Postal Development Report 2020

Achieving higher
performance
amid a major crisis

October 2020

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About this report

This report benchmarks the situation of postal development around the world in 2020 – a crucial topic owing to the important role played by the postal sector in promoting socio-economic development. The analysis is based on the Integrated Index for Postal Development (2IPD), which draws on a wide range of postal (big) data from numerous sources to provide a composite picture of postal development in 170 countries. Switzerland tops the list, followed by Austria, Germany, the Netherlands and Japan, with the top 10 mostly made up of advanced economies. There are also encouraging results among regional leaders, such as Poland, Singapore, Tunisia, Brazil and Ghana. The report discusses the considerable impact of COVID-19 on the postal sector through the lens of the 2IPD. The analysis reveals that the reliability of the international postal supply chain has been re-established, after considerable disruptions in March and April 2020. Nevertheless, a major consequence of the pandemic is that the postal network is still less connected and far-reaching than it was a year ago. While the operators of most advanced economies appear to be resilient to the economic shock, in most developing countries the battle for the relevance of the sector is gathering pace.

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Glossary

2IPD	Integrated Index for Postal Development
COVID-19	Coronavirus disease 2019
DO	Designated operator
GDP	Gross domestic product
EDI	Electronic data interchange
EMS	Express Mail Service
EMSEVT	EMS item event
PREDES	Pre-advice of dispatch
PTC	Postal Technology Centre
SDGs	Sustainable Development Goals
SDR	Special Drawing Rights
USD	United States dollar
WDI	World Development Indicators

Introduction

Postal development matters

The postal sector plays an important role in promoting socio-economic development.[i] Affordable, efficient and universal postal services substantially reduce transaction costs between economic agents, granting them access to a vast communications and infrastructure network. In this sense, the postal sector actively contributes to the achievement of the United Nations Sustainable Development Goals (SDGs).

Postal development can be defined as reflecting the ability of a country's postal network to perform across a wide range of factors that enable socio-economic development. In this regard, postal networks can be considered as high performing if they offer a reliable service and have good connectivity, a high level of demand from citizens, and operations that are resilient to external shocks.

The Integrated Index for Postal Development (2IPD) embodies this definition and provides policymakers, regulators and operators with tools to assess a country's level of postal development.

By drawing on a wide range of (big) data from numerous sources, the 2IPD provides a composite picture of postal development in 170 countries, with a ranking that focuses on the performance of traditional postal operators. Historically, these operators have primarily been considered as vehicles for delivering socio-economic development, representing one of the largest physical networks in the world, with some 656,000 post offices and 5.23 million employees.[ii]

Top performers in 2020

This year, Switzerland continues to top the ranking, followed by Austria, Germany, the Netherlands and Japan, with the top 10 mostly made up of advanced economies.

As in previous years, there are, of course, encouraging results among regional leaders, such as Poland, Singapore, Tunisia, Brazil and Ghana.

The COVID-19 crisis and postal development

The report discusses the impact of the COVID-19 pandemic through the lens of the four dimensions of the 2IPD.

At first, major logistical challenges faced throughout the world during the height of the "great lockdown" rapidly affected postal reliability. The worldwide drop in air travel coupled with a shortage of labour supply caused many mail items to become "stranded", dilating international delivery times. As the necessary sanitary measures were progressively eased, the logistics supply chain started returning to more "normal" levels.

However, the medium-to-long-term effects on postal operators cannot be underestimated. At the time of writing this report, the connectivity of the international network has not yet been fully restored. Currently, fewer items are being sent internationally and to fewer destinations than in 2019. Some countries will struggle to regain the volumes generated prior to the crisis.

The crisis will put to test the relevance of the sector as the world still has to bridge the so-called "postal development divide". While in most advanced economies postal services are at the heart of everyday business needs, many developing countries are currently witnessing low levels of demand for letter post as well as parcels and logistics.

In this context, the operators that already had the most resilient business models prior to the crisis will fare better, but they will also remain highly dependent on the growth of e-commerce and on wider economic circumstances in their countries.

The new road(s) to postal development

As a rising number of postal operators increase their reliance on parcels and logistics in order to reap the benefits of e-commerce growth, they are also *de facto* increasing their dependence on a highly competitive segment in which reliability and reach are pre-conditions for success. In such an environment, the only way for postal operators to boost relevance in the long term is to attract and retain customers that order goods online and value timeliness and predictability in delivery, regardless of whether the item is

purchased domestically or imported. As the starting conditions are not the same everywhere, there will be different roads to postal development, heightening the importance of international cooperation in areas such as knowledge sharing, common standards and technology. As a forum, a provider of technical solutions and a knowledge centre for the postal sector, the UPU can certainly contribute to this endeavour.

Structure of this report

This report is structured in four sections. Section 1 discusses the methodology behind the 2IPD. Section 2 presents the latest 2IPD ranking. Section 3 discusses the consequences of COVID-19 on postal development. Section 4 concludes the report.

1. The 2IPD

Four pillars of postal development

The 2IPD is a comparative indicator of postal development around the world.[iii] It is a composite index that summarizes information about the performance of postal operators in 170 countries. As such, the 2IPD is a unique tool for analyzing the state of the postal sector. Thanks to its wide geographic coverage and the depth of its underlying data, this index appeals to a multitude of stakeholders, from policymakers and regulators to postal operators and wider postal sector players.

The 2IPD is built on four pillars (which are in turn sustained by a variety of sub-indicators):

– **Reliability** reflects performance in terms of speed and predictability of delivery, across all the key segments of physical postal services (letter post, parcel post and express).

– **Reach** synthesizes global connectivity by evaluating the breadth and depth of the postal operators' international network. These are measured by the number of partner networks and the volumes of international exchanges, respectively, across all the key segments of physical postal services.

– **Relevance** measures the intensity of demand for the full portfolio of postal services relative to the best performers in each category of postal activity, also taking into account elements such as the number of international transactions and the number of post offices.

– **Resilience** indicates the level of diversification of revenue streams, as well as the capacity to innovate and deliver inclusive postal services.

The purpose of the reliability pillar is to measure the operational efficiency of postal services, showing the degree to which they are performed in a timely and predictable manner.

The reach pillar captures the level of internationalization of these operations, demonstrating whether postal services in the country in question have a high level of cross-border exchanges.

When it comes to relevance, the key goal is to evaluate the competitiveness of postal services in all key segments, and in particular the potential to generate higher volumes. Countries possessing a relatively denser network and a high level of postal consumption per capita will show good performance in this area.

Regarding the resilience pillar, the intent is to assess the ability of postal services to withstand external shocks through adaptable business models.

Overall, these four pillars are aimed at providing a balanced view of postal development, without solely focusing on operational (e.g. delivery), strategic (e.g. business portfolio management) or societal matters (e.g. financial inclusion). This enables the final score to comprehensively reflect (while succinctly expressing) the situation of postal services in any given geography.

The input is then integrated into an algorithm, which yields a general score between 0 and 100 for each assessed country.

Data supporting the pillars

The 2IPD draws on the following types of UPU data:

– UPU postal big data, namely, tracking data on postal transactions worldwide;

– Official UPU postal statistics and UPU surveys.

The first type is used mainly to compute indicators associated with quality of service, transactions, volumes and connectivity. It feeds the reliability and reach pillars. The second type applies to the measurement of revenue streams, economies of scale, infrastructure and financial inclusion.

Every year, the best postal development performer obtains a normalized maximum score of 100, while the worst gets the minimum score of 0. Thus, the normalized scores can be read as the performance of any given country compared with the best (score of 100) or worst (score of 0) global performer.

Comparing postal development around the globe

Given the statistical distribution of the 2IPD scores, it is possible to categorize countries in four main categories (see Figure 1):[iv]

– **Postal champions:** A score above 60 shows that a country's postal development is among the top 20% in the world – a performance which can be considered very good to outstanding. This group of countries can be denoted as having a well-balanced performance across all pillars of postal development.

– **Good performers:** A score between 35 and 60 shows an upper-intermediate level of performance. These countries are consistent performers and belong to the top 50%.

– **Potential performers:** A score between 15 and 35 shows a performance that is lower than the median, with countries usually performing only partially well, albeit with some development potential. Most countries in this group exhibit glaring weaknesses in one or more areas of postal development.

– **Least developed operators:** A score below 15 shows that a country's postal development is very low. These countries are facing major challenges in several of the key pillars of postal development.

Figure 1 Cumulative distribution, 2020 2IPD
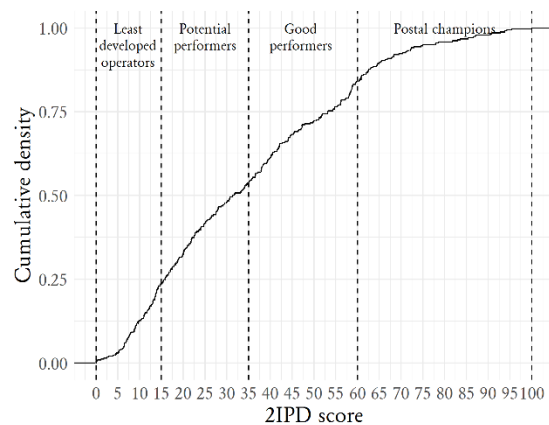
Source: 2020 2IPD ranking.

Since the 2IPD is a comparative index, the interpretation of the scores has to take into account four important elements:

First, the scores are of a relative nature. Thus, the position of a given country is determined by its performance relative to its peers. If a country makes absolute progress on a specific dimension of the 2IPD, this will have an impact on the final ranking if and only if its peers have not made even greater gains in performance.

Second, the position of a country in the global ranking should preferably be considered in

conjunction with the regional standing and its economic development level. In this sense, it may be unrealistic to expect countries to be the postal champions if most of their regional peers are struggling.

Third, performance is more adequately evaluated in clusters, such as within one of the four main categories mentioned above (i.e. postal champions, good performers, potential performers and least developed operators). Movements in the ranking within a category are much more likely than between categories. For instance, turning a least developed operator into a good performer will usually require a substantial transformation, and will most likely take years of conscious and continuous improvement initiatives.

Fourth, beyond the comparison of countries solely within the 2IPD ranking, it may also be useful to benchmark postal development against other macroeconomic dimensions, in particular economic development. This may be a useful exercise because it allows one to more clearly disentangle those issues that are inherent to postal services from wider socio-economic factors faced by a given country. An example of such an analysis is presented in Section 3 of the present report.

Further details on the methodology used to calculate the 2IPD are available in Appendix 3.

2. The 2020 2IPD ranking

Persistent postal development gaps

The UPU has been releasing the 2IPD ranking on a yearly basis since 2017. The 2020 edition spans 170 countries (see Table 1 for the full ranking), with a global average score of 35.6 (vs. 35.2 in 2019).

Switzerland, Austria and Germany top the list, followed by the Netherlands and Japan. In order to reach the top 10, countries need to have a score of at least 77.9 (compared with 72.88 in 2019 and 76.3 in 2018). This points to the existence of a group of top-notch performers that are increasing their advance.

Countries that make it to this mark can thus be confident that they have achieved the highest level of performance thanks to a strong showing across the four areas of postal development, i.e. reliability, reach, relevance and resilience.

The 2020 ranking also denotes persistent geographical heterogeneity (see Figure 2), with a continued high level of dispersion in scores.

Figure 3 Continued dispersion in the 2IPD ranking
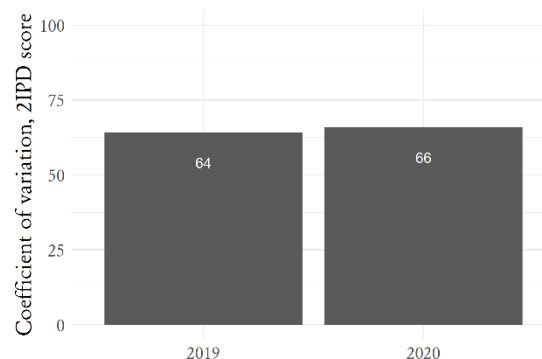
Source: 2019 and 2020 2IPD ranking.
Notes: The coefficient of variation is the ratio between the standard deviation and the mean of the overall 2IPD score.

Figure 2 2020 2IPD

© 2020 Mapbox © OpenStreetMap

2IPD score
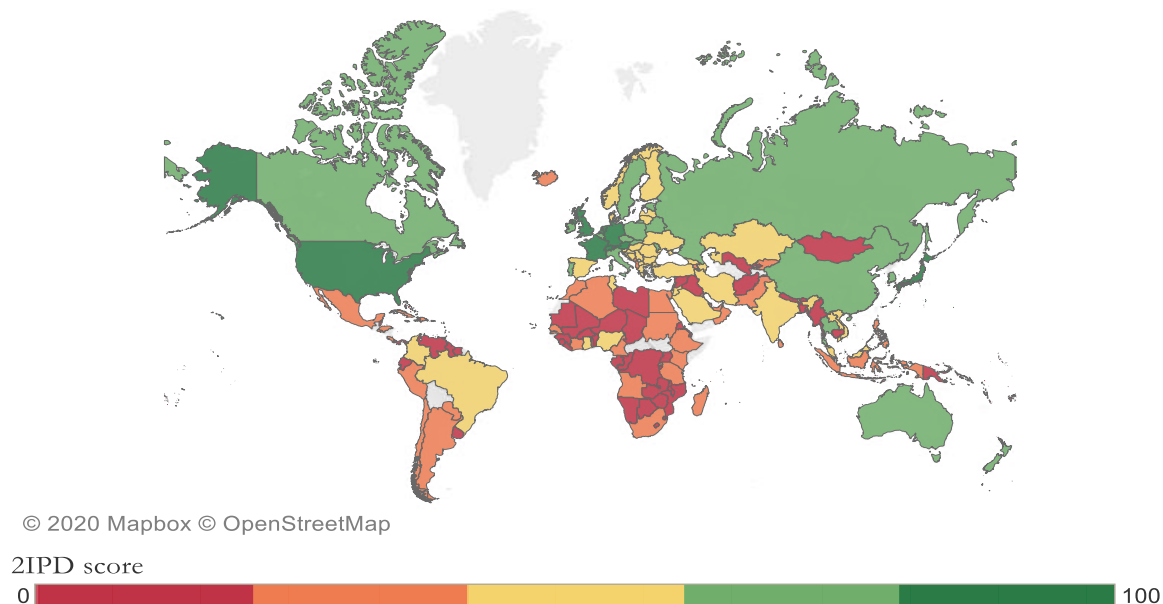
Source: 2020 2IPD ranking.
Notes: The five colours represent scores in the intervals 0–20, 20–40, 40–60, 60–80 and 80–100. The boundaries, colours and any other information on this map do not imply, on the part of the UPU, any judgement on the legal status of any territory, or any endorsement or acceptance of such boundaries.

Indeed, the coefficient of variation, a measure of dispersion with respect to the mean depicted in Figure 3, has slightly increased from 60% in 2018 to 66% in 2020. This reveals what could be called a growing "postal development divide", in which countries and regions continue to diverge in their path towards greater performance. And this is expected to intensify as the effects of COVID-19 take hold.

The group of industrialized countries (ICs) is the region with the highest average (70.6) in the 2IPD 2020 ranking, followed by Eastern Europe and the CIS (51.2), Asia-Pacific (30), the Arab region (28.5), Latin America and the Caribbean (22.6), and Africa (19.8).

Although these averages already point to a clear divergence between regions, they also mask even greater intra-regional disparities. Indeed, as shown in Figure 4, the dispersion of scores within regions can be significant, with, in some cases, score differentials of over 70 points between the best and the worst regional performer.

Figure 4 Within-region dispersion (2020 scores)
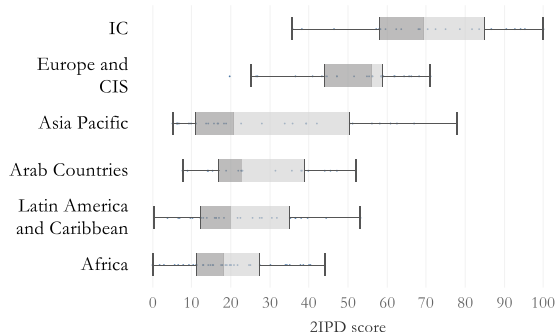
Source: 2020 2IPD ranking.
Notes: Box plots by region, sorted from highest to lowest average value of the 2020 2IPD score. Regional categories defined in Appendix 1.

Industrialized countries continue to top the ranking

The top 10 of the 2IPD ranking remains mostly composed of ICs.[v] Among all regions, this is undoubtedly the most homogeneous group, with a dispersion of scores relative to the regional mean of 25%. Unsurprisingly then, this is the region with the highest level of postal development, in spite of some inequalities between the countries.

Since the first edition of the ranking, Switzerland has managed to hold the top spot,

thanks to its balanced and superior performance in all the dimensions of postal development. In the 2020 edition, it has made further progress in reliability and relevance, while retaining its extraordinary performance in reach and resilience.

Figure 5 Overview: Industrialized countries
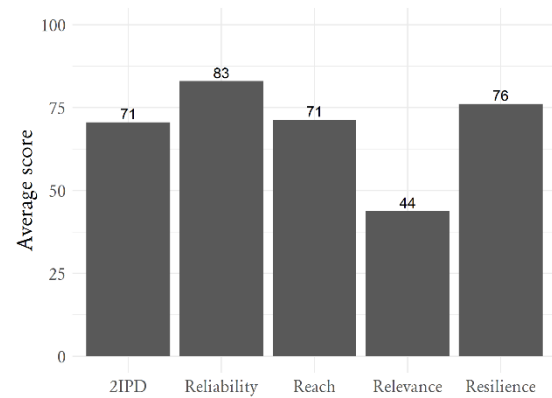
Source: 2020 2IPD ranking.
Notes: Simple averages by region.

This year, the second place in the ranking goes to Austria, which has moved up four places compared with last year. It has attained a total 2IPD score of 95.3, i.e. less than five points away from Switzerland. This is the first time that the runner-up has come so close to the top. Austria has achieved this through significant improvements in reach, relevance and resilience, in addition to continued high performance in reliability.

In the meantime, Germany has managed to consolidate its position, retaining the third place. Balanced performance and a slight improvement in reliability explain this outcome.

The Netherlands and Japan complete the top five, with the former stabilizing its performance and the latter achieving further improvements in reliability. The rest of the top 10 remains relatively stable, with the exception of one country. Within the ICs, Portugal has made the fastest relative progress, jumping from 43rd to 22nd place, thanks to improved reliability, relevance and resilience.

The strengths of the region remain concentrated in the reliability and reach pillars, meaning fast and predictable deliveries, as well as good connectivity. Some progress has also been achieved in resilience, with the average score in this dimension increasing from 69 to 76.

As in the 2019 edition, while all pillars are well above the global average, relevance is still the weakest pillar for ICs, a concern that affects all other regions, and therefore the sector as a whole.

Countries in Eastern Europe and the CIS still show a relatively strong level of postal development

The regional average score of Eastern Europe and the CIS has further increased, up to 51.2 in 2020. Intra-regional homogeneity has also stayed strong, with a coefficient of variation of 27%.

Poland retains the region's top spot, ranking 13th globally, in spite of a drop in relevance and resilience. The best positive move in this region was achieved by Hungary, ranked 32nd – nine places up compared with last year.

Reliability, which has historically been one of the region's comparative assets, has somewhat declined, while resilience (another of the region's traditional strengths) has progressed further.

Figure 6 Overview: Europe and CIS

Source: 2020 2IPD ranking.
Notes: Simple averages by region.
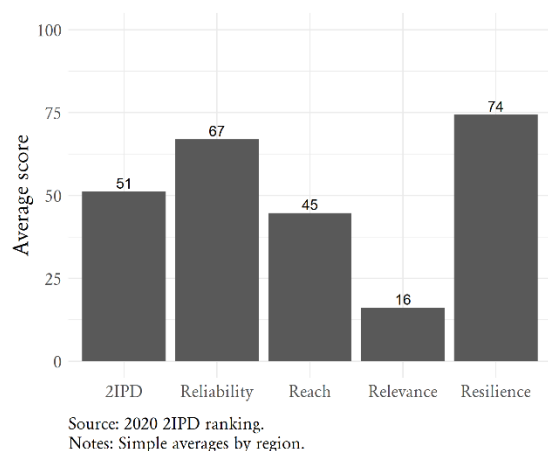
Asia-Pacific – 1 region, 2 speeds

When it comes to postal development, Asia-Pacific provides an interesting case of diversity, displaying the highest degree of dispersion around the mean: close to 73% around the regional average of 30. Indeed, the region includes both very strong performers, such as Singapore (10th) and China (18th), and smaller states at the bottom of the global ranking (e.g. Solomon Islands, Papua New Guinea and Samoa).

Considerable disparities in economic size and development are most likely among the key drivers for such diversity in postal development. This means that the average scores by pillar shown in Figure 7 mask extreme variations from one country to another and should thus be considered in conjunction with other factors.

Figure 7 Overview: Asia-Pacific

Source: 2020 2IPD ranking.
Notes: Simple averages by region.
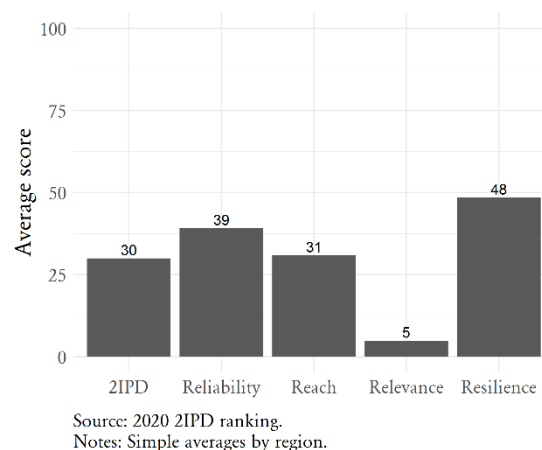
The regional leader, Singapore, has managed to re-enter the top 10, thanks to continued superior reliability, as well as significant improvements in reach and resilience. By contrast, many countries in the region, especially in the Pacific, continue to struggle to raise their reliability and reach scores beyond the "potential performers" mark (i.e. a score that exceeds 15 in one of the pillars).

Arab region – the race to the regional top spot is intensifying

Over the past few years, the Arab region has been marked by increasing dynamism as some countries race to the top.

Tunisia retains the top regional spot (46th globally), followed by Saudi Arabia. It is also worth mentioning the case of Algeria, which has made tremendous progress over the past year, being the country with the highest increase in the global ranking, up by 46 places to reach the 73rd rank worldwide. By contrast, at the bottom of the regional (and global) ranking, one can find countries facing geopolitical issues that are impairing their postal development.

The region's relatively low Internet penetration means that postal operators have a lot of ground to cover to see an expansion in the demand for their services through e-commerce, which would positively affect their postal relevance score within the 2IPD.

At the same time, the strong impact of COVID-19 on the tourism sector and on the price of commodities may significantly hinder prospects for economic growth in the region, thus denting the performance of postal operators.[vi]

Figure 8 Overview: Arab region

Source: 2020 2IPD ranking.
Notes: Simple averages by region.
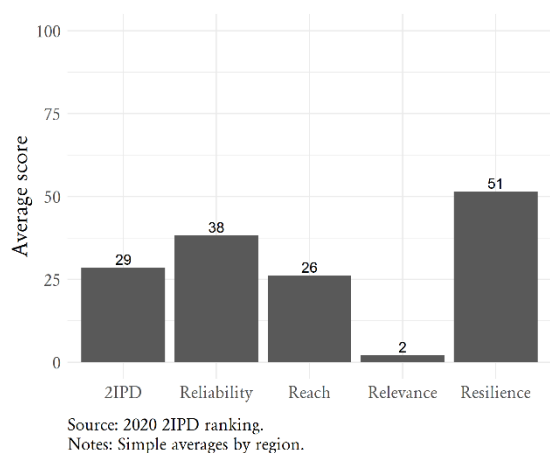
Latin America and the Caribbean – stability, but need for higher growth

Latin America and the Caribbean is one of the regions with the most challenging situation in terms of postal development. Although average scores remain very stable, levels attained prompt the need for stronger convergence towards the global average. Compared with its level of economic development, the region has the worst

Figure 9 Overview: Latin America and the Caribbean

Source: 2020 2IPD ranking.
Notes: Simple averages by region.
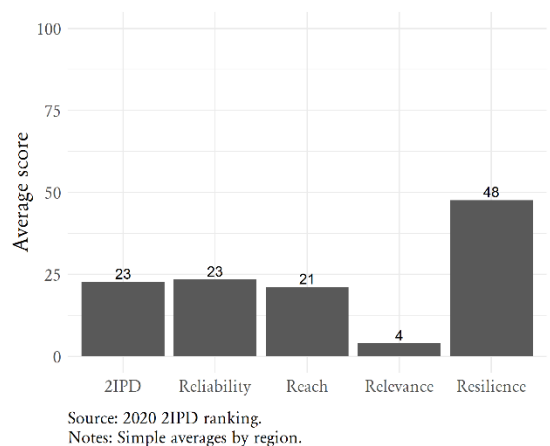
relative performance worldwide, as shown in Section 3. Postal operators in this geographical zone are thus facing significant challenges, as witnessed by the very low regional average scores in reliability (23.45), reach (21.14) and relevance (3.93).

Brazil has reclaimed the top regional spot (45th place globally, up by eight places), thanks mainly to improvements in reliability. By contrast, many Caribbean countries are still occupying the bottom of the regional and global ranking.

Africa – a challenging situation with some movement at the regional top

Africa's average score has slightly dropped in 2020, remaining fairly stable in all pillars, although at a relatively low point. Ghana has now reached the top regional spot, ranked 57th worldwide, followed by Mauritius (63rd) and Nigeria (64th). Reliability is the main reason for Ghana's improved position. Guinea, Cameroon and Zambia have seen large boosts in their rankings too, rising 36, 34 and 25 places, respectively. In all these cases, improvements in quality of service have translated into higher reliability and reach.

Figure 10 Overview: Africa

Source: 2020 2IPD ranking.
Notes: Simple averages by region.
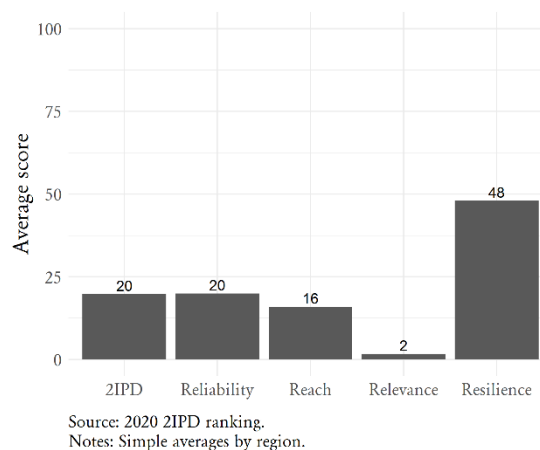
Table 1 2020 2IPD ranking

Rank	Country	Score	Change	Rank	Country	Score	Change
1	Switzerland	100.00	+0.00	44	Romania	54.78	+6.97
2	Austria	95.35	+10.00	45	Brazil	53.16	+6.83
3	Germany	94.22	+3.43	46	Tunisia	51.93	+1.93
4	Netherlands	92.74	-0.92	47	Turkey	51.51	-0.28
5	Japan	90.46	+3.26	48	Iran (Islamic Rep.)	51.10	-3.60
6	France	86.58	-0.28	49	Viet Nam	50.47	-1.32
7	United States of America	83.47	+5.55	50	Saudi Arabia	47.26	+7.06
8	United Kingdom	81.81	-1.12	51	North Macedonia	47.25	-2.47
9	Canada	78.58	+4.04	52	Kazakhstan	47.11	-2.03
10	Singapore	77.90	+13.33	53	Denmark	46.49	+1.99
11	Italy	74.92	+3.57	54	Lebanon	45.46	+3.39
12	Belgium	72.33	+0.27	55	Azerbaijan	44.66	-2.33
13	Poland	71.05	-1.13	56	Colombia	44.44	-2.79
14	New Zealand	70.37	-2.51	57	Ghana	44.08	+7.00
15	Ireland	68.37	-1.08	58	Jordan	44.07	+9.89
16	Czech Rep.	68.25	+3.28	59	Malta	43.97	+1.31
17	Australia	68.03	+7.15	60	Bosnia and Herzegovina	43.35	-2.00
18	China (People's Rep.)	66.85	-0.97	61	Lao People's Dem. Rep.	41.96	+12.55
19	Russian Federation	66.26	+0.95	62	Latvia	40.91	-4.32
20	Belarus	65.56	+2.61	63	Mauritius	40.48	-0.05
21	Slovakia	64.33	+1.28	64	Nigeria	40.04	-1.85
22	Portugal	63.61	+10.51	65	Qatar	39.93	-1.64
23	Korea (Rep.)	62.44	+1.97	66	Dominican Republic	39.67	-1.91
24	Sweden	62.26	-2.29	67	Pakistan	39.36	-0.05
25	Estonia	62.01	+1.75	68	Indonesia	39.32	-2.80
26	Moldova	61.88	-0.67	69	Cameroon	38.52	+14.35
27	Thailand	60.86	+1.13	70	United Arab Emirates	38.25	-5.94
28	Finland	59.60	-1.37	71	Luxembourg	38.14	-3.55
29	Serbia	58.97	+4.57	72	Jamaica	37.98	-4.09
30	Ukraine	58.64	+2.53	73	Algeria	37.97	+17.92
31	Lithuania	58.57	-0.89	74	South Africa	37.86	+4.52
32	Hungary	58.48	+4.13	75	Chile	36.62	+1.86
33	Croatia	58.42	+1.10	76	Peru	36.61	+10.41
34	Norway	58.28	-3.06	77	Armenia	36.52	-3.75
35	Israel	58.21	-0.66	78	Philippines	35.89	-2.04
36	Malaysia	58.08	-0.66	79	Iceland	35.76	+5.03
37	Spain	58.00	+2.47	80	Oman	35.68	+1.65
38	Greece	57.22	+4.02	81	Costa Rica	35.33	+1.79
39	Cyprus	56.26	-1.70	82	Mexico	35.07	-1.44
40	Slovenia	56.16	-2.59	83	Kenya	35.02	+0.88
41	India	56.14	-4.68	84	Ethiopia	34.44	-3.37
42	Georgia	56.09	+4.96	85	Senegal	33.92	-4.29
43	Bulgaria (Rep.)	55.33	-2.63	86	Sri Lanka	33.76	+2.38

Rank	Country	Score	Change	Rank	Country	Score	Change
87	Cuba	31.72	+6.94	130	Iraq	15.36	+7.68
88	Morocco	31.38	-1.70	131	Guinea	15.31	+10.09
89	Honduras	30.57	+0.74	132	Benin	14.80	+2.50
90	Cape Verde	30.09	+0.75	133	Mauritania	14.32	+0.35
91	Argentina	27.93	+3.18	134	Sierra Leone	14.25	-9.25
92	Maldives	27.90	+6.51	135	Afghanistan	14.21	+3.24
93	Barbados	27.49	-1.68	136	Comoros	13.99	+2.23
94	Tanzania (United Rep.)	27.47	-11.65	137	Aruba	13.95	+0.32
95	Albania	26.91	-4.94	138	Nepal	13.65	-3.49
96	Montenegro	26.48	+0.45	139	Saint Lucia	13.06	+4.20
97	El Salvador	25.59	-2.45	140	Zimbabwe	13.03	+0.32
98	Kyrgyzstan	25.19	+1.58	141	Lesotho	13.00	-0.44
99	Angola	24.99	-5.55	142	Malawi	12.93	-0.81
100	Madagascar	24.68	-5.97	143	Suriname	12.37	-1.57
101	Egypt	23.02	-5.75	144	Guyana	12.21	-1.25
102	Sudan	22.77	+2.77	145	Burkina Faso	11.28	-3.45
103	Bahrain (Kingdom)	22.74	+0.24	146	Kiribati	11.12	-0.62
104	Tonga	22.69	+1.79	147	Eswatini	11.05	-4.75
105	Trinidad and Tobago	22.56	+0.55	148	Congo (Rep.)	10.43	+1.63
106	Kuwait	21.90	+0.03	149	Saint Kitts and Nevis	10.20	-3.48
107	Rwanda	21.79	+1.38	150	Tuvalu	9.85	+7.42
108	Paraguay	21.77	-5.88	151	Antigua and Barbuda	9.63	+2.45
109	Côte d'Ivoire (Rep.)	20.75	+3.29	152	Bhutan	9.34	-0.28
110	Seychelles	20.08	-3.92	153	Gabon	9.28	+1.75
111	Uganda	19.86	-6.57	154	State of Libya	8.99	+2.50
112	Togo	19.82	-1.43	155	Niger	7.83	-1.21
113	Uzbekistan	19.67	-8.39	156	Syrian Arab Rep.	7.72	-1.35
114	Botswana	19.01	-1.99	157	Venezuela (Bolivarian Rep.)	6.93	-5.13
115	Mongolia	18.86	-2.79	158	Vanuatu	6.78	-5.00
116	Djibouti	18.78	-1.40	159	St Vincent and the Grenadines	6.51	-0.79
117	Burundi	18.58	-0.42	160	Chad	6.49	-4.41
118	Myanmar	18.23	-7.17	161	Brunei Darussalam	6.39	-2.17
119	Ecuador	18.21	+1.58	162	Samoa	6.12	+6.12
120	Namibia	17.91	-9.61	163	Eritrea	5.72	-1.34
121	DRC	17.49	+0.48	164	Papua New Guinea	5.24	-1.77
122	Bahamas	17.01	-6.96	165	Solomon Islands	5.13	-2.80
123	Fiji	16.73	+3.21	166	Dominica	3.89	-0.75
124	Cambodia	16.54	+1.46	167	Liberia	2.90	-1.53
125	Uruguay	16.23	+3.13	168	Mozambique	1.73	-4.55
126	Panama (Rep.)	16.17	-1.66	169	Haiti	0.34	-0.82
127	Belize	15.95	-2.69	170	Mali	0.00	-10.88
128	Bangladesh	15.80	-4.40				
129	Zambia	15.53	+6.79				

3.   The COVID-19 crisis and postal development

Postal development and economic development are intertwined

The postal sector and the real economy are strongly linked, with advanced economies also being the home of more developed postal services. As shown in Figure 11, countries with a higher GDP per capita will also tend to have better 2IPD scores, translating into a cross-sectional correlation of 63%.

Nevertheless, the relationship between these two variables is not linear. In fact, ICs tend to have a level of postal development comparatively greater than what their GDP per capita would suggest. By contrast, postal operators in developing regions may often underperform against their country's level of economic development, as in the case of Latin America and the Caribbean. This dispersion is symptomatic of the postal development divide alluded to in the previous section of this report.

These gaps imply that the postal services of many developing countries are particularly vulnerable to external shocks, with the risk of being disproportionally hit by a major upheaval, such as the outbreak of COVID-19.

In order to make sense of the impact of such a shock on postal development, it is useful to conceptually group countries into four categories, according to whether or not their economic and postal performance is above the global median. This is shown in Figure 11: the dotted lines represent the worldwide medians of GPD per capita and 2IPD scores.

The first category, represented in the upper-right quadrant of Figure 11, consists of what one could refer to as "wealthy postal performers". These are countries that are both economically and postally developed. Most postal champions and good performers (see Section 2) are in this category, including the majority of ICs.

Figure 11 Postal development and economic development
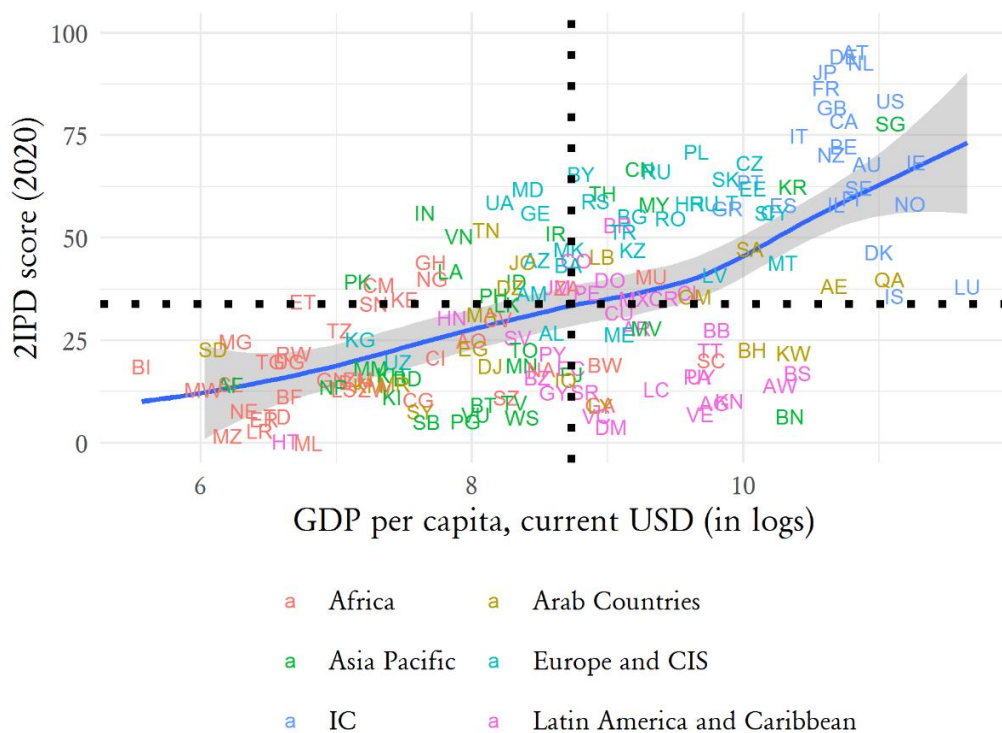
Source: 2020 2IPD ranking and WDI.
Notes: 2019 GDP per capita figures. The dotted lines refer to the sample medians.

The second category, which could be called "developing postal performers", is represented in the upper-left quadrant of Figure 11. These are developing countries that have a relatively well-developed postal sector.

The third category, composed of "wealthy potential performers", is found in the lower-right quadrant of Figure 11. Postal development in these countries is below what could be expected given their level of economic development.

The fourth category, named "developing potential performers", corresponds to the lower-left quadrant of Figure 11. These are developing countries whose postal sectors are performing below the global median.

By grouping countries into these four categories, it becomes possible to analyze how the different dimensions of postal development (reliability, reach, relevance and resilience) are likely to be impacted by COVID-19.

Reliability under pressure

Reliability is undoubtedly one of the areas that has been the most strongly affected by COVID-19 in the short term. Indeed, as lockdowns were rapidly imposed worldwide in March 2020, delivery transactions suddenly had to either stop or be carried out with a greater number of steps. This mechanically reduced speed and predictability of delivery, the two underlying factors of postal reliability.

Since the beginning of the pandemic, the UPU has monitored EDI messages embedded in barcoded mail in order to estimate the ratio between items ready to be exported and items received by an importing country in any given week.

At the beginning of the COVID-19 crisis, this ratio began to increase, reaching a historic peak during the fourth week of April 2020. At the height of the crisis, for every 2.3 items exported per week, only one was notified as received. The result, as shown in Figure 12, was a less reliable network.

However, as restrictions for international travel eased and postal operators started finding alternatives to rebuild the severed supply chains, the stranded mail ratio stabilized once again

during the summer of 2020, allowing delivery times to return to more "normal" levels.

Figure 12 Stranded mail ratio
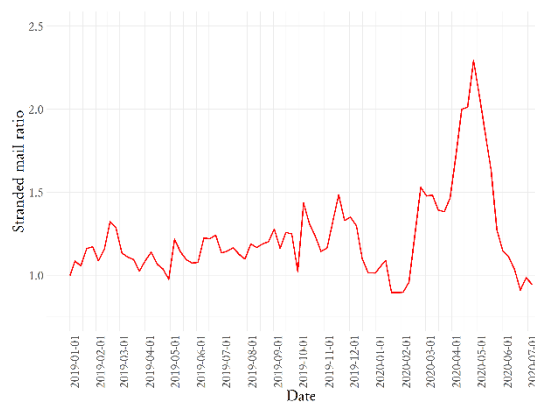
Source: UPU (2020), Postal Economic Outlook.

Reach severely impacted, with a network that is still recovering

When it comes to postal reach, the temporary loss in terms of reliability has translated into less international connectivity.[vii] In order to better understand how this unfolded, it can be useful to analyze the two main factors behind the reach pillar, i.e. the breadth (number of partners) and the depth (number of items) of the international network.

As shown in Figure 13, both factors have dropped because of the pandemic. The monthly median for the number of partners per dispatching operator and for exported items per postal operator declined considerably in 2020 with respect to 2019.

Figure 13 Evolution of network breadth and depth
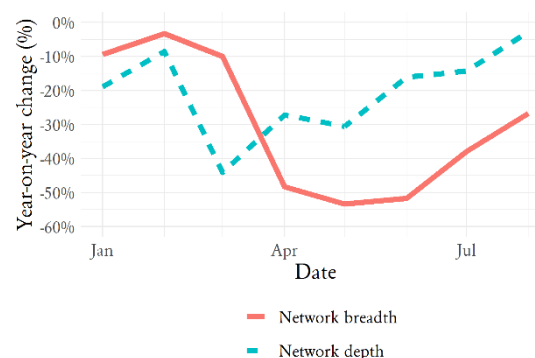
Source: PREDES EDI messages.
Notes: Monthly medians relative to the 2019 levels.

As pressures on the network eased towards the month of June 2020, volumes transacted (network depth) already showed signs of a timid recovery, with the number of partners (network breadth) remaining depressed.

As the crisis entered a new stage and additional logistical barriers were lifted, the breadth of the network started recovering as well. However, pre-crisis levels still appear unattainable.

At the time of writing this report, the international postal network is less connected than it was in 2019. It appears that many destinations remain difficult to reach, even as air traffic starts recovering. In 2020, the average loss of network breadth and depth amounts to -30% and -20%, respectively.

Figure 14 Median monthly network losses
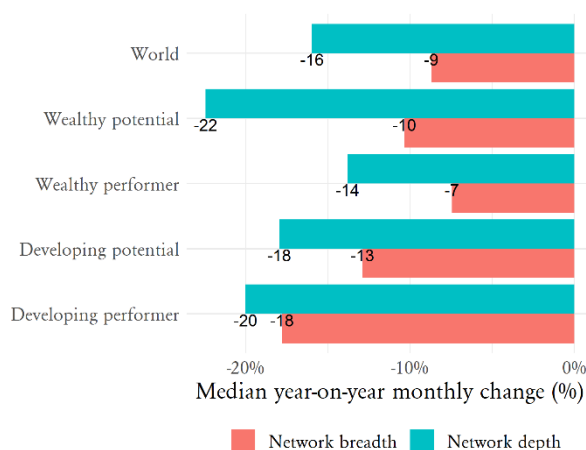
Source: PREDES EDI messages.
Notes: Medians relative to their 2019 levels.

However, these global figures reflect different realities across the four categories of countries depicted above.

Wealthy performers have experienced a median contraction of -7% in terms of network breadth and -14% in terms of network depth.

Developing performers have seen a much steeper drop in their network breadth, -18%, in parallel with a substantial decrease in network depth (-20%).

Wealthy potential performers also witnessed a shrinkage of their bilateral linkages, with network breadth dropping by 14%, coupled with the largest drop in network depth (-23%) among the four categories.

Developing potential performers have been particularly hit as well, with a network depth loss of 20% and a network breadth loss of 18%.

Relevance is at risk as demand may struggle to recover, let alone grow

The relevance of the postal network is also at stake during this difficult time. As explained in previous reports on the impact of COVID-19, the pandemic has affected both the supply and the demand of postal services.[viii]

The effects on supply are the ones explained in the previous subsections: reliability and reach are impacted as postal operators battle to keep up the delivery of services in the midst of an external shock, with some countries struggling much more than others.

The effects on demand are also set to be high and to affect different economies in different ways. In developing countries, the relatively lower level of disposable income means that e-commerce cannot grow as fast as in advanced economies, even in cases where Internet connectivity is high.

Since the first edition of the Postal Development Report, gaps in relevance have been noticeable between developed and developing countries. This was mostly because demand for postal services and infrastructure tended to behave differently according to the country.

Figure 15 shows the current extent of the postal development divide. The figure zooms in on the median difference between wealthy performers and the other categories of countries in terms of demand for domestic letters, parcels, financial services and international mail, and the available infrastructure.

Currently, the greatest differences are in terms of the demand for parcels, letters and international items. The two groups of developing countries have a median level of demand for domestic letters and parcels that is between 94% and 99% lower than in the group of wealthy performers. This considerable gap is also perceptible for international items.

Overall, the effects on demand are expected to be severe, and the economic performance of postal operators is set to worsen, with predicted

worldwide losses of between 4.5 and 6.5 billion SDR.[ix]

High performers are better equipped to withstand shocks owing to their greater resilience

When it comes to resilience, which measures economies of scale, revenue diversification and financial inclusion, the main differences across the four categories of countries reside in the median economies of scale in the distribution of letter-post items.[x]

According to the figures in Table 2, the median level of economies of scale of wealthy performers is 80% higher than in developed countries with slightly less developed postal services. However, the gap is even greater with respect to developing countries, which have median economies of scale 97% to 99% lower than the median level of the top performers.

Given their lower economies of scale as indicated in Table 2, it appears that developing

countries could struggle to cope with the increase in costs triggered by the crisis.

Table 2 Key differences in resilience

	Median level of economies of scale
Wealthy performer	45
Wealthy potential	9
Developing performer	1.3
Developing potential	0.12

Source: UPU official statistics (2018).

Figure 15 Median spread with respect to wealthy performers
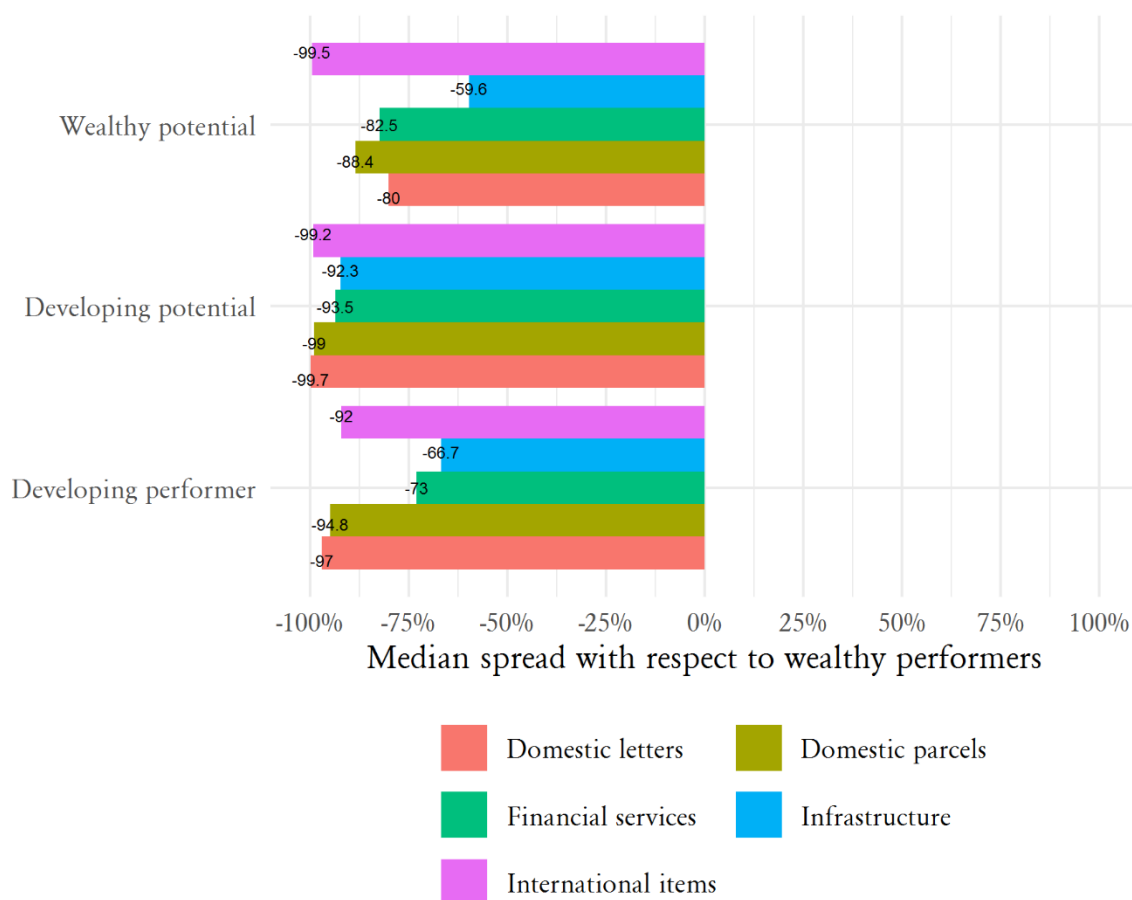
Source: UPU official statistics (2018).

4.   Conclusion

Postal development matters, because it is an essential component of a country's socio-economic infrastructure. Indeed, as shown in this report, economic and postal development are intimately linked. The more a country is suffering from economic hardship, the more it will find it challenging to build high-performing postal services.

This does not mean that pursuing postal development is futile in the absence of a more favourable socio-economic environment: a number of developing countries have shown that at least some degree of success is possible provided the right angle is chosen to tackle the main bottlenecks.

For instance, significant movements in the global ranking are usually the result of investments by countries to improve their quality of service, thus boosting the timeliness and predictability of their deliveries, and enabling larger volumes to be traded with a greater number of external partners.

This is because postal delivery networks are relatively fluid, with a propensity to reinforce those nodes that have proven to be successful in channeling volumes, unless interrupted by a major external shock. The disruptions affecting international supply chains due to the COVID-19 pandemic were a clear example of such a shock. They were also a useful illustration of how networks can rebuild or instead dry up after a major jolt.

In the postal sector, the aftermath of the "great lockdown" was a much more permanent drop in network breadth versus network depth, meaning that volumes are only really recovering in some channels. This implies that the connectivity of the postal sector has been affected and may pursue this course for some time.

In this context, postal services in developing countries are particularly at risk. Even before the crisis, postal economies of scale were low in these countries, translating into relatively high structural operational costs. As the economies of developing countries battle with the unprecedented recession caused by COVID-19, these challenges will add up to other structural issues, some of which are inherent to postal

operators, and others of which result from the state of the wider real economy.

Indeed, in these countries, the relatively lower level of disposable income means that e-commerce cannot grow as fast as in advanced economies, even in cases where Internet connectivity is high. Moreover, especially in the case of smaller items, the transfer of purchases from a physical shop to an online platform presupposes a scalable delivery network – precisely what many developing countries lack.

Therefore, if e-commerce does pursue its path of growth because or in spite of the COVID-19 crisis, the positive externalities for the postal sector are not at all guaranteed, with a risk of further decline in postal relevance.

One differentiating factor in the projected trajectory for different countries will be their resilience and preparedness in the context of postal development. Greater diversification will yield comparative benefits and so will any existing capacity to deliver inclusive services, in areas such as postal payments. Moreover, postal operators that already enjoyed higher economies of scale prior to the crisis will be more at ease in transitioning their value proposition and seizing growth opportunities.

However, regardless of the differences between postal operators, one factor will very likely play a significant role in the coming years: one of the most promising segments of future growth, the segment that is the most connected to the fate of e-commerce, i.e. parcels and logistics, is also more competitive and less profitable and has much more demanding customers than what postal operators have historically been accustomed to.

In such a challenging environment, one may ask how a country can effectively promote postal development. The answer will very much depend on each specific case and will require careful analysis. Multilateral institutions such as the UPU can be of great assistance in this endeavour, and countries will gain from adding the 2IPD to their toolbox in their road to postal development.

Appendix 1: Regional classification and list of countries

ISO 2	UPU Region	ISO 2	UPU Region	ISO 2	UPU Region	ISO 2	UPU Region
AE	Arab Region	DK	IC	KZ	Europe and CIS	QA	Arab Region
AF	Asia Pacific	DM	Latin America and Caribbean	LA	Asia Pacific	RO	Europe and CIS
AG	Latin America and Caribbean	DO	Latin America and Caribbean	LB	Arab Region	RS	Europe and CIS
AL	Europe and CIS	DZ	Arab Region	LC	Latin America and Caribbean	RU	Europe and CIS
AM	Europe and CIS	EC	Latin America and Caribbean	LK	Asia Pacific	RW	Africa
AO	Africa	EE	Europe and CIS	LR	Africa	SA	Arab Region
AR	Latin America and Caribbean	EG	Arab Region	LS	Africa	SB	Asia Pacific
AT	IC	ER	Africa	LT	Europe and CIS	SC	Africa
AU	IC	ES	IC	LU	IC	SD	Arab Region
AW	Latin America and Caribbean	ET	Africa	LV	Europe and CIS	SE	IC
AZ	Europe and CIS	FI	IC	LY	Arab Region	SG	Asia Pacific
BA	Europe and CIS	FJ	Asia Pacific	MA	Arab Region	SI	Europe and CIS
BB	Latin America and Caribbean	FR	IC	MD	Europe and CIS	SK	Europe and CIS
BD	Asia Pacific	GA	Africa	ME	Europe and CIS	SL	Africa
BE	IC	GB	IC	MG	Africa	SN	Africa
BF	Africa	GE	Europe and CIS	MK	Europe and CIS	SR	Latin America and Caribbean
BG	Europe and CIS	GH	Africa	ML	Africa	SV	Latin America and Caribbean
BH	Arab Region	GN	Africa	MM	Asia Pacific	SY	Arab Region
BI	Africa	GR	IC	MN	Asia Pacific	SZ	Africa
BJ	Africa	GY	Latin America and Caribbean	MR	Arab Region	TD	Africa
BN	Asia Pacific	HN	Latin America and Caribbean	MT	Europe and CIS	TG	Africa
BR	Latin America and Caribbean	HR	Europe and CIS	MU	Africa	TH	Asia Pacific
BS	Latin America and Caribbean	HT	Latin America and Caribbean	MV	Asia Pacific	TN	Arab Region
BT	Asia Pacific	HU	Europe and CIS	MW	Africa	TO	Asia Pacific
BW	Africa	ID	Asia Pacific	MX	Latin America and Caribbean	TR	Europe and CIS
BY	Europe and CIS	IE	IC	MY	Asia Pacific	TT	Latin America and Caribbean
BZ	Latin America and Caribbean	IL	IC	MZ	Africa	TV	Asia Pacific
CA	IC	IN	Asia Pacific	NA	Africa	TZ	Africa
CD	Africa	IQ	Arab Region	NE	Africa	UA	Europe and CIS
CG	Africa	IR	Asia Pacific	NG	Africa	UG	Africa
CH	IC	IS	IC	NL	IC	US	IC
CI	Africa	IT	IC	NO	IC	UY	Latin America and Caribbean
CL	Latin America and Caribbean	JM	Latin America and Caribbean	NP	Asia Pacific	UZ	Europe and CIS
CM	Africa	JO	Arab Region	NZ	IC	VC	Latin America and Caribbean
CN	Asia Pacific	JP	IC	OM	Arab Region	VE	Latin America and Caribbean
CO	Latin America and Caribbean	KE	Africa	PA	Latin America and Caribbean	VN	Asia Pacific
CR	Latin America and Caribbean	KG	Europe and CIS	PE	Latin America and Caribbean	VU	Asia Pacific
CU	Latin America and Caribbean	KH	Asia Pacific	PG	Asia Pacific	WS	Asia Pacific
CV	Africa	KI	Asia Pacific	PH	Asia Pacific	ZA	Africa
CY	Europe and CIS	KM	Arab Region	PK	Asia Pacific	ZM	Africa
CZ	Europe and CIS	KN	Latin America and Caribbean	PL	Europe and CIS	ZW	Africa
DE	IC	KR	Asia Pacific	PT	IC		
DJ	Arab Region	KW	Arab Region	PY	Latin America and Caribbean		

Appendix 2: Economic classification of postal development

ISO 2	Group	ISO 2	Group	ISO 2	Group	ISO 2	Group
AE	Wealthy performer	DK	Wealthy performer	KZ	Wealthy performer	QA	Wealthy performer
AF	Developing potential	DM	Wealthy potential	LA	Developing performer	RO	Wealthy performer
AG	Wealthy potential	DO	Wealthy performer	LB	Wealthy performer	RS	Wealthy performer
AL	Developing potential	DZ	Developing performer	LC	Wealthy potential	RU	Wealthy performer
AM	Developing performer	EC	Developing potential	LK	Developing potential	RW	Developing potential
AO	Developing potential	EE	Wealthy performer	LR	Developing potential	SA	Wealthy performer
AR	Wealthy potential	EG	Developing potential	LS	Developing potential	SB	Developing potential
AT	Wealthy performer	ER	Developing potential	LT	Wealthy performer	SC	Wealthy potential
AU	Wealthy performer	ES	Wealthy performer	LU	Wealthy performer	SD	Developing potential
AW	Wealthy potential	ET	Developing performer	LV	Wealthy performer	SE	Wealthy performer
AZ	Developing performer	FI	Wealthy performer	LY	Wealthy potential	SG	Wealthy performer
BA	Developing performer	FJ	Developing potential	MA	Developing potential	SI	Wealthy performer
BB	Wealthy potential	FR	Wealthy performer	MD	Developing performer	SK	Wealthy performer
BD	Developing potential	GA	Wealthy potential	ME	Wealthy potential	SL	Developing potential
BE	Wealthy performer	GB	Wealthy performer	MG	Developing potential	SN	Developing performer
BF	Developing potential	GE	Developing performer	MK	Developing performer	SR	Wealthy potential
BG	Wealthy performer	GH	Developing performer	ML	Developing potential	SV	Developing potential
BH	Wealthy potential	GN	Developing potential	MM	Developing potential	SY	Developing potential
BI	Developing potential	GR	Wealthy performer	MN	Developing potential	SZ	Developing potential
BJ	Developing potential	GY	Developing potential	MR	Developing potential	TD	Developing potential
BN	Wealthy potential	HN	Developing potential	MT	Wealthy performer	TG	Developing potential
BR	Wealthy performer	HR	Wealthy performer	MU	Wealthy performer	TH	Wealthy performer
BS	Wealthy potential	HT	Developing potential	MV	Wealthy potential	TN	Developing performer
BT	Developing potential	HU	Wealthy performer	MW	Developing potential	TO	Developing potential
BW	Wealthy potential	ID	Developing performer	MX	Wealthy performer	TR	Wealthy performer
BY	Wealthy performer	IE	Wealthy performer	MY	Wealthy performer	TT	Wealthy potential
BZ	Developing potential	IL	Wealthy performer	MZ	Developing potential	TV	Developing potential
CA	Wealthy performer	IN	Developing performer	NA	Developing potential	TZ	Developing potential
CD	NA	IQ	Developing potential	NE	Developing potential	UA	Developing performer
CG	Developing potential	IR	Developing performer	NG	Developing performer	UG	Developing potential
CH	Wealthy performer	IS	Wealthy performer	NL	Wealthy performer	US	Wealthy performer
CI	Developing potential	IT	Wealthy performer	NO	Wealthy performer	UY	Wealthy potential
CL	Wealthy performer	JM	Developing performer	NP	Developing potential	UZ	Developing potential
CM	Developing performer	JO	Developing performer	NZ	Wealthy performer	VC	Wealthy potential
CN	Wealthy performer	JP	Wealthy performer	OM	Wealthy performer	VE	Wealthy potential
CO	Wealthy performer	KE	Developing performer	PA	Wealthy potential	VN	Developing performer
CR	Wealthy performer	KG	Developing potential	PE	Wealthy performer	VU	Developing potential
CU	Wealthy potential	KH	Developing potential	PG	Developing potential	WS	Developing potential
CV	Developing potential	KI	Developing potential	PH	Developing performer	ZA	Developing performer
CY	Wealthy performer	KM	Developing potential	PK	Developing performer	ZM	Developing potential
CZ	Wealthy performer	KN	Wealthy potential	PL	Wealthy performer	ZW	Developing potential
DE	Wealthy performer	KR	Wealthy performer	PT	Wealthy performer		
DJ	Developing potential	KW	Wealthy potential	PY	Developing potential		

Appendix 3: Methodology for calculating the 2IPD index

1. General concept and notation

The 2IPD measures the comparative performance of countries in terms of postal development. As a composite index, the individual final scores are based on several components, called sub-variables. These sub-variables are (conceptually) grouped into four pillars: reach, reliability, relevance and resilience. Sub-scores are computed for each of these pillars and then consolidated into the final score, which takes a value between 0 and 100.

The scores are constructed sequentially and hierarchically in the following manner:

- A sub-variable is rescaled between 0 and 100, i.e. the minimum (or the maximum) value;
- The rescaled sub-variables are weighted and added together in a given sequence;
- The above-mentioned sum is rescaled again between 0 and 100.

In the description of the 2IPD methodology presented henceforth, a vector notation will be used, with vectors and matrices expressed in bold print. Let a_i be the value of a sub-variable a for the country i. In order to denote a collection of values of a for countries $i = 1…k$ the individual values a_i are grouped into a vector: $\boldsymbol{a} = (a_1, …, a_k)^{\mathrm{T}}$.

The rescaling of the vector **a** is done by multiplying it by a diagonal matrix **S** with typical elements defined as:

$$S[i,i] = 100 \frac{\min_k \boldsymbol{a} - \boldsymbol{a}[i]}{\min_k \boldsymbol{a} - \max_k \boldsymbol{a}},$$
$$S[i,j] = 0 \; for \; i \neq j \qquad (1.1)$$

Thus, the vector **Sa** contains the scores for the sub-variable normalized between 0 and 100.

2. Reach score

2.1 Reach: concept and data sources

The reach score is based on the degree of (international) connectivity of the postal network. The connectivity is measured by the number of outbound partners and the number of outbound items for each mail segment (letters, parcels and express). The higher the number of partners and the volume expressed in items, the higher the reach score.

The data needed to compute the reach scores are contained in the pre-advice of dispatch (PREDES) EDI messages gathered by the UPU.

2.2 Notation

The notation is as follows:

K	is the number of countries for which scores are computed
A	is the set of sending (origin) countries.
B	is the set of destination countries
$A \times B$	is the set of all possible country-to-country flows
$O_i D$	is the multiset of all country-to-country registrations for the origin country i in the PREDES file. Each country-to-country flow in this multiset belongs to $A \times B$ but same flows may appear many times (it may occur that $\lvert O_i D \rvert > \lvert A \times B \rvert$).
n_{ijdc}	is the number of items dispatched from country i to country j on date d for mail class c (c ∈ {"letters", "parcels", "express"}).

2.3 Sub-variables

Two sub-variables take part in the calculation of the reach score. First, the number of partners is the number of distinct (unique) destination partners for the given origin country i (the cardinal number of the support of the multiset $O_i D$), which is defined as:

$$rpartners_i =: \lvert supp \; O_i D \rvert, \qquad (2.1)$$

Second, the total number of items, in logarithmic scale, dispatched from country i regardless of mail class.

$$rvolume_i =: \ln\left(\sum_c \sum_d \sum_j n_{ijdc} \right) \qquad (2.2)$$

2.4 Calculation of reach score

The last step consists in applying transformation (1.1) to the two sub-variables and standardizing the average between the two between 0 and 100. In vector notation this leads to:

$$\mathbf{reach} =: S(S\ \mathbf{rpartner} + S\ \mathbf{rvolume})$$
(2.4)

The components of the vector **reach** are the individual reach scores corresponding to each country.

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3. Reliability score

3.1 Reliability: concept and data sources

The reliability score is based on the performance of a given country in terms of speed and predictability of delivery of incoming items, as measured by the tracking events recorded in EMS item events (EMSEVT) EDI messages, collected by the UPU through the PTC. The underlying assumption for measuring quality of service this way is that performance should not be assessed according to delivery standards, which are more arbitrary and may vary considerably from one country to another. Instead, the assumption is that high performing Posts are those that can deliver mail within an acceptable average time, with a reasonable amount of variability from this average. The total score of the pillar is based on two main sub-variables, speed of delivery and predictability of delivery.

3.2 Notation

The following notation applies:

T_{cij} is the time elapsed between scanning of the event HI and event D, in country i, for item j belonging to the category of mail c (c ϵ {"letters", "parcels", "express"})

avT_{ci} is the average time T_{ci} for mail class c and country *i*. In other terms:

$$avT_{ci} = \frac{1}{N_{ci}} \sum_{j=1}^{N_{ci}} T_{cij} , \qquad (3.1)$$

where N_{ci} is the number of valid observations (scanned items) for mail category c in country i

sdT_{ci} is the standard deviation of observations T_{cij} from mean avT_{ci}.

$$sdT_{ci} = \sqrt{\frac{\sum_{j=1}^{N_{ci}}(T_{cij}-avT_{ci})^2}{N_{ci}-1}}, \qquad (3.2)$$

where N_{ci} is the number of valid observations (scanned items) for mail category c in country i.

3.3 Sub-variables

There are two main sub-variables that have to be computed. First, the speed of delivery, defined as:

$$rspeed_i =: \frac{1}{N_i} \sum_{c=1}^{N_i} avT_{ci} , \qquad (3.3)$$

The speed of delivery, $rspeed_i$, is the average across mail classes of avT_{ci} for country i. N_i represents the number of different mail classes (letters, parcels, express) in country i.

The second sub-variable is the predictability of delivery, defined as:

$$rpredi_i =: \frac{1}{N_i} \sum_{c=1}^{N_i} sdT_{ci} \qquad (3.4)$$

Once again, this is the simple average of sdT_{ci} over valid mail classes for country i. Here too, N_i is the number of valid avT_{ci} times for the country i.

3.3 Calculation of reliability scores

The last step for the reliability pillar consists in applying transformation (1.1) to the two sub-variables and standardizing the average between the two between 0 and 100.

Notice that in the case of both $rspeed_i$ and $predi_i$, the lower the value, the better the performance. Therefore the standardization needed, using the vector notation, is:

$$Srspeed = S(-rspeed) \qquad (3.5)$$

$$Srpredi = S(-rpredi) \qquad (3.6)$$

The final reliability scores are obtained by rescaling the sum between the two:

$$reliability =: S(Srspeed + Srpredi) \qquad (3.7)$$

This leads to the final reliability scores.[1]

4 Relevance score

4.1 Relevance: concept and data sources

The relevance score measures the degree of competitiveness of a given operator in its most important business segment (letters, parcels, financial services) as well as the density of its infrastructure. To this end, the most important business segment is first identified, then compared with the best performing operator for this segment in the world. The (rescaled) distance from the best performing operator becomes the first sub-variable. The second sub-variable is the rescaled number of permanent postal offices per capita. Contrary to what is done for the previous pillars, the sub-scores of relevance do not receive the same weight in the final calculation. The data needed to compute the relevance score is derived from the official UPU Postal Statistics and UN statistics (for population data).

4.2 Notation

The following notation is used:

k is the number of countries for which scores are computed for the given year

$vpal_i$ is the percentage of revenue generated by the letter post for the given country i. If not available for the given year, the latest value from the last five years is taken.

$vcol_i$ is the percentage of revenue generated by parcel post and logistics. If not available for the given year, the latest value from the last five years is taken.

$vsfp_i$ is the percentage of revenue generated by the financial postal services. If not available for the given year, the latest value from the last five years is taken.

$palint_i$ is the number of domestic letter-post items in country i.

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[1] These final scores are compared with reach scores in order to control for countries with very few observations.

$palexp_i$ is the number of international exported letter-post items in country i.

$popul_i$ is the population of country i.

$bseden_i$ is the value of permanent post offices (including outsourced ones) in country i

4.3 Sub-variables

Before identifying the most important transaction segment it is necessary to define a certain number of variables.

$tpal_i$ is the number of letter post transactions per capita in country i

$$tpal_i =: \frac{palint_i + palexp_i}{popul_i}, \qquad (4.1)$$

$tcol_i$ is the number of postal transactions attributed to parcel post, but expressed in "letter post units"

$$tcol_i =: \begin{cases} \frac{vcol_i}{vpal_i} tpal_i, & vpal_i \neq 0 \text{ and available} \\ 0, & \text{otherwise} \end{cases} \quad (4.2)$$

$tsfp_i$ is the number of postal transactions attributed to postal financial services, expressed in "letter post units".

$$tsfp_i =: \begin{cases} \frac{vsfp_i}{vpal_i} tpal_i, & vpal_i \neq 0 \\ 0 \text{ otherwise} \end{cases} \quad (4.3)$$

$infra_i$ is the number of permanent post offices per capita in country i.

$$infra_i := \frac{bseden_i}{popul_i}, \qquad (4.4)$$

4.4 Identification of top-performing segments

The observations $tpal_i, tcol_i, tsfp_i, infra_i$ are stacked up for all countries into vectors **tpal, tcol, tsfp, infra,** which in turn are rescaled according to (1.1). This yields four vectors: **Stpal, Stcol, Stsfp, Sinfra.** At this point it is necessary to identify, for each country, its most important segment, $Strans_i$, which is defined as:

$$Strans_i =: \max\{Stpal_i, Stcol_i, Stsfp_i\} \qquad (4.5)$$

4.5 Calculation of relevance scores

The relevance scores are the following linear combination of **Strans** and **Sinfra**:

$$\boldsymbol{relevance} =: \boldsymbol{S}(0.75 * \boldsymbol{Strans} + 0.25 * \boldsymbol{Sinfra}).$$
$$(4.6)$$

5 Resilience scores

5.1 General concept and data source

The resilience score relies on a number of factors, which determine a postal operator's adaptability to economic, social, technological and environmental shocks.

Firstly, a combination of factors such as the mail volumes decline rate, the level of economies of scale achieved by the postal mail delivery network or the degree of diversification in terms of postal revenues measures the level of economic strength of a given postal business model in response to both macroeconomic and technological shocks.

Secondly, the potential for delivering financial inclusion through the postal network constitutes a measure of the level of social resilience provided by postal operators in order to mitigate economic and social inequalities within any given country.

The data needed to compute the resilience score is sourced from the official UPU Postal Statistics, as well as the UPU's Global Panorama on Financial Inclusion.

In most cases, the key variables are transformed into scores which are functions of critical value thresholds.

5.2 Notation

Let us denote by:

k is the number of countries for which scores are computed for the given year.

$vpal_i$ is the proportion of revenue generated by letter post for the given country i.

$vcol_i$ is the proportion of revenue generated by parcel post and logistics.

$vsfp_i$ is the percentage of revenue generated by financial postal services.

$vaut_i$ is the percentage of revenue generated by other services.

$palint_i$ is the number of domestic letter-post items in country i for the given year

$palexp_i$ is the number of international exported letter-post items in country i for the given year

$palint\_prev_i$ is the number of domestic letter-post items in country i three years ago

$palexp\_prev_i$ is the number of international exported letter-post items in country i three years ago

$popul_i$ is the population of country i for the given year

5.3 Computation of sub-variables

$vdec_i$ is the ratio of decline of letter-post volumes

$$vdec_i = \frac{palint_i + palexp_i}{palint\_prev_i + palexp\_prev_i}, \qquad (5.1)$$

$veco_i$ is the number of letter-post items per capita

$$veco_i = \frac{palint_i + palexp_i}{popul_i} \qquad (5.2)$$

$sdec_i$ is the indicator of letter post decline in country i

$$sdec_i = \frac{1}{1 + e^{-10(vdec_i - 0.9)}}, \qquad (5.3)$$

This function takes values between 0 and 1. If the ratio of decline of letter post is below the threshold of 0.9 the function rapidly tends to zero. Conversely, above the threshold it rapidly tends to 1.

$seco_i$ is the indicator of economies of scale for country i (threshold = 15).

$$seco_i = \frac{1}{1 + e^{-(veco_i - 15)}}, \qquad (5.4)$$

$seor_i$ is the indicator of concentration on other services than postal business

$$seor_i = \frac{1}{1 + e^{(vaut_i - 33.3)}} \qquad (5.5)$$

Above the threshold of 33.3% the function tends rapidly to 0, below the threshold to 1.

$scon_i$ is the indicator of diversification of services in country i

$$scon_i = \sqrt{(1 - vpal_i)(1 - vcol_i)(1 - vsfp_i)}, \qquad (5.6)$$

The variables $vpal_i, vcol_i, vsfp_i$ are the relevant proportions of revenue generated by the given service, and here they are represented by values between 0 and 1 and not, as in postal statistics, in percentages. The higher the diversification, the greater the function value. If the arguments are missing the function will get the value of 0.

$fincl_i$ is the individual score of country i in Postal Financial Potential Success Index as found in the UPU's Global Panorama for Financial Inclusion.

5.4 Calculation of resilience scores

First, we compute the variable of economic resilience. To this end, for each country *i* we sum together the four variables computed according to (5.3), (5.4), (5.5), (5.6):

$$ecores_i = \ sdec_i + seco_i + scon_i + seor_i \ , (5.7)$$

Then, the variables *ecores_i* and *fincl_i* are assembled into vectors **ecores, fincl,** which in turn are rescaled according to (1.1). This yields two vectors, **Secores, Sfincl**.

The final resilience scores are computed according to the usual formula:

$$resilience = \ : S(Secores \ + Sfincl) \ .$$
$$(5.8)$$

6. The 2IPD scores

Once all the scores for the four pillars have been computed, the final 2IPD scores can be obtained. For each country, the sum of the four scores is taken and then rescaled according to (1.1).

$$\textbf{2IPD} = \ : S(\textbf{reach} \ + \textbf{reliability} + \textbf{relevance} + $$
$$+ \ \textbf{resilience}). \qquad (6.1)$$

Endnotes

[i] Rogowski, J.C., Gerring, J., Cojocaru, L. and Maguire, M. (2017). Communications Infrastructure and Economic Development: Evidence from Postal Systems.

[ii] UPU (2020), Postal Economic Outlook.

[iii] The 2016 Istanbul Congress gave the International Bureau a mandate to update and release the 2IPD results on a regular basis with a view to maintaining indicators for cooperation and development purposes.

[iv] The discussion revolves around the quintiles of the 2IPD statistical distribution.

[v] Regional categories defined in Appendix 1.

[vi] World Bank (2020), Global Economic Prospects, June 2020. Washington, DC: World Bank. © World Bank.

[vii] Substitution from international to domestic consumption has also depressed the demand for international mail.

[viii] UPU (2020), The COVID-19 Crisis and the Postal Sector.

[ix] UPU (2020), Postal Economic Outlook.

[x] Economies of scale in letter post are based on the number of domestic postal items per capita.