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Designing a Social Banking Model to Reduce Conflict of Financial Interest between Banks and Manufacturing Firms through Agent-Based Modeling Simulation

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ABSTRACT

Known as financial intermediaries, banks should direct capital toward different projects and industries in a bid to play a positive role in the sustainable development of society and fulfill their social responsibilities. However, the design frameworks of Iran's banking business models have failed to simultaneously provide financial interests for firms and banks. Despite the analysis of the agents affecting the liquidity problems of manufacturing firms, the literature has nearly neglected the conflict of financial interest between banks and those firms. Hence, this study aims to design and simulate a social banking model based on agent-based modeling to reduce the conflict of financial interest between banks and manufacturing firms. The social banking model was simulated in NetLogo for Resalat Qard–al-Hasan Bank of Iran, selected due to its leading role in providing inexpensive microfinance services to develop social entrepreneurship without expecting dividends. The proposed model pursues the cash flow and other important financial parameters related to firms, the bank, clients, and Iran's state during the 2017–2022 period. Tested, implemented, and analyzed in multiple simulation intervals, the results indicated changes in the parameters in response to developments based on social banking implementation.

Keywords: Conflict of financial interest, Social banking, Agent-based modeling simulation.

1. Introduction

The limited liquidity of firms in Iran's economy has always been an agent halting growth and development in the domestic economy. Firms ask for simplification to access banking facilities and a reduction in the financial costs of these facilities. At the same time, banks are unwilling to direct their resources toward manufacturing firms. Instead of directing the saved capital toward manufacturing sectors, banks direct them toward non-productive sectors and exacerbate the recession in manufacturing sectors due to high inflation and profitability of purchasing land, gold, and foreign currency (Crotty, 2008). The situation is worsened by the inability of firms to pay back banking facilities and a few other agents.

This claim is backed by the statistics published by the Central Bank of the Islamic Republic of Iran (Fig. 1 and Table 1).

According to Table 1 and Fig. 1, despite the explosive growth of liquidity in Iran, it has had no positive effect on economic variables, such as economic growth and production development. Due to Iran's economic structure, non-manufacturing activities are more productive than manufacturing activities in the short run. On the other hand, with the shock to the economy due to the spread of the corona virus, small manufacturing companies have suffered a severe liquidity crisis and their financial strength and credibility have been seriously damaged. (Mesgior et al., 2020)

The unsuitable conditions of macroeconomics and the high risk of borrowers increase the financing costs, leading to a challenging environment for SMEs (Wehinger, 2014).

Table 1: The ratio of liquidity to production (Ref.: Central Bank of Iran)

PERIOD	GDP	LIQUIDITY	LIQUIDITY-TO-GDP RATIO (%)
2012	686،828	357،070	51.9
2013	784،200	460،693	58.7
2014	1،054،945	639،550	60.6
2015	1،200،499	782،390	65.1
2016	1،179،503	1،017،280	86.2
2017	1،392،969	1،253،390	89.9
2018	1،618،790	1،529،980	94.5
2019	2،080،826	1،882،890	90.4
2020	2،673524	2،472،150	92.4
2021	3،842،086	3،476،170	90.4

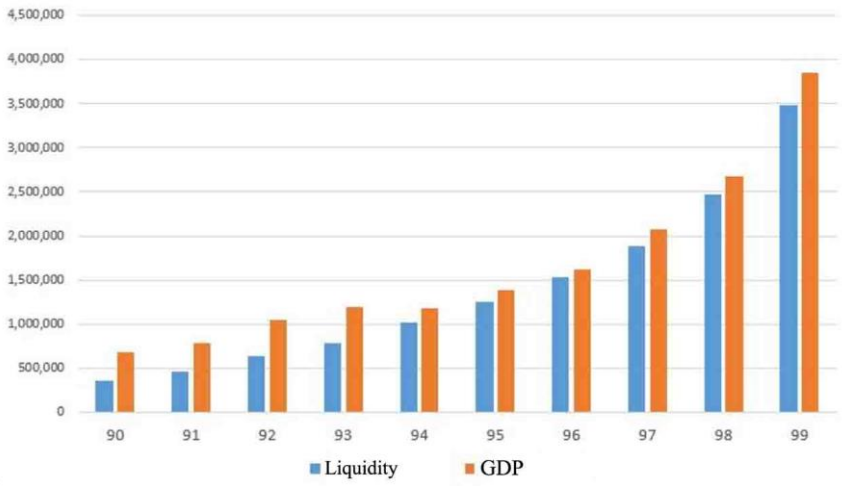

Figure 1: The ratio of liquidity to GDP (Ref.: Central Bank of Iran)

Although Iranian states have asked Iranian banks to provide vulnerable social classes with special credit schemes with low interest rates, these schemes have failed to solve the problems faced by these classes properly. Therefore, not only should banks seek to do their social responsibilities through social banking as an ethical guarantee tool, but they should also try to maximize the profit that might widen social gaps. Hence, they face a dichotomous mission and have financial conflict with micro-manufacturing firms (Smith, 2018), which should be solved.

This study formulates strategies for reducing the financial conflict between banks and micro-manufacturing firms by simulating social banking functions in a conflict-resolving model. The following questions are addressed in this study:

1) What is the financial conflict between banks and manufacturing firms?
2) How can social banking reduce the financial conflict between banks and manufacturing firms?

In addition to a systematic review of the literature, this paper identified the research variables through in-depth interviews with experts, surveys, and archived documents. The fuzzy Delphi technique was then employed to determine --- main variables and propose the initial model. Resalat Qard–al-Hasan Bank of Iran was selected as the research sample due to its leading role in social banking and providing nonprofitable micro facilities. The research model was designed considering variables and main agents. It was then simulated through agent-based modeling based on the real data of financial statements and opinions of experts.

Theoretical Foundations

Conflict of Financial Interest between Banks and Manufacturing Firms

There are evident conflicts of interest between the manufacturing and banking sectors in Iran like in many other countries. Sometimes, manufacturing firms publish misinformation to direct the loans granted by banks toward mercantilist activities; hence, banks adopt various methods to avoid providing financial services with good interest rates for manufacturing sectors. The insufficient financial resources, high interest rates on facilities, long processes of granting loans, heavy collateral, and short repayment periods have dissatisfied manufacturing firms. Furthermore, any distribution of facilities based on the maximization of banking profits will not necessarily maximize collective interests and can even adversely affect the whole society. This is more relevant to the economies lacking powerful manufacturing structures in which the intermediary sector acts as a serious rival of the manufacturing sector. In such economies, the service sector limits the manufacturing sector instead of completing the production/consumption process. Hence, allocating resources to manufacturing and non-manufacturing sectors will bear importance. As a result, banks should focus on the fulfilment of public interests and social responsibilities and profitability. (Cornee, 2019)

Despite formulating and adopting supportive policies by Iranian states, most of these problems are caused by the conflict of financial interest between banks and manufacturing sectors and the lack of certain mechanisms for tying the conflict between these two sectors. Hence, these temporary policies have not been successful. As a result of the conflict of financial interest between these two sectors, banks' attempts at maximizing their profits are not related to the attempts of manufacturing sectors to maximize their benefits. Even in collaborative contracts in which the interests of both sectors are common, the union of interests would not happen in the banking system because of formal collaboration. At the same time, banks widen the gap between the banking and the manufacturing sectors due to noncompliance with their social responsibilities. However, there should be a mechanism in which the interests of banks are tied with those of the manufacturing sector; therefore, banks would really comply with their social responsibilities and act as a partner of investors in production. and be a strong driver to achieve sustainable development in the economy. (Kumar and Prakash, 2018)

Social Banking

It is not always easy to define social banking, for there are very different approaches introduced as social banking. Their differences lie in various approaches concentrated on different aspects of social developments (Benedikter, 2011). Thus, different researchers have interpreted social banking differently. Table 2 presents various definitions of social banking provided by different authors:

Table 2. Different definitions of social banking given by various researchers

Author	Year	Definition
karimi	2022	Social banks or banks that have a social approach to their business model are trying to revive and implement social goals alongside economic goals. One of the important measures for the serious role of social banks in the economic and social system of Iran is the development of instruments to equip the resources of this type of banks. Most common financial instruments used in social banks include crowd funding, microfinance, and the social business model.
Rostami et al.	2018	The most obvious case of social entrepreneurship is microfinance. Islamic banks can be considered the institutes that adopt this approach. Although the concept of Islamic banking is older than that of social banking, it can be regarded as an early policy for forming this trend. In particular, the concept of Qardh al-Hassan (*i.e.*, benevolent lending), which exists in Islamic banks, is consistent with the values of social banks that mostly favor the poor and the low-income class of society.
Cornée & Szafarz	2014	Social banking is defined as a set of financial intermediaries considering noneconomic criteria (*e.g.*, social, ethical, environmental criteria).
Benedikter	2011	Social banking is a kind of reform in the financial system that is inclined toward a more powerful and more ethical approach and depends less on short-term financial interests. It adopts a social approach to meet the needs of the majority of the public.
Defourny	۲۰۰۱	Social banks, sometimes called ethical or alternative banks, are hybrid financial intermediaries that finance society-oriented projects and social firms.
Guene & Mayo	2001	Social banking is defined as a platform in which financial services providers are positively interested in social outcomes and the effects of their activities.

Different definitions of social banking consider specific aspects of this concept but cannot depict all of its types clearly. Given the research goals and objectives, this paper selects one of the most comprehensive definitions given by Rostami *et al.* (2018). By definition, social banking is a combination of social trends in social entrepreneurship and loans granted to manufacturing sectors through banking products and services.

Role of Social Banking in Conflict of Financial Interest between Banks and Manufacturing Firms

Numerous studies have been conducted on the conflict of financial interest between banks and manufacturing firms. Table 3 overviews these studies with regard to different approaches adopted by conventional banks and social banks to deal with the conflict of financial interest.

Table 3: An overview of studies on banking developments based on social banking indices

No.	Subject	Agent	Conventional Banking	Social Banking	Reference
1	Access to banking facilities	Firms	Access of large-scale firms to banking resources	Granting facilities to social sectors of high priorities	Martínez, *et al.* (2020)
2	Trust	Bank	Distrust in small-scale companies	Trust in small-scale companies	Ghisetti *et al.* (2017)
3	Trust	Client	Distrust in the banking system	Trust in the banking system	Isidore (2013)
4	Transparency	Banks	Lack of transparency	Transparency	Cornée (2019)
5	Participation	Banks/Firms	Lack of participation	Integrated participation	Paul *et al.* (2015)
6	Sustainability	Banks/Firms	The unsustainability of financed projects	Financing sustainable projects	Kraus & Buttenfeld (2019)
7	Validation	Bank	Unsuitable validation	Flexible credit scoring	Zhang *et al.* (2016)
8	Type of Facilities	Bank	Public macro-finance	Specialized microfinance	Hamidi *et al.* (2018)
9	Deferrals	Client	Deferred instalment	Reducing noncurrent demands for micro facilities	Weber (2012)
10	Turnover	Client/Firm/Bank	Centralized and unproportioned distribution of financial resources	Turnover and working capital in society	Moradi *et al.* (2019)
11	Productivity	Bank/Client/Firm	Limited productivity	High financial productivity	Dorflener & Yotz (2014)

No.	Subject	Agent	Conventional Banking	Social Banking	Reference
12	Main Purpose	Bank	Profit maximization	Empowering people	Paul *et al.* (2015)
13	Branch Management	Bank	Firm management and branch proliferation	Banks leaving firm management and directing resources toward manufacturing	Azizi (2016)
14	Ethics	Bank	Possibility of financial corruption and money-laundering	Returning to ethics and laws	Movahednoor *et al.* (2014)
15	Speculation	Bank/Client	Speculation	Value-oriented investment	Weber (2014)
16	Consumption of facilities	Client	Insufficient access of the public to banking facilities	Financial universality	Tort (2017)
17	Employment	Bank/Client	Unemployment	Creating businesses	Hobervechetz & Nichols (2012)
18	Environment	Bank	Lack of environmental protection	Environmental advantages	Clerk (2009)
19	Synergy	All	Lack of inter-organizational collaboration and lack of value-added	Coordination and cooperation between different levels of the chain value	Shuffle (2016)
20	Collaterals	Bank	Granting loans on heavy collaterals	Simplifying the grants of loans and taking collateral	Sanjoz et al. (2011)
21	Amounts of Facilities	Bank	Macro-finance	Microfinance	Hamidi et al. (2018)
22	Interest	Bank	High-rate interests	No interests	Telmesani & Matheus (2002)
23	Diversity of Products	Bank	Lack of innovation in services	Innovation-based diversity	Albadvi (2019)
24	Consumption of Facilities	Client/Firm	Use of facilities in the consumption sector	Use of facilities in the manufacturing sector	Kaya & Kadanalı (2021)
25	Place of Investment	Client/Firm/Bank	Nonproductive investment (*e.g.*, purchase of gold)	Productive investment (*e.g.*, civil projects)	James (2008)
26	Support	State	Exacerbating recession	Supporting manufacturing firms	Abili (2018)
27	Inflation	State	Creating liquidity	Controlling liquidity	Sadiq et al. (2022)
28	Support	Client	Not supporting vulnerable classes	Supporting vulnerable classes	srinivasan, & Thampy (2017)
29	Investment of Clients	Client	Investment of clients in nonproductive sectors	Investment in social banks	Bo¨lw (2016)

Although these studies analyzed banking developments based on social responsibility indices, none have addressed the role of social banking in reducing the conflict of financial interest between banks and manufacturing firms through a comprehensive model. Based on the above table, this study designed a model structure to simulate the data through agent-based modeling by using the financial information from the financial statements of banks.

Methodology

Agent-Based Modeling

Agent-based modeling is a new computational method for modeling dynamic and complicated systems in which humans play the major role. This modeling method creates an artificial population of individuals and allows for modeling two vital problems existing in most systems: diversity of people (*i.e.*, heterogeneity of population) and their interaction and mutual effects (Jager, 2000).

Each factor is known as a dependent, autonomous, and intelligent computation unit that can think, make decisions and have social interactions in such systems (Norvig & Russell, 2010).

Agent-based modeling is characterized by the following features, making it a popular modeling method (Gilbert, 2008).

1) It is impossible to model dynamic, complicated interactions between the system elements through other methods; however, it is easily feasible in agent-based modeling.
2) It is possible to create heterogeneous agents with different characteristics in large numbers through agent-based modeling; however, other methods face serious limitations.
3) It is much easier to use complicated learning and reasoning mechanisms for agents in agent-based modeling than in other methods.

None of the previous studies addressed using social banking in reducing the conflict of financial interest between banks and firms; therefore, this paper simulates the role of social banking in solving this conflict through agent-based modeling. To this end, the influential factors of the model were first identified. Resalat Qard–al-Hasan Bank of Iran was selected due to its leading role in providing inexpensive microfinance services for developing social entrepreneurship without expecting dividends. The financial statements data was then collected from the bank, and the simulation was implemented in NetLogo. Coding steps were then performed to introduce agents and their mutual interactions. Finally, virtual tests were conducted with respect to the real data after validating the model and confirming its reliability. The results were then explained.

According to the interviews with experts, it was assumed that social banking functions had the following features differing from conventional banks.

1) In the conventional model, banks invest in nonproductive sectors; however, in the social banking model, investments are made in productive sectors with micro and household facilities granted for social entrepreneurship.
2) In the conventional model, banks increase their branches and prefer to manage firms. However, bank branches are deleted in the social banking model, and resources are spent on granting further facilities to the people in need.
3) In the conventional model, the rate of banking deferrals is high; however, in the social banking model, clients and firms are committed to paying installments on time; thus, the rate of deferrals is very low.
4) Clients spend their savings and facilities on purchasing nonproductive assets in the conventional model. However, in the social banking model, clients spend their savings and facilities on investments in social entrepreneurship projects.
5) The Central Bank provides slight support for banks and the manufacturing sector in the conventional model. However, the Central Bank provides further support for entrepreneurship projects and social banks in the social banking model.
6) In the conventional model, manufacturing firms face a lack of liquidity. However, firms are financed by social banks in the social banking model.
7) In the conventional model, manufacturing firms produce low-quality products; however, firms produce further products with higher quality in the social banking model.

In the agent-based modeling simulation, the data of financial statements and reports of Resalat Qard–al-Hasan Bank of Iran were used along with relevant economic information to simulate the model in the 2017–2022 period. The data were extracted from https://www.codal.ir/ and https://www.amar.org.ir/ to implement the 2017–2022 period simulation in NetLogo. The statistical population included all Iranian banks and manufacturing firms. Given the transparency and availability of financial statements and reports and the statistics of banking variables, Resalat Qard–al-Hasan Bank of Iran was selected as the research sample due to its leading role in providing social banking services such as micro-employment and household employment, and social entrepreneurship.

4- Data Analysis

The first step in the agent-based modeling methodology is to "identify" the phenomenon to be perceived clearly. Hence, it is necessary to analyze a phenomenon called the industry of banking services or the method of interacting with manufacturing firms. Figure 2 demonstrates the simulation parameters and agents' interactions within the banking supply chain framework.

The second step is to "define a field" in the agent-based modeling simulation. To this end, researchers must point out all the hypotheses used in the model, beginning with a simple model that is easy to implement. Iran's banking industry and manufacturing firms were defined as the research field by considering the data collected from the annual reports and financial statements published at https://www.codal.ir/. The behaviors of the main functional model indices, *i.e.*, "manufacturing" and "other important parameters", were simulated for the 2017–2022 period. Resalat Qard–al-Hasan Bank of Iran was selected and simulated because it is a social bank interacting with micro household firms through social entrepreneurship.

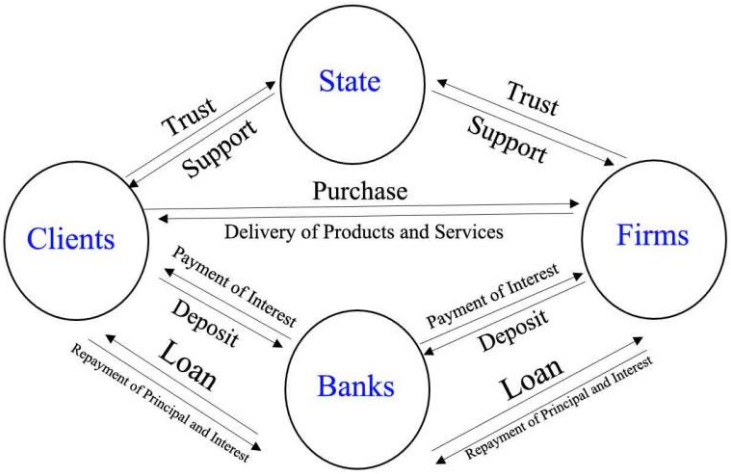

Figure 2: The research model framework for simulation (researcher-made)

The third step is to determine the "simulation scheme". In this step, the types of objects are defined in the simulation. Usually, there are two types of objects called "agents" and "environment" in simulations. The characteristics of all objects should be then determined. The agent-based modeling simulation was implemented in NetLogo Ver.5.3.1 considering the identified agents and coding their relationships. Since the agents are the "decision-making members" of banks and manufacturing firms in the agent-based modeling simulation, four agents were identified as the main players with the highest levels of dynamism in the manufacturing environment (Table 3):

Table 3: Interactions of important agents and variables in the simulation

No.	Agent	Variables/Interaction with Banking Agent
1	Bank	• The number of deferred cases • The number of deferred demands • The costs of managing branches • The number of verified flexible loan cases • The number of conventional loan cases • The ratio of capital sufficiency • The number of entrepreneurship loans • The number of conventional loan cases • The amounts of entrepreneurship loans • The quantities of conventional loans • Resources • Investment in the productive sector • Investment in the nonproductive sector
2	Clients	• The number of empowered individuals • The number of self-employment banking facilities • The number of loans granted without guarantors • The number of loans granted to the needy
3	State	• Employment • Inflation • Economic development
4	Firms	• The finance provided for entrepreneurship projects • The production rate of firms

To explain the attributes of agents, it can be argued that the attributes remained intact in all simulation steps and maintained the general nature of an agent (*e.g.*, the gender attribute). In this study, such attributes are introduced as the financial indices:

- The attribute of the bank: attraction of clients and profitability
- The attribute of firms: acquiring facilities and manufacturing
- The attribute of clients: acquiring facilities and welfare
- The attribute of the state: supporting role

Figure 3 shows a schematic view of the most important financial data collected from the financial statements of Resalat Qard–al-Hasan Bank of Iran for the model simulation.

The fourth step is to determine the "scheme of interaction" between objects for simulation. In this step, all possible actions of each agent are determined along with the potential principles. All input and output variables were coded in NetLogo according to statistical reports and financial statements of Resalat Qard–al-Hasan Bank of Iran and relevant economic reports Based on the indicators identified from the research literature. All the variables were selected based on the indicators identified from the research literature based on the content analysis method and were confirmed by 10 experts in the field of banking and economics in Iran. (Table 4)

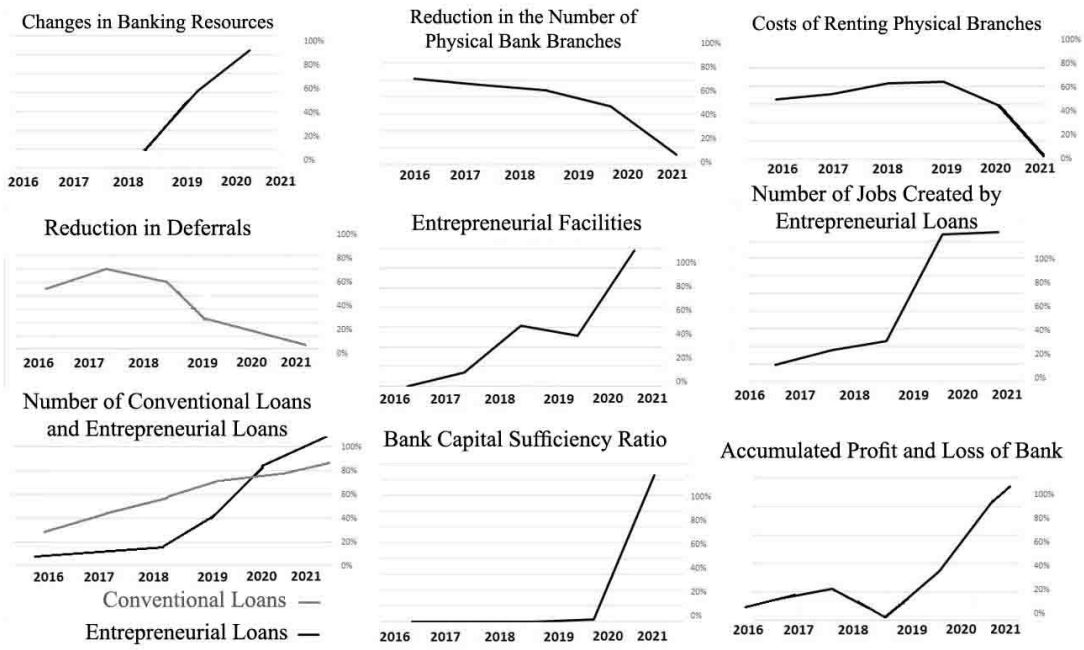

Figure 3: A schematic view of the most important financial data for the model simulation in NetLogo

Table 4: The scheme of interactions between agents

No.	Agent	Decision on Business Banking Policies	Decision on Social Banking Policies
1	Bank	Investing in nonproductive activities Granting loans with heavy collateral Purchasing estates for branches Macro financing Macro deposits High-rate interests	Investing in productive activities Simplifying loans and collaterals Deleting branches through digital banking Microfinance Micro deposits No interests
2	Clients	Paying installments late Using facilities in the consumption sector Nonproductive investment (*e.g.*, purchase of gold) Purchasing foreign products	Paying installments on time Using facilities in the manufacturing sector Productive investment (*e.g.*, investment in civil projects) Purchasing Iranian products

No.	Agent	Decision on Business Banking Policies	Decision on Social Banking Policies
3	State	Borrowing from banks Exacerbating recession Creating liquidity Not supporting the vulnerable class	Supporting banks Supporting the manufacturing firms Controlling liquidity Supporting the vulnerable class
4	Firms	Investing in the nonproductive sector Using facilities in the consumption sector Producing low-quality Iranian products	Investing in the manufacturing sector Using facilities in manufacturing firms Producing premium Iranian products

The fifth step is "model validation". There are two model validation steps for agent-based modeling simulation: internal validation and external validation. Internal validation consists of two processes: conceptual reliability and explanation analysis. Model reliability indicates whether the model suits the research purpose. The validation process generally aims at eliminating the problems with the model. The opinions of banking experts were collected through in-person interviews to analyze the conceptual reliability of the model. They were confirmed after necessary modifications. According to two agent-based modeling simulation experts (based on judgmental sampling), the model explanation process was confirmed. The "accuracy" of the model was tested through external validation. The model accuracy indicates to what extent the model can reflect reality. For external validation, the values obtained from the model should be compared with those obtained from manual calculations for all parameters in each interval. The acceptable deviation of values was set up to 0.2. Coding and modeling should be revised if the results deviate from 0.2. Table 5 reports the external validation results indicating validation of the model.

The final step in the agent-based modeling simulation is a "virtual test" to develop the hypotheses related to discovering the banking system dynamism. Therefore, it is first essential to identify the main variables or parameters assumed to be the best variables affecting the necessary features. The ranges of primary research variables should then be defined as the slider, and the secondary variables can be defined as random numbers based on real-world data. The multiple simulation periods should then be tested and implemented for each set, and the simulation results should then be analyzed (Fig. 5).

Table 5: The results of validating the simulation model

Year	Parameter	Simulated Value	Calculated Value
2018	Accumulated interest of bank (million rials)	42,270,000,000	42,386,000,000
	Number of customers	4,570,000	4,600,000
2019	Accumulated interest of bank (million rials)	(457,920,000,000)	(458,708,000,000)
	Number of customers	5,790,000	5,900,000
2020	Accumulated interest of bank (million rials)	362,200,000	361,925,000,000
	Number of customers	6,980,000	7,020,000
2021	Accumulated interest of bank (million rials)	1,613,200,000,000	1,612,582,000,000
	Number of customers	7,890,000	7,800,000

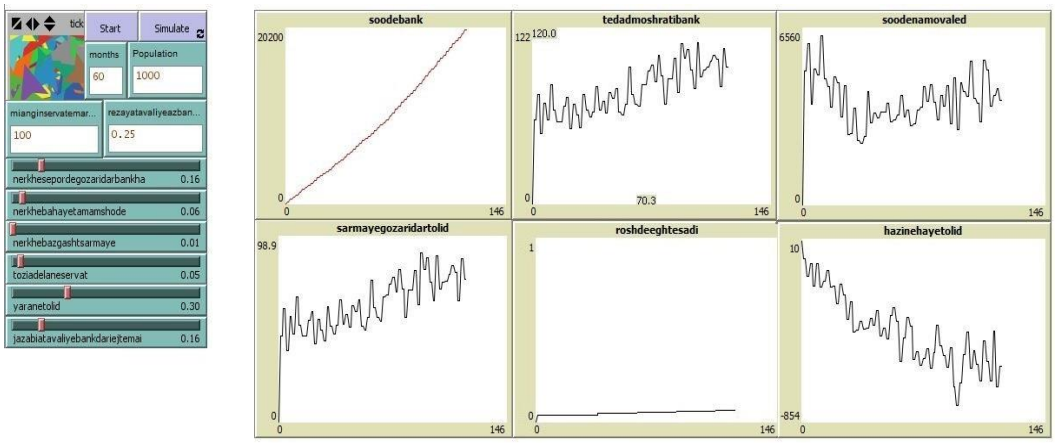

Figure 4: A schematic view of the simulation environment and the virtual test in NetLogo

5- Discussion and Conclusion

This study analyzed the roles of the social banking agents in reducing the conflict of financial interest between banks and firms by employing the agent-based modeling simulation approach. According to statistical reports and financial statements, Resalat Qard–al-Hasan Bank of Iran does not receive interests and fulfills social responsibilities for the development of microbusinesses. The social banking behavior was analyzed by simulating the important agents of the model identified as the accumulated interest of the bank, the investments made by the bank in microbusiness development, the employment rate, the number of clients, the profits obtained from productive investment, and the number of conventional and entrepreneurial loans granted in the 2017–2022 period. A regular process was followed up to address the research questions. According to the research objectives and given the research process, the findings can be analyzed in two areas:

1) What is the financial conflict between banks and micro-manufacturing firms?
2) How can social banking reduce the financial conflict between banks and manufacturing firms?

According to the literature, an initial list was extracted to indicate the components of conflict of financial interest between banks and manufacturing firms. The next step was to identify the effects of developing social banking on reducing this conflict. Table 3 demonstrates the financial indices of this study. The model agents were identified, and their relationships were then drawn based on the opinions of the banking experts and simulation results (Fig. 2).

According to Zhang et *al.* (۲۰۱۶) on the fundamental architecture of the service model and the opinions of experts, it can be stated that the structural model of banking services includes accepting deposits and making deposits as well as granting facilities and providing financial intermediary to the other model members. Therefore, the bank, clients, firms, and state were identified as the integrator of services, end users, providers of services or products, and providers of economic development context, respectively. Hence, the identified agents were integrated based on the structural model proposed by Zhang *et al.*

The simulation outputs for some important items can be observed for the model indicating the effect of social banking on reducing conflict of financial interest between banks and manufacturing firms.

According to Figs. 5 to 10, developing banking activities and moving toward social banking indices, such as increasing the number of micro loans with no interests, reducing collaterals, building social trust, decreasing investment in the nonproductive sector, reducing the number of physical branches, and digitalizing banking processes, will increase the number of clients in the long run. Consequently, more deposits will be placed in the bank, and the banking profitability will finally increase and become more stable. At the same time, hefty costs of managing branches would reduce when investment decreases in the nonproductive sector by not freezing banking resources in estates and branches. Hence, the bank will make more investments in productive sectors such as

purchasing securities, investing in the capital market, and granting facilities to the productive sectors of the economy such as micro and household firms. The lack of liquidity will significantly decrease in the manufacturing sector by financing social entrepreneurship schemes, microbusinesses, and household businesses. Thus, production will increase, and the scarcity of products and inflation will reduce.

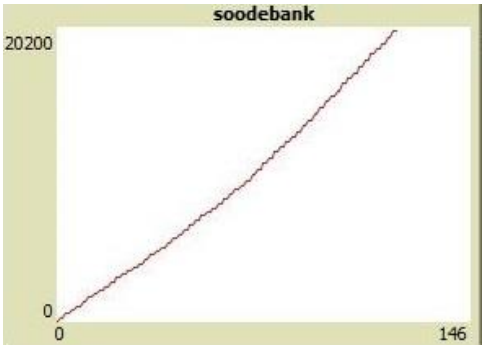

Figure 5: The effect of developing social banking on increasing sustainable banking profitability

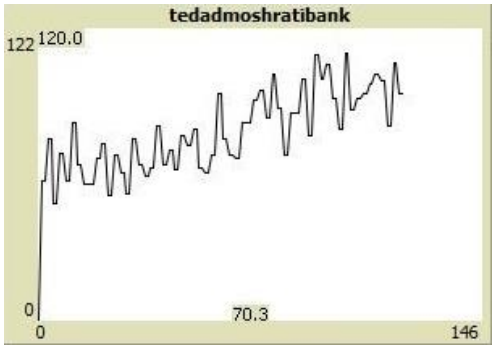

Figure 6: The effect of developing social banking on increasing the number of real and legal clients of banking

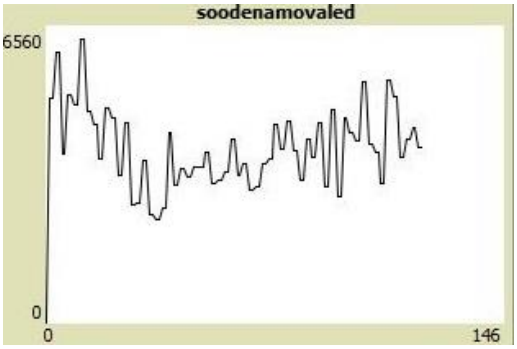

Figure 7: The effect of developing social banking on increasing the profit obtained from nonproductive activities

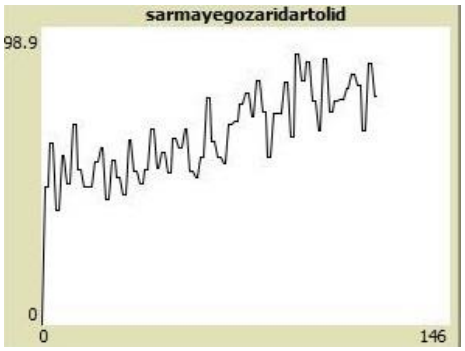

Figure 8: The effect of developing social banking on investment in manufacturing

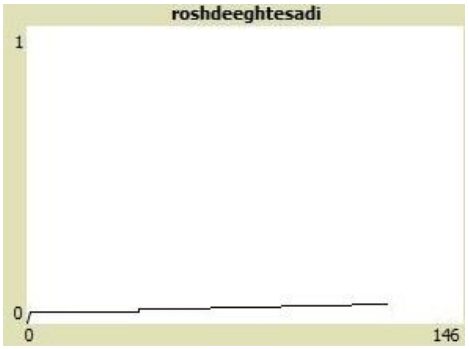

Figure 9: The effect of developing social banking on economic growth

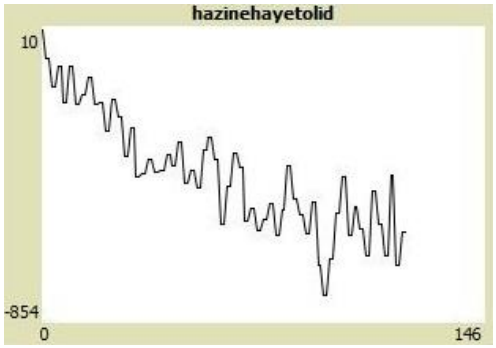

Figure 10: The effect of developing social banking on reducing the manufacturing costs of firms

Therefore, one of the main challenges of the banking system, which has caused the diversion of resources and liquidity over the past years, such as the expansion of the informal sector in the economy, unfair income distribution and the weakening of the production sector, should be reduced. However, these will not be the only companies that benefit from the development of social banking in the country's banking system. Because in the course of directing liquidity towards

and developing self-employment and home businesses, banks have succeeded in determining the identity and branding of their social commitment (Bigdali, 2021) and through this, the satisfaction and loyalty of bank customers has increased and more investment in banks. It has been done and along with the growth of resources and reduction of arrears, the profitability of the bank will increase.

The research innovation can be analyzed from two perspectives. This is the first study identified the roles of agents in reducing the conflict of financial interest between banks and firms through social banking by considering their interactions in agent-based modeling. According to the literature, no studies have ever identified and analyzed the interactions of these agents. Despite numerous studies on social banking, no studies have been found with respect to social banking simulation in reducing the abovementioned conflict. Hence, another innovation of this study is to propose a simulated agent-based model of social banking that can be used in the banking system.

6- Suggestions and Limitations

This study has some weaknesses and limitations, which can naturally reduce the quality of results and suggestions. For instance, the behaviors of other banks were not simulated, and only the financial data of Resalat Qard–al-Hasan Bank of Iran were considered. Hence, it is recommended that a study be conducted to simulate some top banks in social banking. Moreover, some other effective variables and agents can be included in the proposed model. Due to complexity and the lack of accurate information, the available structures were used. Thus, future studies must identify other effective variables and evaluate their effects on the conflict of financial interest between banks and manufacturing firms. It is also possible to identify and simulate the causal relationships between variables through the system dynamic approach by analyzing the important social banking variables.

This is among the first studies to analyze the role of social banking in reducing the conflict of financial interest between banks and manufacturing firms. Therefore, it can be considered the starting point for introducing social banking studies into the development of social entrepreneurship. Transforming this starting point to a scientific movement would require other supplementary studies.

According to the findings, if banks move toward social banking and fulfil their social responsibilities, the conflict of financial interest between banks and manufacturing firms will be reduced by providing financial interest for clients, banks, and firms. In other words, developing social banking in Iran's banking system will release the banks from managing firms, and massive banking resources will be directed toward production and support for microbusinesses. This process will help create jobs, reduce poverty, and create sustainable value. As a result, production will improve, and investments in firms will increase. The banking system will also enhance financially. With the fair and proportionate distribution of banking facilities, the noncurrent demands for micro-facilities will reduce; therefore, banks, firms, and people will benefit from developing social banking.

References

* Abili, I. D. (2018). Development finance interventions of the Central Bank of Nigeria in agriculture. International Journal of Advanced Studies in Economics and Public Sector Management
* Azizi S. Conceptual Mapping of Retail Banking: A Correspondence Analysis Approach. Journal of New Research in Decision-Making. 2016;1(3
* Albadvi, A. Implement an open innovation approach in innovation development Challenges, Considerations and Solutions; The banking and payment industries case study. Management Research in Iran, 2019. 23(2): p. 200-225.
* Benedikter, R. (2011). Social banking and social finance. In Social banking and social finance (pp. 1-128).
* Bigdeli, A., Abdolvand, M. A., Heidarzadeh, K., & Khoun Siavash, M. (2021). CSR Branding Model in Iran Banking Industry based on Structural Equation Modeling with the Focus on Brand Social Identity. Iranian journal of management sciences, 16(61), 85-115
* Bo¨lw. (2016). Umsatz mit Bio-Lebensmitteln in Deutschland in den Jahren 2000 bis 2016 (in Milliarden Euro). https://de.statista.com/statistik/daten/studie/4109/umfrage/bio-lebensmittelumsatz-zeitreihe/. Accessed 18 Feb 2017.

* Clerck, F. D. (2009). Ethical banking. In *Ethical prospects* (pp. 209-227). Springer, Dordrecht.
* Cornée, S. (2019). The relevance of soft information for predicting small business credit default: Evidence from a social bank. *Journal of Small Business Management*, *57*(3), 699-719
* Crotty, J. (2008). "Structural Flaws in Deregulated Financial Markets Caused the Current Crisis: A Critical Evaluation of the New Financial Architecture", PERI.
* Cornée, S., & Szafarz, A. (2014). Vive la Différence: Social Banks and Reciprocity in the Credit Market. Journal of Business Ethics, 125(3), 361- 380
* Defourny, J. (2001). From Third Sector to Social enterprise. The Emergence of Social Enterprise
* Dorfleitner, G., & Utz, S. (2014). Profiling German-speaking socially responsible investors. Qualitative Research in Financial Markets, 6(2), 118–156.

  Ghisetti, C., Mancinelli, S., Mazzanti, M., & Zoli, M. (2017). Financial barriers and environmental innovations: evidence from EU manufacturing firms. Climate Policy, 17(sup1), S131-S147
* Gilbert N. (2008). Agent-Based Models. Sage Publication.
* Guene, C., & Mayo, E. (Eds.). (2001). Banking and Social Cohesion: Alternative Responses to a Global Market. Jon Carpenter Publishing.
* Hamidi, M.L. and A.C. Worthington, Islamic Social Banking: The Way Forward Perbankan Sosial Islam: Langkah Kehadapan? Jurnal Ekonomi Malaysia, 2018. 52(1): p. 195-20
* Huybrechts, B. and A. Nicholls, Social entrepreneurship: definitions, drivers and challenges, in Social entrepreneurship and social business. 2012, Springer. p. 31-48.
* Isidore, C. (2013). Bank of America in $10 billion settlement with Fannie Mae. CNN Money
* Jager W.(2000) Modeling consumer behavior. Ph.D. thesis. Groningen University. Karimi, H. (2022). A sustainable financial model for the social banking business. Financial Research Journal

  Kaya, E., & Kadanalı, E. (2021). The nexus between agricultural production and agricultural loans for banking sector groups in The Central Bank of Iran (CBI)- https://www.cbi.ir/
* Krause, K., & Battenfeld, D. (2019). Coming out of the niche? Social banking in Germany: An empirical analysis of consumer characteristics and market size. *Journal of business ethics*, *155*(3), 889-911.

  Kumar, K., & Prakash, A. (2018). Developing a framework for assessing sustainable banking performance of the Indian banking sector. Social Responsibility Journal, 15(5), 689-709
* Martínez-Campillo, A., Wijesiri, M., & Wanke, P. (2020). Evaluating the double bottom-line of social banking in an emerging country: How efficient are public banks in supporting priority and non-priority sectors in India?. Journal of business ethics, 162(2), 399-420.

  McGeever, N., McQuinn, J., & Myers, S. (2020). SME liquidity needs during the COVID-19 shock (No. 2/FS/20). Central Bank of Ireland

  Moradi, D., Sh, M., & Kh, T. (2019). The Effect of Realization of Social Development Banking Model on the Development and Economic Development of the Country with Emphasis on Banking Network. *Journal of Iranian Social Development Studies*, *11*(42), 121-414

  Mohd Nor, S., Abdul Rahim, R., & Che Senik, Z. (2016). The potentials of internalising social banking among the Malaysian Islamic banks. *Environment, Development and Sustainability*, *18*(2), 347-37
* Norvig P. and Russell S. J.(2010). Artificial Intelligence: A Modern Approach. Prentice Hall Paulet, E., Parnaudeau, M., & Relano, F. (2015). Banking with ethics: Strategic moves and structural changes of the banking industry in the aftermath of the subprime mortgage crisis. *Journal of Business Ethics*, *131*(1), 199-207
* Rostami, Mohammadreza, Ahmad Nabizade, and Zahra Shahi. "Factors affecting credit risk of commercial banks of Iran with emphasis on banking and macroeconomic specific factors." Journal of Asset Management and Financing 6.4 (2018): 79-92

  San-Jose, L., Retolaza, J. L., & Gutierrez-Goiria, J. (2011). Are ethical banks different? A comparative analysis using the radical affinity index. Journal of business ethics, 100(1), 151-173

  Sadiq, M., Alajlani, S., Hussain, M. S., Ahmad, R., Bashir, F., & Chupradit, S. (2022). Impact of credit, liquidity, and systematic risk on financial

structure: comparative investigation from sustainable production. Environmental Science and Pollution Research, 29(14), 20963-20975

* Schueffel, P. Taming the beast: a scientific definition of fintech. Available at SSRN 3097312, 2016.
* Smith, J. (2018). Efficiency and ethically responsible management. Journal of Business Ethics, 150(3), 603–618
* Thorat, A., Vanneman, R., Desai, S., & Dubey, A. (2017). Escaping and falling into poverty in India today. World Development, 93, 413–426.
* srinivasan, A., & Thampy, A. (2017). The effect of relationships with government-owned banks on cash flow constraints: Evidence from India. *Journal of Corporate Finance*, *46*, 361-373
* Tlemsani, I. & R. Matthews. (2002). Ethical Banking: The Islamic View.
* James, B. A. (2008). What Are the Mechanisms Linking Financial Development and Economic Growth in Malaysia; Economic Modeling, 25(1): 38-53
* Weber, O., Diaz, M., & Schwegler, R. (2014). Corporate social responsibility of the financial sector – Strengths, weaknesses and the impact on sustainable development. Sustainable Development, 22(5), 321–335
* Weber, O. and Y. Duan, Social finance and banking. Socially responsible finance and investing: Financial institutions, corporations, investors, and activists, 2012: p. 161-180.
* Wehinger, G. (2014). SMEs and the credit crunch: Current financing difficulties, policy measures and a review of literature. OECD Journal: Financial Market Trends, 2013(2), 115-148.
* Zhang, Y. et al., Research on credit scoring by fusing social media information in online peer-to-peer lending. Procedia Computer Science, ٢٠١٦. ٩١: p. ١٦٨١٧٤.