain-based charitable interactions within a structured and trackable environment.

The platform is designed as a decentralized, user-driven system, where participants can initiate, continue, and monitor chains of helping behavior. Unlike traditional charity platforms that emphasize centralized allocation of resources, this system emphasizes participant agency, allowing users to directly contribute to and shape the progression of chains.

The platform translates key elements of the conceptual model into functional components, including chain formation, participant selection, and visibility of interactions. This enables the system to move from an abstract representation to a real-world experimental environment.

### **Key Features and Functionalities**

The prototype platform incorporates several core functionalities that directly reflect the structure of the model:

#### *User Authentication and Participation*

Each participant interacts with the system through a personal account, enabling tracking of participation and role transitions (donor → recipient → future contributor).

#### *Chain Creation and Management*

Users can initiate new chains by making an initial contribution or participating in a crowdfunding process. Each chain represents a sequence of helping interactions, forming the core structural unit of the system.

#### *Trust-Based Participant Selection*

A defining feature of the platform is that participants select the next recipient in the chain. This reflects the forward trust mechanism and decentralizes decision-making, allowing chains to evolve organically based on social relationships.

#### *Invitation and Linking Mechanism*

The system generates unique invitation links that allow a participant to invite the next individual into the chain. This mechanism ensures continuity while preserving the directed structure of the chain.

#### *Chain Tracking and Transparency*

Participants can observe the progression of chains, including past and current interactions. This increases visibility of outcomes, which is critical for building trust and reinforcing participation.

### **Supporting Mechanisms Integration**

The platform supports:

- ❖ Crowdfunding, enabling multiple contributors to initiate a chain
- ❖ Backward-step adjustments, allowing flexible role transitions
- ❖ Chain branching, enabling expansion into multiple chains

These features ensure that the platform reflects the full complexity of the conceptual model.

### **Role of the Platform in System Exploration**

Beyond its functional role, the web application can serve as a research and experimentation platform for studying the dynamics of chain-based charitable systems.

First, it enables the observation of feedback-driven behavior in practice, including how trust, participation, and continuation evolve over time. This is consistent with system dynamics approaches that emphasize the importance of studying systems through simulation and real-world experimentation.

Second, the platform allows for the analysis of reinforcing and balancing mechanisms identified in the CLD. For example:

- Reinforcing loops related to trust, reputation, and participation can be observed through repeated successful chains
- Balancing mechanisms, such as resource constraints or participation barriers, can be identified when chains fail to initiate or continue

Third, the platform provides a foundation for future data collection and model calibration, enabling the transition from conceptual modeling to empirical validation.

Finally, the platform plays an important role in communicating the concept to stakeholders. By making the system visible and interactive, it allows users to understand not only *what* the model is, but *how it behaves*. This is particularly important for practitioner-oriented work, where demonstrating applicability and usability is essential.

### **Discussion**

The Chain of Happiness explores a new way of thinking about charity, based on chains of generosity rather than isolated donations. Instead of one-directional giving, the model proposes an expandable structure in which individuals receive help and later extend help to others, forming visible and interconnected chains of support. From a systems perspective, the Chain of Happiness can be interpreted as a feedback-driven social system in which behavior emerges endogenously from the interaction of reinforcing and balancing loops. In particular, successful helping experiences strengthen trust and participation, which in turn enable further helping, creating reinforcing cycles that propagate prosocial behavior over time. In this way, charitable interactions are transformed from discrete events into a continuous, evolving process characterized by accumulation, feedback, and network expansion.

In parallel, several balancing mechanisms constrain system growth and introduce realism. Resource limitations restrict contribution capacity; mismatches between required and available support create initiation barriers; trust erosion can occur when chains break; and psychological resistance may reduce willingness to accept help. These balancing processes, often subject to delays, regulate system expansion and prevent unrealistic growth.

A key contribution of the model is the introduction of structural mechanisms—such as role transition, crowdfunding in every step, backward-step adjustment, and chain branching—that modify the relative strength of reinforcing and balancing loops. In particular, the role transition mechanism counteracts self-esteem-related resistance by increasing perceived dignity; while crowdfunding and backward-step mechanisms reduce the gap between need and contribution. As a result, the system exhibits bounded growth with propagation, where expansion is possible but mediated by structural constraints.

### **Implications for Participation and Trust**

The findings suggest that participation in charitable systems (apart from culture) is highly sensitive to system structure, particularly in how contributions are framed and how outcomes are experienced. By organizing help as a chain rather than a one-time transfer, the model increases the perceived impact of individual contributions, which can motivate participation even among individuals with limited resources. This addresses the hidden participation barrier identified in the literature.

Trust emerges as a central dynamic variable within the system. Rather than being externally imposed through institutional guarantees, trust is generated internally through repeated successful interactions, visibility of outcomes, and participant-driven decision-making. This aligns with research showing that trust is reinforced through transparency, social proof, and observed effectiveness.

The role transition from recipient to contributor plays a critical role in shaping both participation and acceptance of help. By redefining participants as active contributors within an ongoing process, the model reduces the psychological asymmetry between giving and receiving. This can mitigate self-esteem barriers and increase willingness to engage with the system. In system dynamics terms, this represents a shift from a dominant balancing loop (self-esteem resistance) toward a reinforcing loop based on dignity and reciprocity.

### **Comparison with Traditional Charity Models**

Compared to conventional charitable systems, the Chain of Happiness represents a structural shift from linear transfer models toward trust-based, decentralized, and participatory systems of charitable interaction. In traditional models, resources typically flow in a one-directional manner from donors to recipients through intermediary organizations. While these systems can be effective in resource allocation, they often lack mechanisms for continuation, participant feedback, and behavioral propagation. As a result, charitable interactions tend to remain transactional, and the system relies heavily on repeated external inputs rather than endogenous growth.

In contrast, the Chain of Happiness embeds continuation and participation within the system structure. Each act of help is not an endpoint but a link in an evolving chain, allowing the system to generate its own momentum through reinforcing feedback. Additionally, decision-making is decentralized, with participants directly influencing chain progression through trust-based selection.

Another key distinction lies in how recipients are positioned within the system. Traditional models often maintain a clear separation between donors and recipients, whereas the Chain of Happiness enables dynamic role transitions, allowing recipients to become future contributors by adding their chosen contribution to the value they received. This reduces dependency dynamics and promotes a more inclusive and participatory structure.

Overall, the comparison highlights that the primary innovation of the Chain of Happiness is not only in how resources are distributed, but in how system structure influences behavior over time. By redesigning the architecture of charitable interaction, the model enables new patterns of participation, trust formation, and social impact.

### **Limitations and Future Work**

#### **Limitations**

Despite its promising structure and initial implementation, the Chain of Happiness model has several limitations. First, the current implementation is based on a relatively small number of chains and participants, which limits the generalizability of the observed outcomes. Second, the system has primarily been managed informally and, until recently, relied on manual tracking,

which may introduce inconsistencies and limit data accuracy. Additionally, while the conceptual model is grounded in system dynamics principles, it has not yet been fully formalized into a quantitative simulation model. As a result, the relative strength of reinforcing and balancing loops, as well as long-term system behavior under different conditions, has not been tested.

Finally, an important limitation of the current implementation arises in high-inflation contexts. As chains progress over time, the real value of contributions may decline, creating a dynamic in which longer chains can inadvertently reduce the effective value of support delivered. This introduces a structural tension: while the system is designed to extend help across more participants, inflation can erode the value of each transfer. In practice, this may lead recipients to feel implicit pressure to increase the amount when continuing the chain in order to preserve its real value, potentially altering participation dynamics and deviating from the original intent of the system.

### **Opportunities for Model Development**

The Chain of Happiness presents several opportunities for further model development. A key next step is the formalization of the conceptual model into a quantitative system dynamics framework, enabling simulation of different scenarios and sensitivity analysis of key parameters such as participation rates, trust dynamics, and resource constraints.

In addition, the prototype web platform provides a foundation for systematic data collection, which can be used to calibrate and validate the model. This would allow for a more rigorous examination of how different structural mechanisms such as crowdfunding, backward-step adjustments, and chain branching affect system performance.

Another important opportunity lies in extending the model beyond financial contributions. The underlying structure of chain-based helping can be applied to other domains, including knowledge sharing, mentorship, and skill exchange. This opens the possibility of developing a broader “help ecosystem” in which different forms of support are integrated within a unified participatory system.

### **Future Research Directions**

Future research may explore several key directions. First, the dynamics of chain propagation can be studied in greater detail, including how chains grow, branch, or terminate under different conditions. Second, the model can be extended to analyze generosity as a network phenomenon,

examining how helping behavior spreads across interconnected participants. Third, the development of a fully quantitative model would enable the analysis of policy and design interventions. Fourth, future work may investigate community-based implementations, where chains operate within specific social or geographic contexts.

More broadly, the concept of chain-based interaction is not limited to financial support. Many social systems—such as education, mentorship, and knowledge dissemination—exhibit similar patterns of propagation and branching. For example, academia can be viewed as chains of knowledge transmission, where individuals both receive and contribute to the development of others. This perspective suggests that the Chain of Happiness may represent a more general framework for understanding how value, knowledge, and support spread within social systems.

Finally, this work aims to expand the reach of helping behavior by enabling broader participation and, ultimately, to evolve toward a decentralized marketplace of support. Under the concept of the *Chain of Happiness*, our team is developing a system in which individuals themselves become link-continuing and extending support to one another to build a more inclusive and **happier** future.

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