Table 1- Definition of search standards in the first step

|  |  |
| --- | --- |
| Standard | Standard domain |
| Article’s language | English |
| Date of publication | Articles published from 1970 to 2021.5.24 |
| Subject of the article | Investigation of the influence of urban policies on tendency to walk using ABM |
| Type of study | Articles published in journals and international conferences |
| Research information’s situation | Articles with transparent research findings and process |
| Database | Scupos and Web of Science webbases |

Source: research findings

Table 2- Extraction of concepts relevant to the simulation space structure categories

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Concepts | sources | Sub category | Category |
| 1 | Family income and socioeconomic status | (Aziz et al., 2018), (Lemoine et al., 2016), (Yang et al., 2015), (Gao, 2013), (Jin & white, 2012), (Yang et al., 2012), (Yang et al., 2011) | **Demography** | **Simulation space structure** |
| 2 | Age | (Aziz et al., 2018), (Lemoine et al., 2016), (Yang et al., 2015), (Yang et al., 2011) |
| 3 | Gender | (Aziz et al., 2018), (Yang et al., 2011) |
| 4 | Identity | (Aziz et al., 2018) |
| 5 | Education | (Aziz et al., 2018) |
| 6 | Owning a dog | (Yang et al., 2011) |
| 7 | Workplace | (Yang et al., 2011) |
| 8 | Ability to walk | (Yang et al., 2011) |
| 9 | Tendency to walk | (Yang et al., 2011) |
| 10 | Friends | (Yang et al., 2011) |
| 11 | Family dimensión | (Aziz et al., 2018), (Yang et al., 2015), (Yang et al., 2011) |
| 12 | Owning a personal car | (Aziz et al., 2018), (Yang et al., 2015) |
| 13 | Crime rate | (Yin, 2013), (Gao, 2013) |
| 14 | Population density | (Aziz et al., 2018) | **Built environment** |
| 15 | Building density | (Aziz et al., 2018) |
| 16 | Occupation density | (Aziz et al., 2018) |
| 17 | Land use | (Omer & kaplan, 2017), (Badland et al., 2013), (Yin, 2013), (Gao, 2013) |
| 18 | Train station | (Zellner et al., 2016) |
| 19 | Buildings | )Filomena & Verstegen, 2021(, (Aschwanden et al., 2011) |
| 20 | Places for leisure time activities which are suitable for physical activities | (Garcia et al., 2018) |
| 21 | Origins and destinations | (Filomena & Verstegen, 2021); (Filomena, Manley, Verstegen, 2020); (Abel & Faust, 2020), (Garcia et al., 2018), (Aziz et al., 2018), (Hu et al., 2017), (Lemoine et al., 2016), (Asriana & Indraprastha, 2016), (Zellner et al., 2016), (Omer & Jiang, 2015), (Yang et al., 2015), (Badland et al., 2013), (Yin, 2013), (Aschwanden et al., 2011) |
| 22 | Urban divisions (zonning, selection of the borderlines between neighborhoods and blocks) | (Filomena, Manley, Verstegen, 2020), (Aziz et al., 2018), (Zellner et al., 2016), (Yang et al., 2012) |
| 23 | Street network (knots, connections, streets, pavements, …) | (Filomena & Verstegen, 2021); (Filomena, Manley, Verstegen, 2020); (Abel & Faust, 2020), (Garcia et al., 2018), (Aziz et al., 2018); (Omer & kaplan, 2017), (Zellner et al., 2016), (Badland et al., 2013), (Gao, 2013), (Yang et al., 2012), (Jin & white, 2012), (Aschwanden et al., 2011) |
| 24 | Transportation network | (Abel & Faust, 2020), (Lemoine et al., 2016) |
| 25 | barriers (e.g.natural and severe barriers, walls, …) | (Filomena, Manley, Verstegen, 2020), (Hu et al., 2017) |
| 26 | Landmarks | (Filomena & Verstegen, 2021) |
| 27 | Stores | (Abel & Faust, 2020) |
| 28 | Lawscape | (Yang et al., 2020) |
| 29 | Segment analysis | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020), (Hanna, 2020), (Omer & kaplan, 2017), (Omer & Jiang, 2015), (Yin, 2013) |
| 30 | Walking | (Yang et al., 2021), (Hanna, 2021), (Filomena & Verstegen, 2021), (Florindo et al., 2021), (Huang, Kimm & Burry, 2021), (Filomena, Manley & Verstegen, 2020), )Abel & Faust 2020(, (Aziz et al., 2018), (Garcia et al., 2018), (Garcia et al., 2017), (Elbanhawy, 2017), (Hu et al., 2017), (Huang, White & Burry, 2017), (Omer & Kaplan, 2017), (Asriana & Indraprastha 2016), (Lemoine et al., 2016), (Zellner et al., 2016), (Omer & Jiang, 2015), (Yang et al., 2015), (Fidler & Hanna, 2015), (Badland et al., 2013), (Yin, 2013), (Zhu et al., 2013), (Jin & White, 2012), (Yang et al, 2012), (Aschwanden et al., 2011), (Yang et al., 2011), (Chen & Chiu 2006), (Turner & Penn, 2002). | **Transportation modes in the region** |
| 31 | Bicycle | (Aziz et al., 2018), (Zellner et al., 2016) |
| 32 | Public transportation (taxi, bus, BRT) | (Abel & Faust, 2020), (Lemoine et al., 2016), (Zellner et al., 2016), (Yang et al., 2015), (Yang et al., 2012) |
| 33 | Personal car | (Abel & Faust, 2020), (Lemoine et al., 2016), (Zellner et al., 2016), (Yang et al., 2015), (Yin, 2013), (Yang et al., 2012) |
| 34 | Boundary of the congestion charge zone | (Filomena & Verstegen 2021); (Yang et al., 2020), (Abel & Faust, 2020), (Badland et al., 2013) | **Study’s geography** |
| 35 | Boundary of the congestion charge zones | (Zellner et al., 2016), (Jin & White, 2012), (Gao, 2013) |
| 36 | The whole city | (Aziz et al., 2018), (Yin, 2013), (Jin & white, 2012), (Aschwanden et al., 2011) |
| 37 | Boundary of two or more cities | )Filomena, Manley, Verstegen, 2020(, (Omer & Kaplan, 2017), (Omer & Jiang, 2015) |
| 38 | Urban square | (Hu et al., 2017), (Asriana & Indraprastha, 2016) |
| 39 | Virtual | (Garcia et al., 2018), (Lemoine et al., 2016), (Yang et al., 2012) |
| 40 | Cognitive maps | (Yang et al., 2020) |

Source: research findings

Table 3- Extraction of concepts relevant to the agent categories

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | concepts | Sources | Sub category | category |
| 41 | Pedestrians, citizens or work population | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020); (Abel & Faust, 2020), (Garcia et al., 2018), (Aziz et al., 2018), (Omer & kaplan, 2017), (Hu et al., 2017), (Lemoine et al., 2016), (Asriana & Indraprastha, 2016), (Zellner et al., 2016), (Yang et al., 2015), (Badland et al., 2013), (Yin, 2013), (Gao, 2013), (Jin & white, 2012), (Yang et al., 2012), (Aschwanden et al., 2011) | **human** | **agents** |
| 42 | Food sellers | (Abel & Faust, 2020) |
| 43 | Mobility agents (e.g. public transportation) | (Abel & Faust, 2020) | **systemic** |
| 44 | Metric | (Omer & kaplan, 2017), (Omer & Jiang, 2015) | **Human and criterion-based** |
| 45 | topological | (Omer & kaplan, 2017), (Omer & Jiang, 2015) |
| 46 | angular | (Omer & kaplan, 2017), (Omer & Jiang, 2015) |

Source: research findings

Table 4: Extraction of concepts relevant to the interaction category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | concepts | Sources | Sub category | category |
| 47 | function | (Yang et al., 2021), (Hanna, 2021), (Filomena & Verstegen, 2021), (Florindo et al., 2021), (Huang, Kimm & Burry, 2021), (Filomena, Manley & Verstegen, 2020), )Abel & Faust 2020(, (Aziz et al., 2018), (Garcia et al., 2018), (Garcia et al., 2017), (Elbanhawy, 2017), (Hu et al., 2017), (Huang, White & Burry, 2017), (Omer & Kaplan, 2017), (Asriana & Indraprastha 2016), (Lemoine et al., 2016), (Zellner et al., 2016), (Omer & Jiang, 2015), (Yang et al., 2015), (Fidler & Hanna, 2015), (Badland et al., 2013), (Yin, 2013), (Zhu et al., 2013), (Jin & White, 2012), (Yang et al, 2012), (Aschwanden et al., 2011), (Yang et al., 2011), (Chen & Chiu 2006), (Turner & Penn, 2002). | **Agent’s act** | **interactions** |
| 48 | Functional variables and parameters | (Yang et al., 2021), (Hanna, 2021), (Filomena & Verstegen, 2021), (Florindo et al., 2021), (Huang, Kimm & Burry, 2021), (Filomena, Manley & Verstegen, 2020), )Abel & Faust 2020(, (Aziz et al., 2018), (Garcia et al., 2018), (Garcia et al., 2017), (Elbanhawy, 2017), (Hu et al., 2017), (Huang, White & Burry, 2017), (Omer & Kaplan, 2017), (Asriana & Indraprastha 2016), (Lemoine et al., 2016), (Zellner et al., 2016), (Omer & Jiang, 2015), (Yang et al., 2015), (Fidler & Hanna, 2015), (Badland et al., 2013), (Yin, 2013), (Zhu et al., 2013), (Jin & White, 2012), (Yang et al, 2012), (Aschwanden et al., 2011), (Yang et al., 2011), (Chen & Chiu 2006), (Turner & Penn, 2002). |
| 49 | Decisión rules | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020), (Hanna, 2020) (Abel & Faust, 2020), (Garcia et al., 2018), (Aziz et al., 2018), (Omer & kaplan, 2017), (Hu et al., 2017), (Lemoine et al., 2016), (Asriana & Indraprastha, 2016), (Zellner et al., 2016), (Badland et al., 2013), (Yin, 2013), (Gao, 2013), (Jin & white, 2012), (Yang et al., 2012), (Aschwanden et al., 2011) |
| 50 | Resident agent and bus agent | (Abel & Faust, 2020), (Zellner et al., 2016) | **Agent-agent interaction** |
| 52 | Influence of society’s behavior of people’s behavior | (Garcia et al., 2018), (Aziz et al., 2018) (Omer & Kaplan, 2017), (Zellner et al., 2016), (Yang et al., 2015), (Yin, 2013) |
| 53 | Residents and routes agent | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020), (Hanna, 2020), (Abel & Faust, 2020), (Omer & kaplan, 2017), (Zellner et al., 2016), (Jin & white, 2012), (Aschwanden et al., 2011) | **Agent-environment interaction** |
| 54 | Residents agent with transportation agent | (Abel & Faust, 2020); (Lemoine et al., 2016) |
| 55 | Human agent with the defined space by space syntax theory | (Omer & kaplan, 2017), (Omer & Jiang, 2015), (Hu et al., 2017), (Asriana & Indraprastha, 2016); (Yin, 2013) |

Source: research findings

Table 5- Extraction of concepts relevant to the scenario category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | concepts | Sources | Sub category | Category |
| 56 | Road-distance minimisation, RD scenario | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020) | **Cost-based scenarios** | **scenario** |
| 57 | Least cumulative angular change, AC scenario | (Filomena & Verstegen 2021); (Filomena, Manley, Verstegen, 2020) |
| 58 | Landscape-based scenario | (Filomena & Verstegen 2021) | **Built environment-based scenario** |
| 59 | Regionalisation-based | (Filomena, Manley, Verstegen, 2020) |
| 60 | Natural and severe barrier-based | (Filomena, Manley, Verstegen, 2020) |
| 61 | Street network change | (Badland et al., 2013) |
| 62 | Introduction of new food stores to the model | (Abel & Faust, 2020) |
| 63 | Transportation system development | (Abel & Faust, 2020), (Lemoine et al., 2016), (Zellner et al., 2016) |
| 64 | Pavement widening | (Aziz et al., 2018), (Aschwanden et al., 2011) |
| 65 | Reduction of pedestrians’ and bicycles’ incidents | (Aziz et al., 2018) |
| 66 | Development of pedestrians and bike lanes | (Jin & White, 2012) |
| 67 | Random distribution of non-residential functions and safety levels without considering the income rate | (Yang et al., 2015) | **Distribution-based scenario** |
| 68 | Segmentation of the city into central regions for low-income families and outskirts for high-income families | (Yang et al., 2015) |
| 69 | Safety improvement as approaching the downtown | (Yang et al., 2015) |
| 70 | Non-residential function density rise as moving from outskirt to downtown | (Yang et al., 2015) |

Source: research findings

Table 6- Extraction of concepts relevant to the validation category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Concepts | sources | Sub category | category |
| 72 | Consistency analysis | (Omer & kaplan, 2017), (Florindo et al., 2021) | **Calibration** | **Model Accuracy** |
| 73 | Simultaneous Perturbation Stochastic Approximation (SPSA) | (Aziz et al., 2018) |
| 74 | Change in initial values of parameters | (Garcia et al., 2018), (Lemoine et al., 2016), (Jin & White, 2012) |

Source: research findings

Table 7- Extraction of the concepts relevant to the verification category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Concepts | sources | subcategory | category |
| 75 | Applying experimental data to define agents’ behavior in model creation | (Abel & Faust, 2020), (Yang et al., 2020), (Yin, 2013), (Jin & White, 2012) | **validation of conceptual model** | **Verification and Validation** |
| 76 | Sensitivity analysis | (Abel & Faust, 2020), (Garcia et al., 2018) | **Operational validity** |
| 77 | Consistency analysis | (Garcia et al., 2018) |
| 78 | Consistency of the model’s output data with experimental data (e.g. consistency of average numbers of commuting to food stores in the real world with the model’s output) | (Abel & Faust, 2020); (Filomena & Verstegen 2021); (Lemoine et al., 2016), (Asriana & Indraprastha, 2016), (Yin, 2013); (Omer & kaplan, 2017) | **Data validity** |
| 79 | Logical trace of the governing rules and the model’s investigation during its operation | (Abel & Faust, 2020); (Filomena, Manley, Verstegen, 2020) | **Computer-based verification** |

Source: research findings