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Research Article

The Optimum Age of Retirement Index: The Case of Malaysia

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Abstract: This paper proposes a list of crucial factors that can be considered as a template for universal retirement plan. Malaysia is used as the base of our modeling. Nine crucial factors that are identified to have direct or indirect effect on the retirement plan among the three largest races in Malaysia, namely the Malay, Indians and Chinese are examined. The main objective of this research is to propose a new approach to evaluate the optimum age retirement for Malaysians in general. Hence, this new index is entitled "The Optimum Age Retirement Index (OAR-Index)". Based on the findings, the study proposed that Malaysia would be well served to increase the retirement age of the country's workforce and proposes a number of recommendations and policies to complement the retirement-age extension.

***Keywords*:** retirement, Malaysia, health care, Employees Provident Fund (EPF)

JEL: A13, B41, C15, I38, J18, J81

1. Introduction

Malaysia is a multi-ethic country which comprises four key ethnics group i.e. the Bumiputra (20.07 million/69.1%) which the largest ethnics group in the country, followed by Chinese (6.69 million/23.0%), Indian (2.01/6.9 million) and others (0.29 million/1.0%) (Department of Statistic Malaysia, 2018). The Bumiputra cohort comprises the Malay ethnic and the indigenous Sabahan and Sarawakian. The general worldwide trend of rising life expectancy is posing a huge challenge to the Malaysian retirement system. (Refer to Table 1)

Table 1. Projection of the ageing population in Malaysia from 2015 to 2050 (%)

Years	Percentage (%)
2015	3.5%
2030	14.4%
2050	23.5%

Source: Global Ageing Index (2015)

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The rising number of elderly people in this country has accentuated the perspicacity of the gradual accretion of mandatory retirement age that has been legislated in Malaysia and several countries in the region with rising life expectancy such as Japan and Singapore. The increase of retirement age in Malaysia was enforced a number of times, started with age 56 to 58 in 2008, and later raised to 60 years in 2013. Nevertheless, the latest initiative to increase the age of retirement from 60 to 65 years old was accosted with stiff opposition (Kanyakumari, 2017). The pertinent question of when is the best time for retirement is natural, yet critical especially for people who enter the final decade of their career.

From the financial view point, it is not viable realistically for a majority of Malaysians to opt for early retirement due to insufficient retirement fund. The statistic showed that over 68% of Employees Provident Fund (EPF) [EPF is a statutory agency of Malaysia that manages the retirement fund of Malaysian private sector where saving contribution to the fund through gross salary deduction is compulsory (Contribution, n.d.).] contributors had not more than RM50,000 in their accumulation with the fund 6 years before their mandatory retirement age. This has prompted the government to consider extending the age of retirement beyond 60 years old (Kuek, 2019).

Notwithstanding the financial reality, the perception of retirement in Malaysia has been changing dramatically in the past ten years. Numerous reports (e.g. Wahab, 2015; Yeap, 2017) highlighted that the number of Malaysians retiring in early 50's has increased to 40% in the last ten years due to various factors such as stress, health problems, and lack of job prospect. Thus, only 60% of the Malaysian workforce reached the official retirement age of 60 years old. Specifically, in the public sector which offers the life pension system, almost 98% of Malaysian bureaucrats retires at the mandatory age of retirement.

This paper examines the plausible factors to the paradoxical decision of early retirement at the backdrop of financial insecurity in Malaysia namely (i) job dissatisfaction (lack of financial and professional growth prospect); (ii) office stress (extra hours and datelines pressure from the management); (iii) office politics (disequilibrium of power distribution between the top and lower level of staffs); (iv) family problem (caused by long working hours and negligence on family issues); (v) health issues; (vi) labor condition (demotivation caused by the management and institution); (vii) debts; (viii) level of personal satisfaction (lack of emotional support and self-esteem); (ix) children's education.

A closer scrutiny on early retirement caused by health issues sheds light on a couple of underlying dietary laxities such as skipping of regular meals due to long working hours, diet imbalance i.e. habitual intake of food laden with sugar, oil and sodium. Such unhealthy food that come in many varieties are commonly served in cafeterias and eateries patronised by Malaysian workforce, particular those from the lower income (Chee et al., 1996; Tee, 1999).

The most common diseases that lead to early retirement among Malaysians are as follow in descending order (some cases are combination of more than one illness): (1) diabetes (68%), (2) high blood pressure (68%), (3) heart attack (47%), (4) stomach disorders (32%), (5) nervous breakdown (18%), (6) respiratory problems (12%), (7) and other health issues (22%). While the lack of exercise and outdoor activities could compound the vulnerability of Malaysian's physical health, emotional imbalance arising from work-family conflict (Mumin & Ho, 2019) could also lead to the drastic decision of early retirement.

The implication of early retirement among Malaysians, especially those from the private sector is critical and could alter the structure of the labour market and the productivity of the Malaysian economy in the long run dramatically. The economic sector could be severely impacted by the disequilibrium of demand and supply of labor in the market and such imbalance could lead to a shortfall in the gross domestic production and overdependence on foreign labor. More acutely, the country is fast approaching the threshold of aging population where approximately 61% to 75% of the Malaysian population is located below the cohort of 40 years-old category (Refer Table 1). Thus, about 25% to 39% of the population are retirees or retiring soon (Jomo, 2017).

According to Jomo (2017) and the reports of the Department of Statistics Malaysia (DOSM) (2019), the life expectancy of Malaysians has increased from 63 to 78 years of age (see Table 2). However, divergence between the intention for early retirement and the post-retirement financial needs has magnified the pressure on EPF to provide adequately to the fund's contributors in terms of the annual compounding dividends. Thus elevating the level of pre-retirement financial literacy is crucial in to reduce the dependency of retirees solely on their EPF fund (Caraher, 2000).

Table 2. Malaysia population projection from 2010 until 2040 (in million)

Year	2010				2015				2020				2025				2030				2035				2040			
Age/ Gender	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%
85+	43	0.2	57	0.4	56	0.3	77	0.5	74	5.3	98	0.6	99	0.5	126	0.7	114	0.6	147	0.8	147	0.7	196	1.0	181	0.9	249	1.3
80-84	64	0.4	81	0.5	73	0.4	87	0.5	103	0.6	121	0.7	109	0.6	130	0.7	154	0.8	190	1.0	180	0.9	229	1.2	225	1.1	298	1.5
75-79	110	0.7	123	0.8	150	0.9	166	1.1	160	0.9	178	1.1	222	1.2	255	1.5	263	1.4	308	1.7	327	1.7	396	2.1	377	1.9	463	2.4
70-74	201	1.3	209	1.5	216	1.3	226	1.5	294	1.7	315	1.9	350	1.9	380	2.2	433	2.3	482	2.7	498	2.6	561	3.0	521	2.6	641	3.3
65-69	270	1.8	268	1.9	316	2.0	368	2.4	429	2.5	442	2.7	526	3.0	555	3.3	605	3.2	641	3.6	631	3.3	726	3.9	683	3.4	768	4.0
60-64	417	2.8	407	2.9	500	3.2	491	3.3	614	3.6	612	3.8	711	4.0	706	4.2	758	4.1	803	4.5	840	4.4	854	4.6	960	4.9	930	4.9
55-59	547	3.7	519	3.7	669	4.2	644	4.3	769	4.6	738	4.6	813	4.6	834	4.9	894	4.8	882	5.0	1011	5.3	953	5.1	1274	6.5	1217	6.4
50-54	707	4.7	664	4.7	811	5.1	760	5.1	853	5.7	854	5.3	931	5.3	900	5.3	1046	5.7	968	5.4	1307	6.8	1231	6.7	1343	6.8	1334	7.0
45-49	840	5.7	774	5.5	884	5.6	870	5.8	961	5.7	915	5.7	1074	6.1	980	5.8	1334	7.2	1243	7.0	1363	7.1	1343	7.3	1425	7.2	1377	7.2
40-44	908	6.1	883	6.3	988	6.3	929	6.2	1102	6.6	993	6.2	1366	7.7	1258	7.4	1386	7.5	1353	7.6	1443	7.5	1382	7.5	1433	7.3	1350	7.1
35-39	1014	6.8	941	6.7	1134	7.2	1006	6.7	1405	8.4	1275	8	1431	8.1	1368	8.1	1476	8	1389	7.8	1464	7.6	1354	7.3	1474	7.5	1349	7.1
30-34	1162	7.8	1,019	7.3	1442	9.2	1293	8.7	1451	8.7	1386	8.7	1485	8.4	1400	8.3	1471	8	1360	7.7	1476	7.7	1353	7.3	1402	7.1	1276	6.7
25-29	1479	10	1311	9.4	1479	9.4	1400	9.4	1503	9	1415	8.9	1479	8.4	1370	8.1	1482	8	1360	7.7	1403	7.3	1281	6.9	1444	7.3	1314	6.9
20-24	1504	10	1408	10	1524	9.7	1426	9.6	1492	8.9	1382	8.7	1486	8.4	1369	7.4	1404	7.6	1286	7.2	1441	7.5	1318	7.1	1514	7.7	1383	7.2
15-19	1454	9.8	1384	9.9	1397	8.9	1325	8.9	1402	8.4	1324	8.3	1325	7.5	1248	7.4	1366	7.4	1284	7.2	1438	7.5	1352	7.3	1453	7.4	1364	7.1
10-14	1358	9.2	1296	9.3	1361	8.7	1293	8.7	1281	7.7	1216	7.6	1319	7.5	1250	7.8	1389	7.5	1316	7.4	1401	7.3	1327	7.2	1360	6.9	1288	6.7
5-9	1365	9.2	1295	9.3	1284	8.2	1218	8.2	1321	7.9	1251	7.9	1390	7.9	1317	7.8	1402	7.6	1328	7.5	1362	7.1	1289	7	1291	6.5	1222	6.4
0-4	1288	8.7	1220	8.8	1324	8.4	1253	8.4	1393	8.3	1319	8.3	1405	8	1329	7.9	1363	7.4	1290	7.3	1292	6.7	1223	6.6	1221	6.2	1156	6
Total (%)		78		77		76		75		74		73		72		70		69		67		66		64		64		61

Source: Department of Statistic Malaysia (2019c)

2. Multidimensional modelling framework

Multidimensional modelling is based on the application of Econographicology has been well-developed and applied over the years (Ruiz Estrada, 2011; 2013a; 2013b; 2017). It is an alternative dynamic modelling framework derived mathematically which is more flexible and effective than the conventional approaches to examine multivariate data behavior. The efficacy multidimensional modeling is explained comprehensively in the review by Hayakawa (2012). Apart from micro-socioeconomic analyses, such approach is also efficient cross countries macroeconomic analyses (e.g. Ruiz Estrada et al., 2018).

3. An introduction to the optimum age retirement index (OAR-Index)

The constructs proposed for the study are exploratory. The research design of investigating socioeconomic perceptions encapsulated from informal sources such as newspaper reports, opinion piece by prominent economist and statistics compiled by media, instead of the conventional means of literature review on academic publications is purposeful. The aim is to feel the pulse of Malaysians at the visceral level on their motivation to retire early or otherwise. The Optimum Age Retirement Index (OAR-Index) that incorporates nine main factors is constructed by employing the input-output ix j represented by Expression (1).

$$\Delta_{ij:vn} = \begin{pmatrix} \Delta 11{:}v1 & \Delta 12{:}v2 & \Delta 13{:}v3 \\ \Delta 21{:}v4 & \Delta 22{:}v5 & \Delta 23{:}v6 \\ \Delta 31{:}v7 & \Delta 32{:}v8 & \Delta 33{:}v9 \end{pmatrix} \times 100\% \tag{1}$$

$\Delta_{ij:vn}$ = Determinant $\quad \Delta$ = variable(s) $\quad j$ = column $\quad i$ = row

The aforementioned nine variables proposed by the study (scaled between 1 and 0 or [0, 1]) are expressed in a matrix of three by three. The representations of variables in the matrix are in the followings: (i) job dissatisfaction (lack of financial and professional growth prospect) ($\Delta_{11:v1}$), (ii) office stress (extra hours and datelines pressure from the management) ($\Delta_{12:v2}$), (iii) office politic (disequilibrium of power distribution between the top and lower level of staffs) ($\Delta_{13:v3}$), (iv) family problem (caused by long working hours and negligence on family issues) ($\Delta_{21:v4}$), (v) health issues ($\Delta_{22:v5}$), (vi) labour condition (demotivation caused by the management and institution) ($\Delta_{23:v6}$), (vii) debts ($\Delta_{31:v7}$), (viii) level of personal satisfaction (lack of emotional support and self-esteem) ($\Delta_{32:v8}$), (ix) children's education ($\Delta_{33:v9)}$. Each scaled variable are measured in growth rate. Information captured in the database (φ) is represented by a matrix (See Expression 2). The matrix consists of information obtained in real time ($\divideontimes$) while the application of n-derivative $v = f^{\lambda}(\partial\beta_0/\partial\alpha_0, \ldots, \partial\beta_\infty/\partial\alpha_{\infty\ldots})$ on each vector input data (v = 1, 2, 3, …, 9) and a large number of successive derivatives iterate infinite times (δ = 0, 1, …, ∞…).

$$\varphi_{ij:vn} = \begin{pmatrix} \divideontimes\partial\Delta 11{:}v1 < +t > \partial\Delta 11{:}v1 < -t > \divideontimes\partial\Delta 12{:}v2 < +t > \partial\Delta 12{:}v2 < -t > \divideontimes\partial\Delta 13{:}v3 < +t > \partial\Delta 13{:}v3 < -t > \\ \divideontimes\partial\Delta 21{:}v4 < +t > \partial\Delta 21{:}v4 < -t > \divideontimes\partial\Delta 22{:}v5 < +t > \partial\Delta 22{:}v5 < -t > \divideontimes\partial\Delta 23{:}v6 < +t > \partial\Delta 23{:}v6 < -t > \\ \divideontimes\partial\Delta 31{:}v7 < +t > \partial\Delta 31{:}v7 < -t > \divideontimes\partial\Delta 32{:}v8 < +t > \partial\Delta 32{:}v8 < -t > \divideontimes\partial\Delta 33{:}v9 < +t > \partial\Delta 33{:}v9 < -t > \end{pmatrix} \times 100\% \tag{2}$$

The vector input data which changes in real time ($\divideontimes\partial$) (Ruiz Estrada, 2017) is based on the simultaneous iteration of a large number of partial derivatives where the data obtained in the previous period (< − t > = last period of time) is compared with the data of the next period (< + t > = next period of time) as illustrates in Expression 3.

$$\partial\Delta_{ij:vn} < t > \;=\; \Delta_{ij:vn} < +t > - \;\Delta_{ij:vn} < -t > / \;\Delta_{ij:vn} < -t > \tag{3}$$

The final determinant is computed in Expression (4) for the final time analysis < t >:

$$\Delta_{ij:vn} = \begin{pmatrix} \partial\Delta 11{:}v1 < t > & \partial\Delta 12{:}v2 < t > & \partial\Delta 13{:}v3 < t > \\ \partial\Delta 21{:}v4 < t > & \partial\Delta 22{:}v5 < t > & \partial\Delta 23{:}v6 < t > \\ \partial\Delta 31{:}v7 < t > & \partial\Delta 32{:}v8 < t > & \partial\Delta 33{:}v9 < t > \end{pmatrix} \times 100\% \quad (4)$$

A matrix in Expression (4) is used next to derive the OAR-Index for Malaysian pensioners by multiply the final determinant of life environment by the present health situation (H), divided by the average national life expectation (LE) (See Expression 5).

$$\text{OAR} - \text{Index} = [(\Delta\Pi_{ij:vn}) \times (\text{H})/(\text{LE})] \quad (5)$$

4. The optimum age retirement index surface (OAR-Index-Surface)

The construction of the *OAR-Index Surface* allows for a comprehensive graphical visualization all results and variables interactions derived in the *OAR-Index* (see Expression 4). It also enables a more in-depth evaluation on both the strengths and weaknesses of variables for future studies on the optimum age retirement for Malaysians (see Figure 2). Derivation of the *OAR-Index Surface* is dependent on the OAR-*Index*-Matrix's variables outcome in the final results. The *OAR-Index-Matrix* is a three by three matrix that captures the individual results of all nine readings of the main variables of which a symmetric surface is based on. When the *OAR-Index*-Matrix is strictly identical in the number of rows and columns, the *OAR-Index Surface* would therefore mirror the symmetric output perfectly (see Expression 6).

$$OAR - Index - Surface = \begin{pmatrix} \Delta 11(v1) & \Delta 12(v2) & \Delta 13(v3) \\ \Delta 21(v4) & \Delta 22(v5) & \Delta 23(v6) \\ \Delta 31(v7) & \Delta 32(v9) & \Delta 33(v9) \end{pmatrix} \quad (6)$$

The result of each main-variable in the OAR-Index-Surface is evaluated based on four levels of categorizations. For example, if the reading of a main-variable in the OAR-Index-Surface is measured between 10 and 7.6, then it will be classified as 'Late retirement'; if the main-variable result is measured between 7.5 and 5.1, then it is 'Normal retirement'; if the main-variable has a reading between 5.0 and 2.6, then the 'Early retirement' categorization will be triggered; and if the output of a main-variable in the OAR-Index-Surface shows a result between 2.5 and 0, then it will be designated as 'Young age retirement'. The coordinate space illustration of the OAR-Index-Surface is an innovation from the basic modelling approach proposed by Ruiz Estrada (2017), see Figure 1.

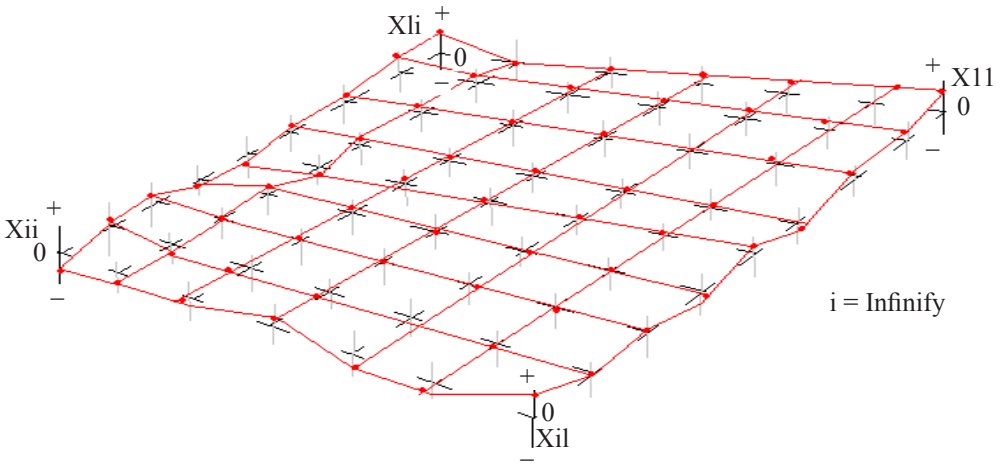

Figure 1. The fundamental modelling approach of the *OAR-Index-Surface*
Source: (Ruiz Estrada, 2017)

5. The application of the OAR-Index: The case of Malaysia

The tendency of early retirement has been a growing predicament in Malaysia in the last 10 years. The incipient of such socio-economic patterns can detect in the Malaysian workforce among the 40's age cohort between 2009-2019 which sums up to 3.7% as observed in the Malaysian *OAR-Index*. The early retirement inclination, notwithstanding private or public sector is directly caused by the factors as discussed in the paper.

The findings of the paper are in the followings: (i) job dissatisfaction (lack of financial and professional growth prospect) 0.27 satisfaction score; (ii) office stresses (extra hours and datelines pressure from the management) 0.25 satisfaction score; (iii) office politic (disequilibrium of power distribution between the top and lower level of staffs) 0.23 satisfaction score; (iv) family problem (caused by long working hours and negligence on family issues) 0.18 satisfaction score; (v) health issues 0.23 satisfaction score; (vi) labor condition (demotivation caused by the management and institution) 0.31 satisfaction score; (vii) debts 0.21 satisfaction score; (viii) level of personal satisfaction (lack of emotional support and self-esteem) 0.31 satisfaction score; (ix) children's education 0.21 satisfaction score (See Figure 2 for the interactions of scores over time). Historical data for the past 10 years indicates that the inclination to early retirement is influenced significantly by the perception on work place environment and physical health.

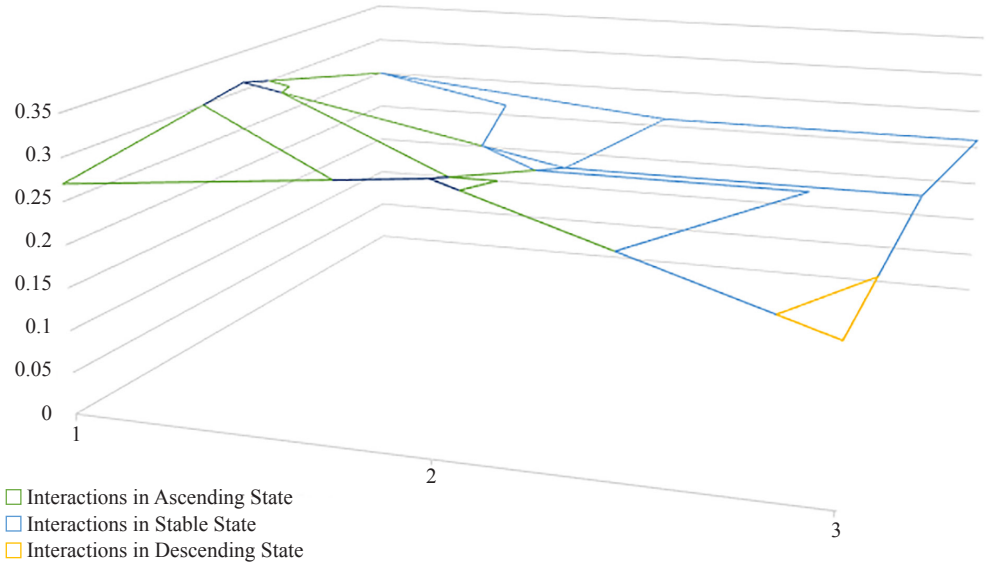

Figure 2. The OAR-Index-Surface Malaysia (2009-2019)
Source: Authors Calculations

In a conclusion, the optimum age of retirement measured based on the *OAR-Index* is 52 years of age for the general Malaysian workforce. Extension to the optimum retirement age can be calibrated for a medium run duration (five years) by improving the critical factors as discussed in the paper. However, the trepidation of "Young age retirement" category of workforce has to be addressed more delicately and may require more than a quantum improvement work environment e.g. a better understanding on the millennials psyche and the provision of better healthcare benefits from both the public sector and the private sector. Overall, the paper supports the hypothesis that the inclination of early retirement in Malaysia stems from two main factors, namely work place environment and individual's health conditions.

6. Conclusions

The paradoxical phenomena of early retirement tendency and the lack of post-retirement fund are a cause for concern in Malaysia, particularly for the private-sector workforce which lacks healthcare security beyond their career. A

continued trend of labor imbalance could have an enormous adverse impact on the country's level of productivity in the next 30 years (2020-2050). The paralysis is exacerbated matter-of-factly that Malaysia is already confronting with the aging population risk when the age cohort of 65 years and above reaches the 7% threshold benchmarked by the World Health Organization. As of 2017, 6.3% of the population had already breached 65 year of age (Malaysia to become aging population by 2020, 2018) and the criterion of aging population is expected to be realized by year 2020 (see Table 2).

From the policy viewpoint and ageing population will stunt the economy caused by reduced labour participation and assert pressure on the younger generation to make up for the shortfall. Such scenarios could generate a vicious cycle where the younger generation would wish to retire early too due to stress from work or the possible ensuing health problems. These will ultimately lower the country's productivity, increase public expenditure and reduce saving rates in the long run. The dependency on foreign labor will also increase.

To mitigate these precarious eventualities, the government should find ways to modernize the economy to lessen the dependency on labor-intensive sectors. A structural transformation to a knowledge-based economy would reduce the reliant of unskilled foreign labor and to some extent increase the general job dissatisfaction of the Malaysian workforce as skilled economic sectors has lower relative risk of health hazard. The government may also need to review its pension scheme as it may not be fiscally sustainable in an ageing-population economic environment.

The approach adopted for the study was mainly applied on studies of macro data in the past. The method may not be conventional, and the constructs proposed for the study are provisional and experimental, derived intentionally from non-academically supported sources for reasons explained in the content. Thus, the study has its limitations and the efficiency of the approach is open for further examination in future studies.

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