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Analysis of the state of social resilience among different socio-demographic groups during the COVID-19 pandemic

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ARTICLE INFO

Keywords:
Social resilience
COVID-19
Socio-demographic groups
Tehran
Iran

ABSTRACT

This study examines social resilience during the COVID-19 pandemic by analyzing the state of selected indicators among different Socio-Demographic Groups (SDGs) in Tehran, the capital city of Iran. Data were collected via a questionnaire survey. The survey was administered between January and April 2021 and the total number of properly completed questionnaires was 786. The findings show that, first, almost all of the Social Resilience Indicators (SRIs) have experienced negative and unfavorable changes during the pandemic in Tehran. This is remarkably the case for social coping style, social capital, social relationship, and social adaptability. Second, no significant difference in the state of SRIs was observed among different SDGs, except for the age group of 17–20, educational groups with diploma and post-diploma education, and the educational occupational group. Third, testing the impact of the state of SRIs on SDGs indicated a positive and statistically significant impact in four paths, namely SRIs with gender, SRIs with age, SRIs with Job, and SRIs with education. Our results can shed more light on SRIs that can be used to measure the state of social resilience in communities affected by the pandemic, like Tehran. They can also provide insights into actions that should be taken by planners and policy makers to enhance resilience in other communities with similar conditions.

1. Introduction

“Since early 2020, the COVID-19 pandemic is known as the most crucial global health catastrophe and the greatest challenge that humanity faced since the Second World War” [1]; p.3). According to the COVID-19 Dashboard of the Center for Systems Science and Engineering (CSSE) of Johns Hopkins University (JHU),1 as of July 18, 2021 about 190 million confirmed cases and four million deaths have been reported globally. In the meantime, according to the World Health Organization (WHO), the highest number of confirmed cases and deaths are in the United States, India, and Brazil, and the virus, at a frantic pace, is advancing in other parts of the world.2 Clearly, the virus has crippling effects on all features of global development, more specifically, economic and social aspects [2,3].

Since COVID-19 was announced a pandemic by the WHO in early 2020, there has been a wave of global concerns and discomposure, and the high rate of infection has had a traumatic effect on the quality of life of many communities across the globe. The decisions by central and local governments to impose mobility restrictions and self-isolation policies has had major socio-economic implications and has caused tensions in many communities [4]. Impacts of the pandemic have, particularly, been significant across cites and urban communities [5]. Such dire circumstances bring the concept of resilience back to the fore. In particular, social resilience is critical for effective community response to challenges caused by COVID-19.

Resilience is a normative concept for which no universal definition exists yet [6]. It has been defined differently in different fields. For instance, in the engineering field resilience is mainly associated with characteristics such as resistance and rapid recovery. However, ecologists also emphasize other characteristics and abilities such as

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1 https://coronavirus.jhu.edu/map.html.
2 https://covid19.who.int/.

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https://doi.org/10.1016/j.ijdrr.2021.102514
Received 13 May 2021; Received in revised form 19 July 2021; Accepted 15 August 2021
Available online 16 August 2021
2212-4209/© 2021 Published by Elsevier Ltd.
transformation and adaptation to change [7]. This is also the case for social resilience. However, some specific definitions for social resilience have been provided in the literature. For instance, Saja et al. have defined social resilience as “the ability of social entities and social mechanisms to effectively anticipate, mitigate and cope with disasters and implement recovery activities that minimize social disruptions and reduce the impact of future disasters” [8]; p.3. Other works on social resilience highlight the importance of social stimulation and cooperative action capability of people during threats [9]. Furthermore, different indicators of social resilience have been discussed in the literature that will be further elaborated on in the literature review section (Section 2).

Beyond structural and physical aspects, all threats and also risk factors initially affect social contexts. In the face of ‘harmful consequences’ or ‘expected losses’, achieving improvements in resilience capacity is considered as the ultimate goal of all communities [10]. This status, notably, originates from a dynamic identity observed in resilience – neither as a state in ecology nor as a trait in psychology – and also capabilities or capacities of a community to survive problematic conditions and maintain its functionality [6,8]. Another concept related to social resilience, adaptive capacity, can be interpreted as a human capacity level/threshold to prognosticate, resist, manage, adapt, and recover from crises [11]. Certainly, in the face of major adverse events such as the recent pandemic, and when the society is completely gripped by challenges and anxieties, having a participatory spirit and social cohesion can be very important in reducing undesirable effects. Consequently, social resilience during a pandemic crisis can contribute to maintaining functioning capacity of communities and help avoid major social disruptions.

Despite this, social resilience has received less attention in coronavirus studies and more attention has been paid to other effects and consequences of the virus. To fill this gap, this study tries to assess the state of SRIs during the COVID-19 pandemic among different SDGs in Tehran, the capital city of Iran. Like many other countries, COVID-19 has had devastating effects on the social and economic sectors of Iran. According to the CSSE, as of July 18, 2021, the number of confirmed cases of COVID-19 was over 3.5 million and the death toll was over 87,000. In the meantime, based on COVID-19 related-reports that are presented by the Ministry of Health of Iran, an increasing trend is seen daily about the number of cases (close to 20,000) and death (close to 400) from late March and early April 2021 and the fifth wave of the pandemic has started in the country. In this regard, Tehran (Fig. 1) as the largest city in Iran (with over 8,600,000 million people), has been grappling with COVID-19 since mid-February 2020, and usually, the highest number of cases and deaths are reported from this city. It can be said that, due to the concentration of many political, economic, and social activities of the country in this metropolis, and its major influence on the country’s economic and social mobility and transformations, the COVID-related measures and mobility restrictions have led to major social issues and disruptions.

Given the importance of social resilience to deal with adverse events like the recent pandemic, this study seeks to explore the state of SRIs in Tehran during the pandemic. It will also examine if there are differences among different socio-demographic groups in terms of their state of social resilience. This study highlights the importance of social resilience to deal with COVID-19 pandemic, and the results may provide useful insights to policymakers and planners and assist them to take useful strategies to enhance resilience against future adverse events.

2. Literature review

Social resilience has a multidimensional nature and includes both structural and cognitive qualities [13]. All presented definitions related to social resilience are linked to “social entities – be they individuals, organizations or communities – and their abilities or capacities to tolerate, absorb, cope with and adjust to environmental and social threats of various kinds” [14]; p.8. Obrist et al. have presented a multi-dimensional definition for social resilience retrieved from a ‘Multi-layered social resilience framework’ [6]. According to this definition, social resilience can be achieved if a society and social actors features three capacities and characteristics (Fig. 2). These are namely, reactive capacity, proactive capacity, and positive outcomes.

Alongside the definitions, existing theoretical literature on social resilience has had different interpretations of it. Some researchers have viewed social resilience from the perspective of complex adaptive systems [15,16], while others have considered it with a view to social & health sciences [17,18]. As such, according to the literature, various indicators and identities exist for illustrating social resilience in disasters and hazards context.

During the crisis time, social resilience depends on a community’s social situation in both pre-disaster and post-disaster stages and the quality of the community response to the crisis [19,20]. To determine and measure social resilience, indicators are needed to represent each stage of a disaster [21]. Accordingly, in existing literature reliable indicators to measure social resilience have been identified and determined. Some studies have emphasized a few specific indicators and some others have introduced multiple SRIs related to multiple dimensions and categories. For instance, some specific SRIs, such as social education and skills and sense of community [22,23], social trust, relationship, leadership, and social capital, and adaptability [6,21,24] have been identified as essential indicators of social resilience. Khalili et al. [21], indicated that to better respond to the crisis and measure social resilience in both pre-disaster and post-disaster stages some indicators, such as ‘sense of community, education, community participation, social support, learning, trust, exchange of information, shared information’ have more impact and need to be considered [21]. Keck & Sakdapolrak [14]; have pointed to three capacities to realize social resilience. These are ‘coping capacities’ in which social coping style, cohesion, and resource availability are more important indicators; ‘adaptive capacities’ in which some indicators, such as social adaptability, social knowledge and skills, social experience, and ability to anticipate future risks are more important; and ‘transformative capacities in which social participation, social capital, and social trust can be considered as key indicators [14]. In another study, Norris et al. [25] emphasize the importance of social capital for social resilience, presenting it in terms of three aspects, namely place attachment, sense of community, and citizen participation [25].

As was mentioned, in some studies SRIs have been introduced and assessed in special categories and dimensions. Regarding this matter, Cutter et al. [26]; put SRIs in a structural dimension in which discrete features and characteristics of social entity and some elements associated with health status and demographic characteristics are more important. Some SRIs in this dimension include educational attainment, communication capacity, health care capacity, pre-retirement age, resource availability, and health insurance coverage [26]. Contrary to the structural dimension, Paton & McClure have defined and classified SRIs using a cognitive dimension [27]. In this cognitive-based approach, the main focus is on the individual’s attitudes, values, and beliefs and also their mental processes and perceptions of themselves and their environment [13]. In this regard, some key SRIs are social responsibility, coping style, shared view, participation, critical awareness, and collective efficacy capacity [27]. Based on Kwok et al. [13]; to measure resilience, SRIs can be included in four categories, namely ‘skills, abilities, and knowledge’, ‘community qualities and amenities’, ‘community values and perceptions’, and ‘community processes’ [13]. Also, Saja et al. [28], classify SRIs into five major dimensions and refer to them as the ‘5 S’s’. These dimensions are ‘social structure’, ‘social capital’, ‘social mechanism/competence/values’, ‘social equity and diversity’, and ‘social belief/culture/faith’ [28]. Among these dimensions, social structure highlights the importance of socio-demographic features in social

3. https://behdasht.gov.ir/.
In this regard, the population and demographic features, such as gender, ethnicity, education, and income have vital positions to understand social structure to deal with crisis, and determine the ability to plan social resilience in communities based on opportunities and needs during the events [28, 29].

3. Materials and methods

This study seeks to assess the state of SRIs among different SDGs during the COVID-19 pandemic in Tehran. To collect data, we used a questionnaire survey to explore three main goals as follows:

- Assessing the state of SRIs in Tehran during the pandemic;
- Assessing differences in the state SRIs in light of different SDGs;
- Testing the impact of the state of SRIs on different SDG. In other words, the purpose was to understand to what extent the pandemic has affected the state of SRIs among different SDGs, and whether the effects were significant.

With respect to the mentioned goals, we applied a set of statistical tests using SPSS-26 and structural equation modeling via AMOS-Graphics software. Fig. 3 shows the flowchart of the research process.

3.1. Participants and questionnaire

We constructed a questionnaire survey focused on SRIs. As it was mentioned in the literature review section, in previous studies, SRIs have been introduced and described in various types and dimensions. The literature review, presented in the previous section, was used to select relevant SRIs for inclusion in the study. To retrieve relevant documents related to social resilience indicators, we searched the literature indexed in Scopus, which is a widely known database for archiving academic literature. We searched for combinations of terms social resilience, community resilience, and indicators in the titles and abstracts of the archived documents and identified 98 studies in the initial searches.
After carefully reading the abstracts of the retrieved papers, 42 studies were selected for the final investigation. We adopted an inductive content analysis approach to identify and list social resilience indicators mentioned in these studies. According to this approach an initial list of indicators is created after reading the first article. While reading the second article, whenever new indicators were found, they were added to the existing list. This process continued until all selected papers were analyzed and resulted in 29 SRIs that are presented in Table 1. It is worth noting that the purpose of using this number of indicators was to conduct a relatively comprehensive analysis of different issues that may affect social resilience and to, as much as possible, provide a more reasonable understanding of the state of social resilience and more appropriate recommendations for improving the conditions in the city. We, however, acknowledge that the list may not be exhaustive considering the multi-dimensional nature of social resilience.

To construct the questionnaire, 29 questions were designed based on the 29 selected indicators and using a 5-point Likert scale (1: Very low, 2: low, 3: Neither high nor low, 4: high, 5: very high) (See Online supplementary Appendix A). The questionnaire was previously validated by four experts from the urban resilience and social resilience area. They were chosen from researchers who have published papers on relevant topics. Also, for evaluating the questionnaire’s reliability, a pre-test was performed with 50 participants. In this regard, we relied on either KMO and Bartlett or Cronbach alpha(α) tests. The results showed strong values for the 29 questions (without any separate dimensions or category) of the questionnaire as 0.893 for KMO and Bartlett and 0.901 for Cronbach alpha(α). In both tests, the reliability coefficient lies between 0 and 1, and the higher the value of this coefficient, the higher the reliability [63,64]. In Table 2, we also have presented The Cronbach’s alpha of the 29 questions of the questionnaire.

A random sampling method was used and the sample size was 786 [65,66]. Respondents were approached through either e-mail communications or electronic forms shared via social media platforms. In this process, the ‘snowball method’ was also used [67]. In other words, the form was first sent to some participants and then they were asked to, in addition to completing the survey, send it to other potential participants. In fact, the snowball method is applied to obtain a larger and more homogeneous sample. In this method the researcher sends the invitation to some participants to take part in the research and those participants will pass the invitation to other participants [68,69]. It should be noted that, due to the COVID-19 outbreak, the process of collecting data had some limitations and difficulties related to participants’ accessibility and the time to answer the questionnaire completely. We tried to access a large number of participants to ensure better generalizability of the results, and after four months, namely from January to April 2021, we collected 786 complete questionnaires (Table 3). It is worth mentioning that the total number of questionnaires returned was 819. Out of these, 33 were excluded as they were incomplete (e.g., missing personal data or not answering all questions properly). We believe this is an adequate number to obtain generalizable results.

### 4. Results

The results are presented in three sub-sections according to the main research goals. First, the state of SRIs in Tehran is analyzed. Second, the difference in the state of the SRIs are assessed from the lens of SDGs, namely gender, age, educational and occupational groups. Finally, the impacts of the state of SRIs on different SDGs during the pandemic are analyzed.

#### 4.1. Assessing the state of SRIs during the pandemic

Assessing the state of SRIs can provide useful insights into social resilience indicators. In other words, it allows understanding what social aspects have been more affected during the pandemic. For this purpose, we used One-sample T test [70,71]. The results are shown in Table 4.

According to Table 4, with a 95% confidence level, almost all indicators have been in unfavorable states during the pandemic in Tehran. It is notably the case for social coping style, social capital, social relations, and social adaptability that show higher negative distances from the test value. In fact, these indicators have experienced extensive adverse impacts during the pandemic in Tehran. Among the indicators, just social exchange of experiences and information and social leadership have a relatively favorable situation based on participants’ opinion.

Widespread outbreak of COVID-19 and consequently, continuous lockdown, quarantine orders, and loss of thousands of job opportunities have caused a great deal of stress, fear, and anxiety among people in Tehran. Due to the higher costs of living in this city than other cities in Iran, depression and mental tension have increased among the people during the pandemic [72,73]. Regarding the indicators with the most unfavorable conditions, evidence has indicated that the strong coping capacity and also social support can have a positive effect on decreasing adverse effects caused by COVID-19 [74,75]. Likewise, social capital as a vital factor to create a resilient society has an undeniable role during the pandemic. Growing indications propose that massive outbreaks such as the COVID-19 pandemic are better handled in societies where social capital is in a high level [76]. Nevertheless, social capital has a relatively unfavorable outlook in Iranian cities because of some challenges like poverty, low employment rates, and the lack of good local governance [77,78]. These problems have intensified during the pandemic. Overall, in line with our results, many results have emphasized that social characteristics such as weakened social relationships due to social distancing, social isolations, and consequently the fear of getting the virus have intensively affected citizens during the pandemic [79]. These challenges, however, if persistent, can create difficulties in terms of social adaptability and resistance and may negatively affect social resilience.

#### 4.2. Difference in the state of SRIs among SDGs

Assessing differences in the state of SRIs from the lens of - SDGs can assist in developing customized and group-specific plans and policies to provide solutions to enhance social resilience. In this regard, at first, we

### Table 1

SRIs in related literature.

| Indicators                        | References                  |
|-----------------------------------|-----------------------------|
| Social capacity and adaptability   | [6,24]                      |
| Social transformation and strength | [31]                        |
| Sense of community                | [13,32]                     |
| Social trust                      | [21,28,33]                  |
| Social knowledge and skills       | [17,34]                     |
| Social participation              | [35,36]                     |
| Social cohesion                   | [17,38]                     |
| Social demography (Youth - Aging) | [21,39]                     |
| Social communication              | [40,41]                     |
| Social innovation                 | [42]                        |
| Social education                  | (Krasny et al., 2010 [43])  |
| Social - related resource dependency | [24,44]                   |
| Social coping style               | [21]; Krasny et al., 2010   |
| Social collective efficacy        | [36,45]                     |
| Social capital                    | [18,25,46,47]               |
| Social leadership                 | [21,48,49]                  |
| Social networks                   | [50,51]                     |
| Social relationship               | [52,53]                     |
| Social creativity                 | [54]                        |
| Social embeddedness               | [55]                        |
| Social faith-based organizations  | [65]                        |
| Social responsibility and commitment | [56,57]                   |
| Social experience                 | [58]                        |
| Social preparation                | [59]                        |
| Social support                    | [21,45]                     |
| Social motivation and hope        | [13]                        |
| Socially robust community spaces and amenities | [13,60]       |
| Social exchange of experiences and information | [13]                     |
| Social positivity                 | [61,62]                     |
The result of Table 4

Table 2
Cronbach’s alpha, if the items deleted.

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 |
|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| .89 | .9 | .89 | .89 | .89 | .89 | .89 | .89 | .89 | .89 | .89 | .88 | .89 | .9 |
| Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 | Q25 | Q26 | Q27 | Q28 |
| .88 | .89 | .9 | .9 | .89 | .89 | .88 | .88 | .89 | .89 | .89 | .89 | .89 | .9 |
| Q29 | .9 |

Note: Q = Question.

Table 3
Participants’ profile.

| Feature | Option | N  | % |
|---------|--------|----|---|
| Gender  | Male   | 417 | 60|
|         | Female | 316 | 40|
| Education | Diploma degree | 74 | 10|
|         | Post-diploma | 110 | 14|
|         | Bachelor’s degree | 210 | 27|
|         | Master’s degree | 255 | 32|
|         | PhD     | 137 | 17|
| Age     | 17–20  | 116 | 15|
|         | 21–30  | 207 | 26|
|         | 31–40  | 198 | 25|
|         | 41–50  | 136 | 17|
|         | 51–60  | 51  | 7 |
|         | Over 60| 78  | 10|
| Job     | Educational | 199 | 25|
|         | Official | 165 | 21|
|         | Health care services | 158 | 20|
|         | Public services | 208 | 27|
|         | Industrial | 56  | 7 |

* Note: In Iran education system, holders of post-diploma degree are those who have spent two years at university.

Table 4
The result of t-test for the state of SRIs during the COVID-19.

| Indicators                        | Test Value | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | Std. Error Mean |
|----------------------------------|------------|----|----------------|-----------------|------------------------------------------|----------------|
| Social capacity and adaptability | -62.132    | 785.000 | .000          | -1.35751        | -1.4004 -1.3146                           | .02185         |
| Social transformation and strength | -3.393    | 785.000 | .000          | -1.0305         | -1.164 -0.897                            | .03277         |
| Sense of community               | -5.329     | 785.000 | .000          | -1.7557         | -2.402 -1.119                            | .03295         |
| Social trust                     | -41.526    | 785.000 | .000          | -0.9974         | -1.0446 -0.9503                         | .02402         |
| Social knowledge and skills      | -33.174    | 785.000 | .000          | -0.8626         | -0.9136 -0.8116                         | .02600         |
| Social participation             | -48.651    | 785.000 | .000          | -1.13359        | -1.1793 -1.0878                         | .02330         |
| Social cohesion                  | -3.706     | 785.000 | .000          | -0.7125         | -1.090 -0.335                           | .01922         |
| Social demography (youth - aging)| -9.627     | 785.000 | .000          | -1.0560         | -1.1271 -0.0841                        | .01097         |
| Social communication             | -55.958    | 785.000 | .000          | -1.20356        | -1.2458 -1.1613                         | .02151         |
| Social innovation                | -45.204    | 785.000 | .000          | -1.04453        | -1.0899 -0.9992                         | .02311         |
| Social education                 | -55.087    | 785.000 | .000          | -1.27608        | -1.3216 -1.2306                         | .02316         |
| Social - related resource dependency | -29.487 | 785.000 | .000          | -0.70102        | -0.7477 -0.6543                        | .02377         |
| Social coping style              | -118.723   | 785.000 | .000          | -1.77354        | -1.8029 -1.7442                         | .01494         |
| Social collective efficacy       | -6.770     | 785.000 | .000          | -1.1794         | -1.2318 -1.1278                        | .02302         |
| Social capital                   | -73.367    | 785.000 | .000          | -1.61705        | -1.6603 -1.5738                       | .02204         |
| Social leadership                | 1.976      | 785.049 | .000          | 0.04453         | 0.0537 -0.0463                        | .02254         |
| Social networks                  | -42.298    | 785.000 | .000          | -1.01018        | -1.0571 -0.9633                       | .02388         |
| Social relationship              | -70.292    | 785.000 | .000          | -1.43511        | -1.4752 -1.3950                       | .02042         |
| Social creativity                | -9.464     | 785.000 | .000          | -0.24459        | -0.2953 -0.1939                      | .02584         |
| Social embeddedness             | -50.399    | 785.000 | .000          | -1.19975        | -1.2465 -1.1530                       | .02380         |
| Social faith-based organizations | -33.358    | 785.000 | .000          | -0.78117        | -0.8271 -0.7352                      | .02342         |
| Social responsibility and commitment | -20.844 | 785.000 | .000          | -0.50382        | -0.5313 -0.4564                      | .02417         |
| Social experience                | -20.153    | 785.000 | .000          | -0.58651        | -0.6436 -0.5294                      | .02910         |
| Social preparation               | -44.768    | 785.000 | .000          | -1.10433        | -1.1527 -1.0559                      | .02467         |
| Social support                   | -26.324    | 785.000 | .000          | -0.74682        | -0.8025 -0.6911                      | .02837         |
| Social motivation and hope       | -22.916    | 785.000 | .000          | -0.68830        | -0.7477 -0.6293                      | .03004         |
| Socially robust community spaces and amenities | -50.726 | 785.000 | .000          | -1.18193        | -1.2277 -1.1362                      | .02330         |
| Social exchange of experiences and information | 26.351 | 785.000 | .000          | 0.69720         | 0.6453 -0.7491                      | .02646         |
| Social positiveness               | -6.766     | 785.000 | .000          | -0.17939        | -0.2314 -0.1273                      | .02651         |

tried to analyze the difference in the state of SRIs in terms of gender (Table 5).

According to Table 5, there is no significant difference between males and females in terms of the state of SRIs during the pandemic. The results show the fact that males and females have experienced similar states of social resilience during the pandemic. This is, however, not aligned with results reported in other studies. While there are some studies that have reported higher impacts on men [80], generally, it is argued that women are more vulnerable than men to the negative effects of the pandemic [81,82]. Overall, it is argued that due to the unique cultural, social, and contextual characteristics of cities in developing countries, defining and determining ideal levels for social resilience becomes more intricate when considering gender characteristic [83].

At the second stage, we assessed the difference in the state of SRIs during the pandemic among age groups (Table 6).

According to Table 6, difference in the state of SRIs during the pandemic among age groups is significant between the age group of 17–20 and other age groups. Likewise, the results show that there is significant difference between the age group of 41–50 and three age groups, namely 17–20, 21–30, and 31–40 in terms of the state of SRIs. This difference is not significant among other age groups.

It should be said that social resilience has a multi-dimensional nature and has a different outlook among age groups (Hayman et al., 2017; Ungar, 2011). Young people tend to prioritize social networks, social
of the internet and social media are factors that could negatively influence the resilience level and mental health of this age group during the pandemic [84, 85].

Overuse of technology systems, affecting approximately 1.6 billion learners in over 200 countries [86]. It has been reported that closures of schools, institutions and other learning spaces have impacted more than 94% of the world’s student population and resulted in enormous impacts at both societal and educational levels [86, 87]. In Iran, due to the dominance of traditional education systems, the processes of on-line and distance learning have faced several difficulties, such as lacking sufficient skills and knowledge and proper platforms [88]. Overall, the reluctance of the education system to accept new changes has caused difficulties, such as long-term educational disruptions, digital deprivation, poor technology management, and increased psychosocial difficulties among educational groups, particularly among teens and those without academic education [89–91].

As can be seen in Fig. 4, generally, the age group of less than 20 years old (17–20) has assigned the lowest rank for SRIs on average than other groups.

Based on the results, it can be said that due to the imposed restrictions and the closure of the educational centers in particular, the age group of 17–20 has experienced more negative impacts. In fact, anxiety, stress and concerns about the uncertain situation have hurt this vibrant group of 17–20 in various domains, including educational groups without academic education with those who have academic education. In fact, like the results obtained for age groups, individuals with no academic education and young people (up to 20 years old) have experienced more impacts on the state of SRIs during the pandemic. This result could be explained by the drastic changes and impacts that educational groups and systems have undergone during the Pandemic. The pandemic has led to considerable disruptions in education systems, affecting approximately 1.6 billion learners in over 200 countries [86]. It has been reported that closures of schools, institutions and other learning spaces have impacted more than 94% of the world’s student population and resulted in enormous impacts at both societal and educational levels [86, 87]. In Iran, due to the dominance of traditional education system, the processes of on-line and distance learning have faced several difficulties, such as lacking sufficient skills and knowledge and proper platforms [88]. Overall, the reluctance of the education system to accept new changes has caused difficulties, such as long-term educational disruptions, digital deprivation, poor technology management, and increased psychosocial difficulties among educational groups, particularly among teens and those without academic education [89–91].

As can be seen in Fig. 4, generally, the age group of less than 20 years old (17–20) has assigned the lowest rank for SRIs on average than other groups.

Table 5
Independent samples test for analyzing the difference in the state of SRIs from the lens of gender.

| | Levene’s Test for Equality of Variances | t-test for Equality of Means |
|---|---|---|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
| SRIs | Equal variances assumed | .001 | .976 | .774 | 782 | .439 | 22332 | .28835 | -.34272 | 78936 | Lower | Upper |
| Equal variances not assumed | | | | | | | | | |

Table 6
Multiple Comparisons of difference in the state of SRIs among age groups.

| Tukey HSD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| I (age) | J (age) | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval of the Difference |
| | | | | | Lower Bound | Upper Bound |
| 17-20 | 20-30 | -3.84130a | .41834 | .000 | -5.0364 | -2.6462 |
| 31-40 | -3.47771a | .42101 | .000 | -4.6805 | -2.2750 |
| 41-50 | -5.47541a | .45508 | .000 | -6.7755 | -4.1753 |
| 51-60 | -5.29648a | .60497 | .000 | -7.0248 | -3.5682 |
| over 60 | -4.45712a | .52724 | .000 | -5.9634 | -2.9509 |
| 20-30 | 31-40 | 3.84130a | .41834 | .000 | 2.5646 | 5.0364 |
| 31-40 | .36359 | .35878 | .094 | -1.6142 | 1.3886 |
| 41-50 | -1.63411a | .39821 | .001 | -2.7717 | -4.9650 |
| 51-60 | -1.45519 | .56344 | .103 | -3.0648 | 1.5458 |
| over 60 | .61582 | .47902 | .793 | -1.9843 | 7.5273 |
| 31-40 | 20-30 | -3.47771a | .42101 | .000 | 2.2750 | 4.6805 |
| 20-30 | .36359 | .35878 | .094 | -1.6142 | 1.3886 |
| 41-50 | -1.63411a | .39821 | .001 | -2.7717 | -4.9650 |
| 51-60 | -1.45519 | .56344 | .103 | -3.0648 | 1.5458 |
| over 60 | .61582 | .47902 | .793 | -1.9843 | 7.5273 |
| 41-50 | 31-40 | 5.47541a | .45508 | .000 | 4.1753 | 6.7755 |
| 31-40 | 1.63411a | .39821 | .001 | 0.4965 | 2.7717 |
| 41-50 | 1.99770a | .40101 | .000 | 3.1433 | 8.5213 |
| 51-60 | 1.81878a | .56542 | .017 | -3.4341 | -2.0353 |
| over 60 | .97941 | .48135 | .324 | -2.3545 | 3.9577 |
| 51-60 | 41-50 | 5.29648a | .60497 | .000 | 3.5682 | 7.0248 |
| 41-50 | 1.45519 | .56344 | .103 | -1.1545 | 3.0648 |
| 51-60 | 1.81878a | .56542 | .017 | -3.4341 | -2.0353 |
| over 60 | .97941 | .48135 | .324 | -2.3545 | 3.9577 |
| Over | 17-20 | 4.45712a | .52724 | .000 | 2.9509 | 5.8634 |
| 20-30 | 6.15802 | .47902 | .793 | -0.7527 | 1.9843 |
| 31-40 | .97941 | .48135 | .324 | -2.3545 | 3.9577 |
| 41-50 | .101829 | .51142 | .348 | -2.4793 | 4.4282 |
| 51-60 | .83937 | .64841 | .788 | -1.0130 | 2.6918 |
| a The mean difference is significant at the 0.05 level; Dependent Variable: SRIs.

Each node shows the sample average rank of age.

Fig. 4. Average rank assigned to SRIs by age groups.

Differences from the lens of educational groups in terms of the state of SRIs during the pandemic have been presented in Table 7.

Based on Table 7, there is difference in the state of SRIs between the educational groups without academic education with those who have academic education. In fact, like the results obtained for age groups, individuals with no academic education and young people (up to 20 years old) have experienced more impacts on the state of SRIs during the pandemic. This result could be explained by the drastic changes and impacts that educational groups and systems have undergone during the Pandemic. The pandemic has led to considerable disruptions in education systems, affecting approximately 1.6 billion learners in over 200 countries [86]. It has been reported that closures of schools, institutions and other learning spaces have impacted more than 94% of the world’s student population and resulted in enormous impacts at both societal and educational levels [86, 87]. In Iran, due to the dominance of traditional education system, the processes of on-line and distance learning have faced several difficulties, such as lacking sufficient skills and knowledge and proper platforms [88]. Overall, the reluctance of the education system to accept new changes has caused difficulties, such as long-term educational disruptions, digital deprivation, poor technology management, and increased psychosocial difficulties among educational groups, particularly among teens and those without academic education [89–91].

As can be seen in Fig. 5, generally, the educational group without academic education has assigned the lowest rank for SRIs on average relationships, and social innovation, while the elderly put more emphasis on social support and social capital (Warburton et al., 2013).
of the state of social resilience during the pandemic. Therefore, it can be

documented that there is no significant difference between occupational groups in terms

tables presented in Table 8.

As Table 8 shows, except for the educational occupational group, there is no significant difference between occupational groups in terms of the state of social resilience during the pandemic. Therefore, it can be said that only there is a significant difference between educational occupational groups and other occupational groups in terms of changes in SRIs.

For cities in Iran, it has been shown that a strong relationship exists

Fig. 5. Average rank assigned to SRIs by educational groups.

than other groups.

At the end of this section, we analyzed differences in the state of SRIs during the pandemic among occupational groups. The results are presented in Table 8.

As Table 8 shows, except for the educational occupational group, there is no significant difference between occupational groups in terms of the state of social resilience during the pandemic. Therefore, it can be said that only there is a significant difference between educational occupational groups and other occupational groups in terms of changes in SRIs.

For cities in Iran, it has been shown that a strong relationship exists

between quality of life, economic conditions, and social resilience [92].

In accordance with the loss of millions of jobs and the extensive negative economic consequences imposed by COVID-19 pandemic on the global scale (Ceylan et al., 2020; [93]), this crisis has triggered remarkable difficulties and complex problems in Iran. In addition to the pandemic effects, Iran is under the United States economic sanctions that have weakened its economic system [94] and have made a complicated situation from the lens of economic and social resilience. As shown in other context, this situation has had drastic effects on people who are at the bottom of the socioeconomic spectrum [5].

In the meantime, some studies indicate that education system and its related occupational groups have been one of the most vulnerable sectors to the consequences caused by COVID-19 [95]; Kramer & Kramer, 2020). In this regard, some challenges, such as “the high rates of socioeconomic segregation, of school dropouts and of academic failure; poor culture of networking and collaboration; the need to strengthen bimodal education; and teachers’ obligation to update their digital competences” [95]; p.381) have been mentioned as the challenges of educational occupational group during the pandemic, which can negatively affect the resilience of these groups.

Based on our results, as can be seen in Fig. 6, educational occupational group has experienced drastic effects in terms of SRIs during the pandemic and has been assigned the lowest rank for SRIs status on average compared with other occupational groups.

4.3. The impact of the state of SRIs on SDGs

In this stage, we tried to show the impact of the state of SRIs on SDGs, namely gender, age, educational, and occupational groups in the Tehran during the pandemic. The purpose of this analysis was to understand the significance of impacts that SDGs have undergone due to impacts on the SRIs during the pandemic. For this purpose, we used structural equation modeling in AMOS software and applied maximum likelihood estimate for estimating the impacts.

At first, examining the model’s goodness-of-fit showed a 99% confidence level and strong values for related coefficients (Table 9).

Based on (Bentler & Bonett, 1980), a strong value for the indices of goodness-of-fit would be $\chi^2/df \leq 3$, and for RMSEA is 0.08. In Table 10), the values of structural model are shown.

Based on all the four defined paths (Table 10 and Fig. 7), impacts on

### Table 7

Multiple comparisons of differences in the state of SRIs among educational groups.

| Tukey HSD | (I) education | (J) education | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |
|-----------|---------------|---------------|-----------------------|------------|-----|------------------------|
| Diploma   | Post-Diploma  | -1.60688*    | .56929                | .039       |     | -3.1634                |
| Bachelor  | Diploma       | -3.28152*    | .51220                | .000       |     | -4.6820                |
| Master    | Diploma       | -3.18813*    | .50019                | .000       |     | -4.5257                |
| PhD       | Diploma       | -4.27974*    | .54626                | .000       |     | -5.7733                |
| Post-Diploma | Diploma     | 1.60688*    | .56929                | .039       |     | .0503                  |
| Bachelor  | Diploma       | -1.67464*    | .44603                | .002       |     | -2.8942                |
| Master    | Diploma       | -1.58125*    | .43219                | .003       |     | -2.7629                |
| PhD       | Diploma       | -2.67286*    | .48476                | .000       |     | -3.9983                |
| Bachelor  | Post-Diploma  | 1.67464*    | .44603                | .002       |     | .4551                  |
| Master    | .99340       | 3.5362       | .999                 |           |     | .8735                  |
| PhD       | -99822       | 4.1614       | .117                 |           |     | 2.1363                 |
| Master    | 3.18813*     | 5.0019       | .000                 | 1.8205     |     | 4.5557                 |
| Post-Diploma | Diploma     | 1.58125*    | .43219                | .003       |     | .27629                 |
| Bachelor  | .99340       | 3.5362       | .999                 |           |     | .10603                 |
| PhD       | -1.09161     | 4.0137       | .052                 |           |     | .0058                  |
| Master    | -99822       | 4.1614       | .117                 |           |     | 2.1363                 |
| Bachelor  | 1.09161      | 4.0137       | .052                 |           |     | 2.1890                 |

* The mean difference is significant at the 0.05 level. Dependent variable: SRIs.
the state of SRIs during the pandemic have a positive and statistically significant impact on the SDGs. In fact, the path coefficient between impacts on SRIs and gender, as the first path is: \( \beta = 0.101, P: 0.014 \), the path coefficient between impacts on SRIs and age, as the second path is: \( \beta = 0.361, P: 0.000 \), the path coefficient between impacts on SRIs and job, as the third path is: \( \beta = 0.343, P: 0.000 \), and finally the path coefficient between impacts on SRIs and education, as the fourth path is: \( \beta = 0.277, P: 0.000 \).

The Structural Equation Modeling (SEM) results show that socio-demographic groups have been significantly affected by the state of SRIs during the pandemic in Tehran, and age groups have experienced the highest amount of impact from the pandemic. Along with this result, some research has shown how social resilience affects socio-demographic factors such as gender, age, social class, and level of education during the pandemic, and highlighted the importance of political communication, both leadership and political measures, for fostering social resilience [96].

Overall, recent studies have shown that COVID-19 has negatively affected social resilience, especially among vulnerable groups, namely, women and elderly people [97, 98]. It also applies to the adverse economic conditions and the loss of millions of jobs around the globe, which in turn has contributed to reduced social resilience and has created many other challenges [5]. However, it has been revealed that a significant relationship exists between social resilience and the ability to cope with the problems caused by the COVID-19 pandemic [96, 99] and for this purpose, some measures such as government support and enhancement in social justice have been proposed to promote social

### Table 8
Multiple Comparisons of difference in the state of SRIs among occupational groups.

| Tukey HSD | (I) job | (J) job | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |
|-----------|---------|---------|-----------------------|------------|------|------------------------|
| Educational | official | -1.28287* | .41240 | .017 | -2.4104 | -1.553 |
| | healthcare services | -1.57030* | .41811 | .002 | -2.7135 | -1.4271 |
| | Public services | -1.11177* | .38886 | .035 | -2.1750 | -0.486 |
| | industrial | -2.12410* | .59250 | .003 | -3.7441 | -5.5041 |
| Official | educational | 1.28287* | .41240 | .017 | .1553 | 2.4104 |
| | healthcare services | -2.8743 | .43669 | .965 | -1.4814 | .9066 |
| | Public services | .17110 | .40877 | .994 | -0.9466 | 1.2888 |
| | industrial | -1.84123 | .60576 | .635 | -2.4975 | .8150 |
| Healthcare services | educational | 1.57030* | .41811 | .002 | .4271 | 2.7135 |
| | official | -2.8743 | .43669 | .965 | -0.9066 | 1.4814 |
| | Public services | .45585 | .41453 | .803 | -0.6749 | 1.5919 |
| | industrial | .55380 | .60965 | .894 | -2.2207 | 1.1131 |
| Public services | educational | 1.11177* | .38886 | .035 | .0486 | 2.1750 |
| | official | -1.1710 | .40877 | .994 | -1.2888 | .9466 |
| | healthcare services | -4.45854 | .41453 | .803 | -1.5919 | .6749 |
| | industrial | -1.01234 | .58998 | .425 | -2.6254 | .6008 |
| Industrial | educational | 2.12410* | .59250 | .003 | .5041 | 3.7441 |
| | official | .84123 | .60576 | .635 | -0.8150 | 2.4975 |
| | healthcare services | .55380 | .60965 | .894 | -1.1131 | 2.2207 |
| | Public services | 1.01234 | .58998 | .425 | -0.6008 | 2.6254 |

* The mean difference is significant at the 0.05 level.

### Table 9
The model’s goodness of fit coefficients.

| Coefficient | Value | level of acceptance |
|-------------|-------|---------------------|
| \( x^2 /df \) | 2.433 | \( 2x^2 /df \leq 3 \) |
| Goodness-of-Fit Index (GFI) | 0.915 | \( \geq 0.9 \) |
| Adjusted Goodness-of-Fit Index (AGFI) | 0.9 | \( \geq 0.9 \) |
| Normed Fit Index (NFI) | 0.9 | \( \geq 0.9 \) |
| Comparative Fit Index (CFI) | 0.9 | \( \geq 0.9 \) |
| Root Mean Square Error of Approximation (RMSEA) | 0.072 | \( 0.05 \leq \text{RMSEA} \leq 0.08 \) |

### Table 10
Structural model values.

| Standardized regression weights (\( \beta \)) | Direct effect | Indirect effect | Total effect | p-value |
|--------------------------------------------|---------------|----------------|--------------|---------|
| SRIs \( \rightarrow \) Gender | .101 | .101 | .101 | .014 |
| SRIs \( \rightarrow \) Age | .361 | .361 | .361 | *** |
| SRIs \( \rightarrow \) Job | .343 | .343 | .343 | *** |
| SRIs \( \rightarrow \) Education | .277 | .277 | .277 | *** |

Note: p: \( < 0.001 \).
Given the high concentration of economic and social activities in Tehran, under critical conditions. Regarding this purpose, using a survey tool that includes 29 indicators. While we have made efforts to include indicators related to different aspects of social resilience, we acknowledge that our list of selected indicators may not be exhaustive. Many indicators have been identified for explaining social resilience. Human capital, community capital, social and cultural capital, social cohesion, social networks, social trust, risk knowledge, and some demographic features are some examples in this regard [8,13,21]. Given the dynamic nature of social resilience, it is possible to realize and use a series of effective incentives to help promote the level of social resilience under critical conditions. Regarding this purpose, using a survey method, this study strived to assess the state of SRIs in Tehran, Iran during the pandemic. As said earlier, this city has been severely hit by the pandemic and has the largest number of cases and deaths in Iran. Given the high concentration of economic and social activities in Tehran, the conditions created by the Coronavirus and, of course, the international economic sanctions, have created a kind of public frustration and anxiety. Under such conditions, paying attention to social resilience and strengthening its foundations and characteristics can pave the way for dealing with the negative impacts.

Acknowledging this, our results showed that almost all SRIs have experienced negative impacts during the pandemic in Tehran. This was remarkably the case for social coping style, social capital, social relationship, and social adaptability. Moreover, the results indicated that the impacts of the state of SRIs on different socio-demographic features are significant.

5. Conclusions

In times of crisis, such as the Coronavirus pandemic, social resilience plays a pivotal role in maintaining the functionality of communities. Many indicators have been identified for explaining social resilience. Human capital, community capital, social and cultural capital, social cohesion, social networks, social trust, risk knowledge, and some demographic features are some examples in this regard [8,13,21]. Given the dynamic nature of social resilience, it is possible to realize and use a series of effective incentives to help promote the level of social resilience under critical conditions. Regarding this purpose, using a survey method, this study strived to assess the state of SRIs in Tehran, Iran during the pandemic. As said earlier, this city has been severely hit by the pandemic and has the largest number of cases and deaths in Iran. Given the high concentration of economic and social activities in Tehran, the conditions created by the Coronavirus and, of course, the international economic sanctions, have created a kind of public frustration and anxiety. Under such conditions, paying attention to social resilience and strengthening its foundations and characteristics can pave the way for dealing with the negative impacts.

Acknowledging this, our results showed that almost all SRIs have experienced negative impacts during the pandemic in Tehran. This was remarkably the case for social coping style, social capital, social relationship, and social adaptability. Moreover, the results indicated that the impacts of the state of SRIs on different socio-demographic features are significant.

Fig. 7. Results of the structural equation modeling of the significance of the impacts of SRIs on different SDGs.

5.1. Implications for policymakers

We attempted to shed more light on social resilience in Tehran, a developing country city, that suffers from the lack of proper facilities, strategic planning, and notably resilience-oriented planning to deal with the pandemic. The highlighted results can inform local authorities and decision makers of measures, such as enhancing social capital, social participation, and social trust that need to be taken to make the city more resilient. This opportunity, of course, depends on the cooperation of different stakeholders and the provision of a series of facilities, but the ways to promote social resilience have been determined. Based on the results of the study, these major policy implications could be highlighted:

- Social resilience has major implications for quality of life and for dealing with adverse events such as pandemics. Accordingly, enhancing social resilience should be prioritized in local planning and policy making efforts;
- Social capital and its underling components such as trust and social interactions are critical for enhancing social resilience and should receive due attention in planning and policy making;
- Social resilience is a multi-dimensional construct. Accordingly, enhanced governance measures and integrated approaches are needed to strengthen factors that promote social resilience in times of crisis such as pandemics;
- Efforts aimed at enhancing social resilience should acknowledge differential impacts across different socio-economic and age groups. While some societal groups such as elderly are generally vulnerable to adverse events, results of this study also showed that young groups have been negatively affected by the pandemic. Therefore, needs and priorities of young people and their social and psychological demands should also be prioritized in efforts aimed at strengthening social resilience;
- Another noteworthy issue is that negative impacts of the pandemic have been relatively higher on people engaged in educational activities in Tehran. While further research is needed to better understand the reasons behind this, better attention to the needs of this occupational group and providing appropriate infrastructure and social support to them is needed to improve their social resilience.

5.2. Research limitations

The main limitation of our study was the challenge of collecting data about COVID-19 at the local level. We relied on a survey method and questionnaire tool that includes 29 indicators. While we have made efforts to include indicators related to different aspects of social resilience, we acknowledge that our list of selected indicators may not be exhaustive. Also, the process of collecting data had some limitations and difficulties in terms of reaching participants and encouraging them to participate in the survey. We, however, managed to obtain a reasonable number of responses for inclusion in the analysis.

5.3. Future studies

The situation caused by the COVID-19 pandemic has created opportunities to study solutions and strategies for creating and enhancing collaborative planning and resilient-oriented planning at local and global levels to deal with the pandemic effects and to enhance social resilience. Possible interactions of these measures with other economic and environmental measures should be further explored in future research.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence
