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IS ALMATY A 15-MINUTE CITY? WALKING ACCESS TO SIX EVERYDAY PLACES FROM 170,838 BUILDINGS IN THE CITY'S EIGHT DISTRICTS

Abstract: The "15-minute city" is the idea that people should be able to reach the places they need every day within a short walk of home. This study measures how close Almaty is to that idea. Using OpenStreetMap data for Almaty (extract of 12 October 2026), 170,838 buildings in the city's eight districts were checked for six places chosen by the author before the calculation. These were a grocery shop, a pharmacy, a school, a clinic, a park and a public transport stop. A place counted as reachable if it was within 1.2 km along the mapped walking network, about 15 minutes at 4.8 km/h. Only 19.5% of buildings had all six places within this distance; measured in a straight line, the share would be 38.7%. Parks (39.4%) and pharmacies (45.4%) were reachable least often and stops most often (90.4%), although OpenStreetMap records fewer than half the 870 pharmacies counted in Almaty in 2018. Almaly district came first (76.0%), followed by Auezov (42.7%) and Bostandyk (36.5%), while Nauryzbay (6.1%) and Alatau (2.2%) came last. Before the calculation the author had predicted Almaly and Bostandyk as the most walkable districts and Nauryzbay and Alatau as the least walkable. Almaly ranked first and Alatau last under every definition tested, but the order of the districts in between changed with the definitions. The whole prediction held under four of nine definitions, three of which were narrower place definitions added after the main results. Within Bostandyk, 77.0% of buildings in the northern third had all six places nearby, against 0.5% in the southern third, toward the mountains.

Keywords: 15-minute city; walkability; accessibility; OpenStreetMap; walking network; Almaty; urban planning

1. Introduction

The 15-minute city is a model of urban planning in which residents can reach the places they need for daily life, such as shops, schools, health care and green space, within a short walk or bicycle ride of home [1]. The idea has spread quickly, and several studies have measured how far real cities are from it. Using openly available map data, a study of cities around the world measured how long it takes to reach essential services and found strong differences in access both within and between cities, with local population density playing a key role [2]. A study of Barcelona measured walking times along the street network from every cadastral parcel and found that most residents of this dense city live within 15 minutes of services, with shortfalls in peripheral areas [3].

Almaty is the largest city of Kazakhstan. In an earlier study the author found that informal shortcuts mapped in OpenStreetMap in Almaty lie where the walking network makes people detour most. The network route between their ends is a median 2.16 times the straight line, against 1.38 for nearby random pairs of points [4]. This study asks how many buildings in

Almaty have the places that people need every day within walking distance, and how this differs between districts.

The study has three parts. First, it measures, for every building in the city's districts, which of six everyday places are within about 15 minutes' walk. Second, it compares the eight districts of Almaty. Third, it compares the results with a prediction that the author wrote down before any calculation was made.

2. Data and methods

2.1. Data

All data come from OpenStreetMap, an open map of the world made by volunteers [5]. Buildings, places and the walking network were taken from the Geofabrik extract of OpenStreetMap for Kazakhstan with replication timestamp 12 October 2026, 20:21 UTC [6]. The boundaries of Almaty's eight districts (Alatau, Almaly, Auezov, Bostandyk, Medeu, Nauryzbay, Turksib and Zhetysu) were downloaded separately from OpenStreetMap through the Overpass API, with data as of 31 May 2026 [7]. Every building inside the districts was included except three groups. These were buildings tagged with a non-residential use (such as industrial buildings, garages, shops, offices, schools and hospitals), buildings that are themselves recorded as a shop, café, place of worship or similar amenity, and structures with a footprint under 30 m². This left 170,838 buildings. Of these, 63,304 were tagged as homes (houses, apartment buildings and other residential buildings) and 6,927 as apartment buildings; most of the others had no stated use.

2.2. Six everyday places

The author chose six kinds of places from a list of examples given by her mentor and gave her own reason for each. A grocery shop is needed because people buy food often, and a pharmacy and a clinic in case someone falls ill or needs medicine. A school should be close because travelling far to school every day is hard for families. A park is for walks and rest, and a public transport stop is needed because not every trip can be made on foot. In OpenStreetMap these were found as supermarkets, convenience and grocery shops (1,059 inside the eight districts), pharmacies (359), schools (271), clinics, hospitals and doctors' offices (346), parks (126) and bus stops, transport platforms and metro entrances (1,978 mapped points). Places just outside the city boundary were also used, so that buildings at the edge of the city were not counted as lacking a place that is just across the boundary.

After the main results had been calculated, two narrower definitions were added as a check, because the author had described a polyclinic and "a big, proper park". The first counts only parks with an area of at least 2 ha (38 in the city). The second counts only medical objects whose name contains the word for polyclinic in Russian or Kazakh, leaving out departmental and specialist clinics such as those of the police, the security service, the army, an eye institute and a dental clinic (30 in the city). A report from 2018 gave 77 polyclinics in Almaty [8], so this layer is incomplete and was used only to test how sensitive the ranking is.

2.3. Measures

The main measure is the walking distance from each building to the nearest place of each kind along the walking network of OpenStreetMap. The network included streets of every class, service roads, footways, paths, tracks, steps, cycleways and the outlines of pedestrian squares, in total 19,618 km in the study area; 78 km of it were roads with private access, some of which may be gated. Motorways (267 km), ways that are proposed, under construction or abandoned (46 km) and ways closed to pedestrians (28 km) were excluded. Every way was divided into pieces of at most 20 m, and each building and each place was joined to the nearest of these

points; for buildings the median distance to the network was 17 m. Places mapped as areas, such as schools and parks, were reached at the nearest point of their outline. A place was counted as reachable if it was within 1.2 km, which takes 15 minutes at a walking speed of 4.8 km/h.

The share of buildings in a district with all six places within this distance is the main result. The same share was also calculated with straight-line distances, which ignore detours and therefore give an upper bound. It was further calculated for homes and for apartment buildings only, with the two narrower place definitions, with thresholds of 0.8, 1.0 and 1.5 km, and for the southern, middle and northern thirds of Bostandyk and Auezov districts, split by latitude. Every number in the paper was calculated by a Python script from the downloaded data.

2.4. Prediction

Before seeing any results, the author predicted that the most walkable districts would be Almaly, because it is the city centre and everything is close together, and Bostandyk, because it has many shops, schools, cafés and pharmacies near housing. She predicted that the least walkable would be Nauryzbay and Alatau, because they are far from the centre and have many new areas where everyday places are further apart. She also described her own neighbourhood. From her home she can walk to a shop, a pharmacy, a stop, a school and a kindergarten within 15 minutes; a polyclinic is at about the limit, and a large park takes about 20 minutes on foot.

3. Results

3.1. The whole city

Across Almaty, 19.5% of buildings had all six places within 1.2 km on foot (Table 1). For single places the shares were higher: 90.4% of buildings had a stop within this distance, 73.3% a grocery shop, 65.7% a school, 49.1% a clinic, 45.4% a pharmacy and 39.4% a park. Measured in a straight line, the share with all six places nearby would have been 38.7%. Where the nearest place of a kind was 200 to 1,500 m away in a straight line, the walking distance to the nearest place of that kind was a median of 1.45 times longer. For homes the walking share was 18.6%, and for apartment buildings 56.8%.

Table 1. Share of buildings with each place within 1.2 km on foot, by district, %

District	Buildings	Pharmacy	School	Clinic	Park	All six	All six, straight line
Almaly	7,065	100	98	99	78	76.0	94.8
Auezov	9,999	87	98	94	52	42.7	77.7
Bostandyk	17,386	52	67	52	49	36.5	56.8
Medeu	22,687	40	64	51	60	27.1	45.2
Turksib	25,951	63	76	53	55	23.8	53.5
Zhetysu	17,137	57	76	37	44	12.9	35.7
Nauryzbay	32,042	21	46	36	23	6.1	21.1
Alatau	38,571	28	57	40	14	2.2	12.5
Almaty (city)	170,838	45	66	49	39	19.5	38.7

Note: Districts are ordered by the share of buildings with all six places within 1.2 km on foot. The last column uses straight-line distance. A grocery shop was within 1.2 km on foot of 56-100% and a public transport stop of 87-100% of buildings in every district; these two places are not shown. Shares for single places are rounded to whole per cent. Source: OpenStreetMap, extract of 12 October 2026 [6]; author's calculation.

Parks and pharmacies were reachable least often, but the pharmacy result is partly a gap in the map: OpenStreetMap records 359 pharmacies in the eight districts, while a count of pharmacies in Almaty in January 2018 gave 870 [9].

3.2. Districts

The differences between districts were large (Table 1, Figure 1). In Almaty, 76.0% of buildings had all six places within 1.2 km on foot. Auezov came second with 42.7% and Bostandyk third with 36.5%. At the bottom, only 6.1% of buildings in Nauryzbay and 2.2% in Alatau had all six places nearby; in these two districts a park was within walking distance of 14-23% of buildings and a pharmacy of 21-28%.

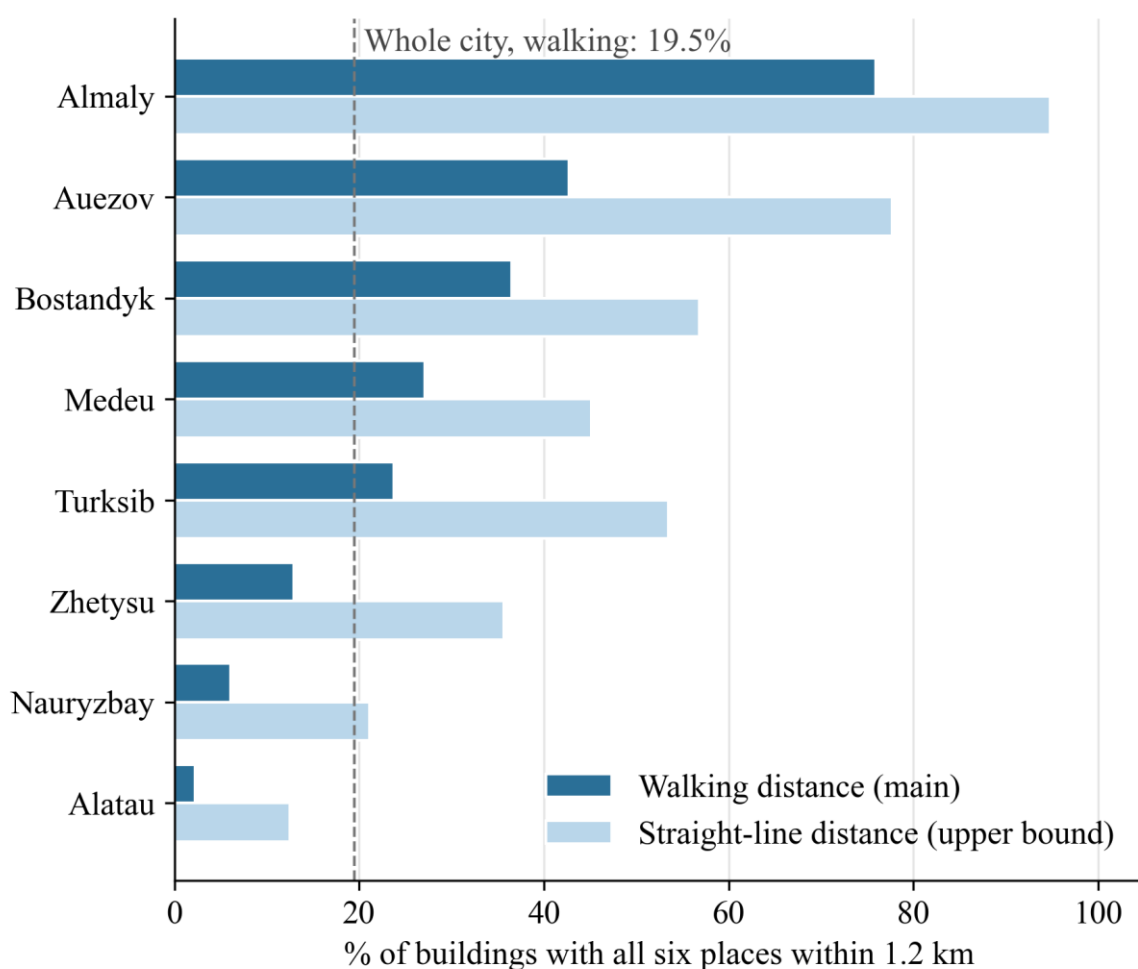


Figure 1. Share of buildings with all six everyday places within 1.2 km, by district, measured along the walking network and in a straight line. The dashed line shows the whole city on foot. Source: OpenStreetMap, extract of 12 October 2026 [6]; author's calculation.

The order of the districts was the same with thresholds of 0.8 km and 1.0 km. With 1.5 km only Turksib (40.8%) and Medeu (38.9%) changed places. Leaving out pharmacies, the place most affected by gaps in the map, moved Medeu from fourth to third place, ahead of Bostandyk.

Apartment buildings had better access than buildings as a whole in every district. The gap was largest in Medeu (83.9% of apartment buildings against 27.1% of all buildings) and Bostandyk (80.5% against 36.5%), and smallest in Alatau, where only 2.6% of apartment buildings had all six places nearby.

3.3. The prediction

The comparison with the author's prediction depends on how buildings and places are defined (Table 2). Under every definition tested, Almaly ranked first and Alatau last, as she predicted. With the main definitions, Nauryzbay was seventh, as predicted, but Auezov, not Bostandyk, came second, 6.2 percentage points ahead of Bostandyk. When only homes were counted, Bostandyk came second on foot, but Nauryzbay moved up to fifth. When only apartment buildings were counted, Medeu came second on foot and Bostandyk second in a straight line. Under the three narrower place definitions, added after the main results, the ranking matched her prediction in all four positions. In two of them, however, less than one percentage point separated Nauryzbay in seventh place from the district in sixth.

Table 2. Districts ranked first, second, seventh and eighth by the share of buildings with all six places nearby, under different definitions

Definition	First	Second	Seventh	Eighth	Matches
All buildings, walking (main)	Almaly	Auezov (6.2)	Nauryzbay (6.9)	Alatau	3 of 4
All buildings, straight line	Almaly	Auezov (20.9)	Nauryzbay (14.6)	Alatau	3 of 4
Homes, walking	Almaly	Bostandyk (8.2)	Turksib (1.6)	Alatau	3 of 4
Homes, straight line	Almaly	Auezov (7.2)	Zhetysu (0.6)	Alatau	2 of 4
Apartment buildings, walking	Almaly	Medeu (3.4)	Nauryzbay (15.3)	Alatau	3 of 4
Apartment buildings, straight line	Almaly	Bostandyk (7.0)	Nauryzbay (24.0)	Alatau	4 of 4
Parks of 2 ha or more*	Almaly	Bostandyk (2.0)	Nauryzbay (4.1)	Alatau	4 of 4
Polyclinics*	Almaly	Bostandyk (4.1)	Nauryzbay (0.1)	Alatau	4 of 4
Parks of 2 ha and polyclinics*	Almaly	Bostandyk (3.6)	Nauryzbay (0.7)	Alatau	4 of 4

Note: The prediction was Almaly and Bostandyk first and second in any order, and Nauryzbay and Alatau seventh and eighth in any order. Numbers in brackets are, for the second place, its lead over the third and, for the seventh place, its gap to the sixth, in percentage points. Rows marked * use all buildings, walking distance and a narrower definition of one or two places, added after the main results had been seen. Source: OpenStreetMap, extract of 12 October 2026 [6]; author's calculation.

3.4. North and south within Bostandyk and Auezov

After seeing the first results, which came from an earlier straight-line version of this analysis, the author was asked why Bostandyk did so much better for apartment buildings than for buildings as a whole. She suggested that Bostandyk contains many new residential complexes with services around them, but also many private houses, especially closer to the mountains, where buildings are more spread out and everyday places are further away, while Auezov is more densely built. To look at this, the buildings of Bostandyk and Auezov were

divided into three groups of equal size by latitude, since the mountains lie to the south of the city (Table 3).

Table 3. Building types and access to everyday places on foot in the southern, middle and northern thirds of Bostandyk and Auezov districts, % of buildings

Part of district	Extent, km	Apartment buildings	Houses	All six	Pharmacy	Clinic	Park
Bostandyk, south	7.0	0.6	16	0.5	11	11	14
Bostandyk, middle	2.3	4.6	46	32.1	54	55	46
Bostandyk, north	3.9	24.5	12	77.0	92	91	85
Auezov, south	1.8	6.5	11	37.7	80	94	55
Auezov, middle	1.3	10.4	14	51.0	92	99	51
Auezov, north	2.6	15.5	16	39.3	91	88	51

Note: Each district's buildings are split into three groups of equal size by latitude (5,795-5,796 buildings in each group in Bostandyk and 3,333 in Auezov); the south lies toward the mountains. Extent is the north-south distance between the 5th and 95th percentiles of the buildings in each group. Apartment buildings and houses are shares of buildings with these tags; shares of places are within 1.2 km on foot. Buildings with no stated use: 83%, 45% and 63% in the southern, middle and northern thirds of Bostandyk and 80%, 75% and 68% in Auezov. Source: OpenStreetMap, extract of 12 October 2026 [6]; author's calculation.

In the northern third of Bostandyk, where a quarter of buildings are apartment buildings, 77.0% of buildings had all six places within walking distance. In the southern third, 0.6% of buildings are tagged as apartment buildings, 83% have no stated use, and almost none (0.5%) had all six places nearby. A pharmacy, a clinic or a park was within walking distance of only 11-14% of buildings there. Most buildings of the southern third lie within 7 km south of the middle third, and a few lie up to 15 km south. Buildings tagged as houses were most common in the middle third (46%), not in the south (16%). In Auezov the three parts were much more alike, and the place most often missing was a park.

4. Discussion

Measured along the mapped walking network, Almaty is far from being a 15-minute city for most of its buildings. Fewer than one in five buildings had a grocery shop, a pharmacy, a school, a clinic, a park and a stop within 1.2 km on foot, and in Alatau almost none did. Measured in a straight line the share roughly doubles (38.7% against 19.5%), so the walking network adds much of the distance.

A district's average can hide large differences inside it. Bostandyk as a whole was third, but its northern third had about the same share as Almaly, the best district (77.0% against 76.0%), while its southern third had almost none. Access in Bostandyk falls toward the mountains, as the author suggested. Most buildings there have no stated use, however, so whether they are private houses cannot be checked from the map.

Her other suggestion, that Auezov is more densely built, is supported when density is measured by built-up area. In the parts of each district that have buildings, building footprints

cover 16.3% of the land in Auezov and 11.2% in Bostandyk; Almaly, the best district, has the highest share (19.6%). Counting buildings gives a different picture: Nauryzbay has more buildings per square kilometre (about 600) than Auezov (about 400), yet its footprints cover only 10.3% of the land, so a count of buildings does not show how densely an area is built. The study of cities worldwide also found local population density to be important for access [2].

Apartment buildings had better access than other buildings in every district. In Bostandyk they were also better served than other buildings in the same third (87.0% against 73.8% in the north and 55.8% against 30.9% in the middle). In Auezov the difference was large in the south (72.9% against 35.2%), smaller in the middle (58.6% against 50.2%) and absent in the north (38.6% against 39.5%). Because access here depends only on where a building stands, this means that apartment buildings stand in better-served spots even within the same part of a district. The data do not show when a building was built, so her suggestion that new residential complexes bring their own services could not be tested.

Almaly first and Alatau last did not depend on the definitions, but the places between them did. Her whole prediction held under four of nine definitions. Three of these use narrower place definitions that were chosen after the main results because they are closer to her own description of her neighbourhood, and in two of them less than one percentage point separated the seventh place from the sixth. This agreement is therefore weak evidence for the middle of her prediction.

These results agree with studies of other cities, which also found large differences in access to everyday services within the same city [2] and weaker access in peripheral areas [3].

5. Limitations

OpenStreetMap is made by volunteers and is incomplete. It records fewer than half as many pharmacies as were counted in Almaty in 2018 [9] and fewer than half as many polyclinics as were reported in the same year [8]. Courtyard paths and informal shortcuts are often missing from the walking network, so walking distances may be overestimated in some places, while straight-line distances underestimate them. On the other hand, main roads were treated as walkable along their whole length and could be crossed wherever the map joins them to another way, and private access roads were included, so some routes may be shorter than in reality. Many buildings have no stated use, so some garages or other non-residential buildings may have been counted. Private houses and large apartment buildings were counted equally, although an apartment building is home to many more people; the results therefore describe buildings, not residents. A place was counted as reachable regardless of its size, quality or opening hours. The 1.2 km threshold assumes a walking speed of 4.8 km/h and does not reflect slopes, which are steep in the south of the city. Finally, the split of districts into thirds by latitude is a simple way to separate the parts of a district closer to the mountains, not an official division.

6. Conclusion

In October 2026, 19.5% of buildings in Almaty had a grocery shop, a pharmacy, a school, a clinic, a park and a public transport stop within 1.2 km along the walking network, about 15 minutes on foot; in a straight line the share would have been 38.7%. The central district of Almaly came closest to the 15-minute model and Alatau was furthest from it, as the author had predicted, while the order of the districts in between depended on how buildings and places were defined. Inside Bostandyk, the northern third had about the same share as Almaly, and the southern third, toward the foothills, had almost none. Parks and pharmacies were reachable least often, although the pharmacy result is partly a gap in the map.

Data availability

All data are publicly available from OpenStreetMap [5], through the Geofabrik extract for Kazakhstan [6] and the Overpass API [7]. The extract used here (replication sequence number 4919) has since been replaced at the Geofabrik address by newer data. The scripts that calculate every number in the paper are available from the author's mentor on request.

AI and tools disclosure

The author chose this topic from two topics proposed by her mentor and chose the six everyday places from a list of examples, giving her own reason for each. Before the calculation she wrote down her prediction and a description of her own neighbourhood. She found two of the studies cited here [2, 3] and, after seeing the first results, wrote the explanation for Bostandyk and Auezov that is examined in Section 3.4. The data were downloaded and analysed, the tables and the figure were made, and the text was drafted by the author's mentor with the help of a generative AI assistant (Claude, Anthropic). The scripts and text were also reviewed by separate AI assistants; corrections were made by the mentor. The author read and approved the final text.

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Conflicts of interest. The author declares no conflicts of interest.

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МАЗМҰНЫ – СОДЕРЖАНИЕ – CONTENT

ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ЖӘНЕ ҚҰҚЫҚ ҒЫЛЫМДАРЫ - СОЦИАЛЬНО-ЭКОНОМИЧЕСКИЕ И ЮРИДИЧЕСКИЕ НАУКИ - SOCIO-ECONOMIC AND LEGAL SCIENCES

Төлегенов Тимур Сейфуллаулы

**ДИНАМИКА ТУРИСТСКИХ ПОТОКОВ И ЭФФЕКТИВНОСТЬ ИНФРАСТРУКТУРЫ
ТУРКЕСТАНА: ОТ ЭКСТЕНСИВНОГО РОСТА К СМАРТ-УПРАВЛЕНИЮ 10**

Alexander Gorevoy

**WHICH INEQUALITY STATISTICS SURVIVE AN ADMINISTRATIVE BOUNDARY CHANGE?
EVIDENCE FROM KAZAKHSTAN, 2010–2023 14**

Rakhimov Djalil

**DOES THE SHIFT TO CASHLESS PAYMENTS GO TOGETHER WITH FASTER GROWTH IN
HOUSEHOLD CREDIT? EVIDENCE FROM THE REGIONS OF KAZAKHSTAN, 2023-2025 26**

Kazhgerey Asan

**HOW MANY FOOD BASKETS DOES AN AVERAGE WAGE BUY? WAGES AND FOOD PRICES IN
THE 20 REGIONS OF KAZAKHSTAN, 2024-2026 37**

Tagimova Alua

**WHO WAS LEFT BEHIND? EDUCATION AND FINANCIAL INCLUSION IN KAZAKHSTAN AND
THREE CENTRAL ASIAN NEIGHBOURS, 2021-2024 44**

Wei Wei, Mynzhanova Gulzhakan, Niyetalina Gaukhar

**DIGITAL–PHYSICAL INTEGRATION AND ECONOMIC PERFORMANCE IN INDUSTRIAL
INTEGRATED ENERGY SYSTEMS: A SCENARIO-BASED ANALYSIS OF SMART GRID
CONTROL, BATTERY ENERGY STORAGE, AND DIGITAL TWINS 51**

Xu Fumin, Wei Wei, Ruziyeva Elvira, Moldabekova A.

**FROM CULTURAL RESOURCES TO GLOBAL CONSUMER VALUE: THE BRIDGE–IMC MODEL
AND THE INTERNATIONALIZATION OF BLACK MYTH: WUKONG UNDER THE BELT AND
ROAD INITIATIVE 64**

Ibraimkhan Alikhan

**WHICH CRIMES CAN A 14-YEAR-OLD BE TRIED FOR? THE LIST IN ARTICLE 15 OF
KAZAKHSTAN'S CRIMINAL CODE COMPARED WITH 30 OTHER JURISDICTIONS 80**

Yerboluly Madi

**DID IMPORTED CARS REALLY GET CHEAPER? CHINESE CARS AND THE AVERAGE
CUSTOMS VALUE OF PASSENGER CARS IMPORTED INTO KAZAKHSTAN, 2015-2025 91**

Салимбаев Ербол Аманжолович

**АНАЛИЗ ИНВЕСТИЦИОННОЙ АКТИВНОСТИ КАК ИНДИКАТОР ИЗМЕНЕНИЙ
ПОТЕНЦИАЛЬНОГО СПРОСА НА КОНСАЛТИНГОВЫЕ УСЛУГИ 99**

Rambergenov Ramil

**REGIONAL NEW-FIRM FORMATION IN UZBEKISTAN AFTER THE 2017 REFORMS:
PERSISTENCE IN SCALE, CONVERGENCE IN INTENSITY, AND RECOMPOSITION TOWARD
TRADE 107**

Abdesh Dinara

**FROM A WOMEN'S LEAD TO A MEN'S LEAD: THE GENDER GAP IN DIGITAL PAYMENTS IN
KAZAKHSTAN AND THREE CENTRAL ASIAN NEIGHBOURS, 2021-2024 116**

Amangeldi Aidana

**DID SMALL BUSINESS IN KAZAKHSTAN REALLY SHRINK IN 2026? THE NEW TAX CODE,
REGIONAL TAX RATES AND THE FALL IN THE NUMBER OF INDIVIDUAL ENTREPRENEURS 124**

Cheng Che	
BUILD, BUY, OR PARTNER? ENTRY MODE SELECTION AND RISK GOVERNANCE FOR WIND POWER INVESTMENT IN KAZAKHSTAN	133
Wang Liang	
FROM CAPACITY EXPANSION TO SYSTEM VALUE: COORDINATED DEVELOPMENT OF RENEWABLE ENERGY, GRID FLEXIBILITY AND ENERGY STORAGE IN KAZAKHSTAN	146
Chen Jun	
CONSTRUCTION-PERIOD CREDIT RISK MANAGEMENT FOR LARGE INFRASTRUCTURE PROJECT FINANCE IN KAZAKHSTAN	159
Alniyaz Danial	
HOW MUCH FUEL DOES A HYBRID REALLY SAVE? A SAME-MODEL COMPARISON OF HYBRID AND GASOLINE CARS IN US FUEL ECONOMY	173
Assem Yergali, Maral Assanova	
DIGITAL TRANSFORMATION AND SUSTAINABLE BUSINESS MODEL INNOVATION IN SMALL AND MEDIUM-SIZED ENTERPRISES: A SYSTEMATIC REVIEW OF DYNAMIC CAPABILITIES, VALUE CREATION, AND THE CREDIBILITY GAP IN EMERGING ECONOMIES	180
ТЕХНИКАЛЫҚ ҒЫЛЫМДАР - ТЕХНИЧЕСКИЕ НАУКИ - TECHNICAL SCIENCE	
Nurmakhan Almira	
ADVANTAGES OF FIBER OPTIC COMMUNICATION OVER TRADITIONAL COPPER CABLES	193
Kozhabai Bereke	
SECURITY CHALLENGES IN IOT-BASED TELECOMMUNICATION NETWORKS	201
Azamatulys Yerasyl	
WHY AI-GENERATED CODE FAILS A BENCHMARK: A FAILURE ANALYSIS OF THREE OPEN LANGUAGE MODELS ON 30 HUMANEVAL+ TASKS	210
Nurzhan Sanzhar	
A FEW SHELLS, A FEW OPERATORS: WHERE LOW EARTH ORBIT IS CROWDED IN AN ALTITUDE-INCLINATION MAP OF 16,620 ACTIVE SATELLITES	219
Askarbek Nurislam	
CAN THE WEATHER TELL WHICH DAYS IN ASTANA WILL BE POLLUTED? CLASSIFYING PM_{2.5} EXCEEDANCE DAYS WITH MACHINE LEARNING AND CHECKING THE DATA AGAINST A GROUND MONITOR	225
Ilyas Arman	
SHOOTING ON THE MOVE: HOW MUCH AIM A ROBOT LOSES BY IGNORING ITS OWN VELOCITY, AND WHETHER A VIRTUAL-TARGET CORRECTION RECOVERS IT	236
Ануар Әлімжан Бахытжанұлы, Сексенбаева Айша Курманбековна	
СРАВНИТЕЛЬНЫЙ АНАЛИЗ СТАНДАРТОВ И МЕТОДИК ОБУЧЕНИЯ КИБЕРБЕЗОПАСНОСТИ: NICE FRAMEWORK, ECSF И ПРАКТИКО- ОРИЕНТИРОВАННЫЕ ТЕХНОЛОГИИ	242
Mukhamedzhan Yerganat	
GROWTH OF GITHUB DEVELOPER COMMUNITIES IN KAZAKHSTAN, UZBEKISTAN AND KYRGYZSTAN, 2020-2026: EVIDENCE FROM THE GITHUB INNOVATION GRAPH	252
Kashkinov Alden	
WHAT DECIDES HOW LONG A LANDER WORKS ON ANOTHER WORLD? SURFACE LIFETIMES OF 55 LANDERS ON THE MOON, VENUS, MARS, TITAN AND SMALL BODIES IN THE GCAT CATALOGUE, 1966-2025	264

Kenesbek Miras	
HOW MANY HERONIAN TRIANGLES HAVE A GIVEN LONGEST SIDE? A COMPLETE COUNT UP TO 2000 AND THE RIGHT TRIANGLES HIDDEN INSIDE	276
Amirlan Seitkadyrov, Akezhan Omashev	
AUTOMATIC MULTIPLE-CHOICE QUESTION GENERATION USING ARTIFICIAL INTELLIGENCE	287
Idrissov Amirzhan	
WHERE DO SMALL OPEN LANGUAGE MODELS BREAK ON OLYMPIAD MATHEMATICS? DOMAIN, DIFFICULTY AND MODEL SIZE ON OMNI-MATH	296
ПӘНДЕР АРАЛЫҚ ҒЫЛЫМДАР – МЕЖДИСЦИПЛИНАРНЫЕ НАУКИ – INTERDISCIPLINARY SCIENCES	
Albiyev Asser	
HOW MUCH OF AN ARTICLE COUNT IS HUMAN WORK? DECOMPOSING THE CREATION OF FIVE WIKIPEDIAS, 2010–2025	301
Amangeldy Nurbolat	
HOW MUCH OF KAZAKHSTAN'S URBAN BUILT STOCK PREDATES ITS SEISMIC CODES, AND WHERE DOES THAT STOCK SIT RELATIVE TO HAZARD?	311
Torekhan Sabrina	
WHERE ALMATY WALKS ITS OWN WAY: INFORMAL SHORTCUTS IN OPENSTREETMAP AND THE DETOURS THEY AVOID	317
Ailan Salybekova	
PARENTAL SUPPORT, PARENTAL CONTROL, STRESS AND EARLY ALCOHOL USE IN ADOLESCENT GIRLS: A NARRATIVE REVIEW WITH A FOCUS ON KAZAKHSTAN	322
ӘЛЕУМЕТТІК ЖӘНЕ ГУМАНИТАРЛЫҚ ҒЫЛЫМДАР - СОЦИАЛЬНО-ГУМАНИТАРНЫЕ НАУКИ - SOCIAL SCIENCES AND HUMANITIES	
Мұқатаева Айзат Амантайқызы, Стамбекова Жанат Байғазықызы, Слямханова Гүлім Болатқызы, Қызырбек Аяулым Ерболқызы	
ЖАСАНДЫ ИНТЕЛЛЕКТ ДӘУІРІНДЕГІ ҒЫЛЫМИ ТАНЫМ: ПОППЕР, КУН ЖӘНЕ ЛАКАТОС ИДЕЯЛАРЫ ТҮРҒЫСЫНАН ТАЛДАУ	330
Мұқатаева Айзат Амантайқызы, Сапарханова Мадина Төлегенқызы, Окенова Аружан Муратхановна, Тұрсынғазыева Ақерке Ерболатқызы	
ШӘКӘРІМ ФИЛОСОФИЯСЫНДАҒЫ ЕРКІНДІК ЖӘНЕ МОРАЛЬДЫҚ ТАҢДАУ МӘСЕЛЕСІ	340
Komekova Saida	
DO UNHAPPY REVIEWERS MIX IN MORE RUSSIAN? STAR RATINGS AND KAZAKH-RUSSIAN CODE-SWITCHING IN 175,002 ONLINE REVIEWS	349
Zhumagali Yerbol	
DOES A BIGGER MODEL CLOSE THE GAP? KAZAKH-LANGUAGE ACCURACY ON KAZAKHSTAN-SPECIFIC VERSUS UNIVERSAL SCHOOL SUBJECTS IN SMALL OPEN-WEIGHT LANGUAGE MODELS	362
Abdrakhmanova Madina	
DOES A MEDAL BUY ATTENTION? WIKIPEDIA VIEWS OF KAZAKHSTAN'S ATHLETES BEFORE AND AFTER THE PARIS 2024 OLYMPIC	366

ПЕДАГОГИКАЛЫҚ ЖӘНЕ ПСИХОЛОГИЯЛЫҚ ҒЫЛЫМДАР – ПЕДАГОГИЧЕСКИЕ И ПСИХОЛОГИЧЕСКИЕ НАУКИ – PEDAGOGICAL AND PSYCHOLOGICAL SCIENCES

Kaldarbek Mergen

FAMILY OR SCHOOL? SOCIOECONOMIC COMPOSITION AND MATHEMATICS

ACHIEVEMENT IN KAZAKHSTAN, PISA 2022 AND 2025 374

Zhenis Adilzhan

WHICH OLYMPIAD PROBLEMS DO STUDENTS TAKE TO THE BOARD? CHOICES AND

DEFENCES IN THE 8TH-GRADE LEAGUE OF KARAGANDY MATHBATTLES 2026 381

Базарбаева Айнура Бектуровна

ДЕТСКИЙ ФОЛЬКЛОР И ПОДВИЖНЫЕ ИГРЫ КАК ИНСТРУМЕНТЫ ФОРМИРОВАНИЯ

ОСНОВ ПРАВОВОЙ КУЛЬТУРЫ У ДЕТЕЙ СТАРШЕГО ДОШКОЛЬНОГО ВОЗРАСТА 388

БИОЛОГИЯ ҒЫЛЫМДАР - БИОЛОГИЧЕСКИЕ НАУКИ - BIOLOGICAL SCIENCES

Bazhenova Diana

GROWTH DYNAMICS OF STERLET (*Acipenser ruthenus* L.) REARED IN A RECIRCULATING

AQUACULTURE SYSTEM 391

ТУРИСТИЧЕСКИЕ И СПОРТИВНЫЕ НАУКИ - ТУРИСТІК ЖӘНЕ СПОРТ ҒЫЛЫМДАРЫ - TOURISM AND SPORTS SCIENCES

Төлеп Жазира Маратқызы

ГАСТРОНОМИЯЛЫҚ ФЕСТИВАЛЬДЕРДІҢ ТУРИСТІК ДЕСТИНАЦИЯ ТАРТЫМДЫЛЫҒЫН

ҚАЛЫПТАСТЫРУДАҒЫ РӨЛІ МЕН ДАМУ ҮРДІСТЕРІ 398

ЕСТЕСТВЕННЫЕ НАУКИ - ЖАРАТЫЛЫСТАНУ ҒЫЛЫМДАРЫ - NATURAL SCIENCES

Нургельдина Асель Ермаковна, Серикбаева Жанерке Алимжановна

ШЕКАРАСЫЗ ФИЗИКА: ӘР ЕЛДЕГІ ФИЗИКАЛЫҚ БІЛІМДІ САЛЫСТЫРУ 405

Torekhan Sabrina

IS ALMATY A 15-MINUTE CITY? WALKING ACCESS TO SIX EVERYDAY PLACES FROM

170,838 BUILDINGS IN THE CITY'S EIGHT DISTRICTS 412