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**ECONOMETRIC ANALYSIS OF CREATIVE ECONOMY EFFICIENCY IN  
ADVANCED COUNTRIES (USING DEA)**

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**Abstract**

This article presents an econometric analysis of the creative economy efficiency in advanced countries using Data Envelopment Analysis (DEA). The main goal of the study is to evaluate the potential for increasing creative exports (output) under the conditions of given input resources (GDP per capita, ICT use, and patents) using an output-oriented model. The results show that Singapore and the UK are utilizing 100% of their existing capabilities, while South Korea and the UAE have the potential to increase their creative product exports by 106.6% and 6.7%, respectively.

**Key words:** creative economy, creative export, DEA model, scale efficiency, output-oriented approach, econometric analysis, CCR and BCC models.

**DUNYONING ILG'OR DAVLATLARI KREATIV IQTISODIY  
SAMARADORLIGINI EKONOMETRIK TAHLIL QILISH (DEA  
YORDAMIDA)**

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**Annotatsiya**

Ushbu maqolada dunyoning ilg'or davlatlari kreativ iqtisodiyoti samaradorligi Ma'lumotlarni o'rash tahlili (DEA) usuli yordamida ekonometrik tahlil qilingan. Tadqiqotning asosiy maqsadi davlatlarning berilgan kirish resurslari (aholi jon boshiga YaIM, AKTdan foydalanish darajasi va patentlar soni) sharoitida kreativ eksport hajmini (chiquvchi resurs) qanchalik oshirish imkoniyati mavjudligini chiquvchiga asoslangan (output-oriented) model orqali baholashdan iborat. Tadqiqot natijalariga ko'ra, Singapur va Buyuk Britaniya mavjud imkoniyatlardan 100% foydalanayotganligi,





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Janubiy Koreya va BAAda esa kreativ mahsulotlar eksportini mos ravishda 106,6% va 6,7% ga oshirish potentsiali mavjudligi aniqlangan.

**Kalit soʻzlar:** kreativ iqtisodiyot, kreativ eksport, DEA modeli, miqyos samaradorligi, chiquvchiga asoslangan (output-oriented) yondashuv, ekonometrik tahlil, CCR va BCC modellari.

Zamonaviy iqtisodiy rivojlanish bosqichida kreativ industriyalar davlatlarning global bozordagi raqobatbardoshligi va innovatsion salohiyatini belgilab beruvchi asosiy omillardan biriga aylanmoqda. Xususan, kreativ mahsulotlar eksporti darajasi mamlakatning iqtisodiy farovonligini ta'minlashda muhim ahamiyat kasb etadi. Ushbu tadqiqotning maqsadi tanlangan ilg'or davlatlar berilgan kirish resurslari (inputs) sharoitida kreativ eksport (output)ni qanchalik oshirish imkoniyati mavjudligini ko'rib chiqishdan iborat. Bu yerda asosiy e'tiborli jihati shundaki, kirimlar (inputs) o'zgarmas deb qabul qilinib, faqat chiqish (outputs) hajmini oshirish imkoniyati ko'rib chiqiladi. Bu esa o'tkazilayotgan modelning bevosita chiqishga asoslangan (output-oriented) yo'nalishga tayanilganligini ko'rsatadi. Tahlilda jami 20 ta davlat qamrab olingan bo'lib, kirish resurslari sifatida aholi jon boshiga YaIM (GDP\_PC), axborot-aloqa vositalaridan foydalanish darajasi (ICT\_use) va patentlar soni (Patents), chiquvchi resurs sifatida esa kreativ mahsulotlar eksporti (Creative\_export) o'zgaruvchilari tanlab olingan.

**Tadqiqotning maqsadi:** Tanlangan davlatlar berilgan kirish resurslari (inputs) sharoitida kreativ eksport (output)ni qanchalik oshirish imkoniyati mavjudligini ko'rib chiqamiz. Bu yerda asosiy etiborli jihati shundaki, kirimlar( inputs) o'zgarmas va chiqish(outputs) ni oshirish imkoniyati ko'rib chiqiladi. Bu esa bevosita modelimiz chiqishga asoslangan (output-oriented) yo'nalishga asoslangan ekanligini ko'rsatadi.

Quyida tahlilimiz uchun ishlatilgan (1-ilova) ma'lumotlarning bir qismi R dagi natijalari "data" jadvali shaklida va uning deskriptiv statistikasi berilgan.

data

## # A tibble: 20 × 5





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```
## Economy Creative_export GDP_PC ICT_use Patents
```

```
## <chr> <dbl> <dbl> <dbl> <dbl>
```

```
## 14 Singapore 12374 85410 93.6 1.62
```

```
## 15 South Korea 9964 35670 91.9 186.
```

```
## 18 UAE 19302 49850 96.0 273
```

```
## 19 UK 16370 49940 91.8 17.4
```

```
describe(data)
```

```
## vars n mean sd median trimmed mad min
```

```
## Economy* 1 20 10.50 5.92 10.50 10.50 7.41 1.00
```

```
## Creative_export 2 20 6530.35 7201.45 2039.50 5660.81 2922.20 48.00
```

```
## GDP_PC 3 20 16804.20 22607.78 4675.00 12326.56 4329.93 1360.00
```

```
## ICT_use 4 20 85.00 6.29 84.47 84.92 8.01 74.66
```

```
## Patents 5 20 273.08 299.80 185.62 239.37 255.59 1.00
```

```
## max range skew kurtosis se
```

```
## Economy* 20.00 19.00 0.00 -1.38 1.32
```

```
## Creative_export 20595.00 20547.00 0.63 -1.19 1610.29
```

```
## GDP_PC 85410.00 84050.00 1.64 1.81 5055.25
```

```
## ICT_use 96.02 21.36 0.12 -1.33 1.41
```

```
## Patents 843.00 842.00 0.75 -1.05 67.04
```

Ushbu dastlabki natijalarda “Economy” ustini tanlab olingan davlatlar nomi, “Creative\_export” kreativ mahsulotlar eksporti (\$ million, output), “GDP\_PC” ustuni esa aholi jon boshiga YAIM miqdori (\$, input), “ICT\_use” ustuni esa axborot-aloqa vositalaridan foydalanish darajasi(% , input) va “Patents” ustuni patentlar soni (PPP\$ bo’yicha YaIM (milliardlarda) bilan normallashtirilgan, input) ni ifodalaydi. Deskriptiv tahlil esa ma’lumotlarning “n”-kuzatuvlar soni, “mean”-o’rtacha qiymat, “sd”- standart og’ish, “median”-medianasi, “trimmed”-eng katta va kichik qiymatlar olib tashlanganda hisoblangan o’rtacha qiymat, “mad(median absolute deviation)”- mediana asosida





tarqalish o'lchovi, "min va max"- katta va kichik qiymatlar, "range"- diapazon ("max" dan "min" ayirmasi), "skew"- taqsimot og'ishi/assimetriya, "kurtosis"- taqsimot qanchalik "o'tkir" yoki "yassi" va "se"- standart xatolik bo'yicha ma'lumot beradi.

Demak tadqiqotimiz uchun CCR modeli (Charnes, Cooper va Rhodes, CRS – Constant Returns to Scale) va BCC modeli (Banker, Charnes va Cooper, VRS – Variable Returns to Scale) ni output ya'ni kreativ eksportini oshirishga qaratilgan modelini R da qurib ko'ramiz. Qurilgan modellarimiz asosida samardorlik ko'rsatkichlari, hamda miqyos samaradorligini ham hisoblaymiz (Natijalar 5-ildovada berilgan). Chiquvchi mahsulotlarni samaradorlik ko'rsatkichlari DEA-BCC-OU va DEA-CCR-OU modellari uchun 1 dan yuqori bo'lishi tabiiy holat, bo'lganligi uchun miqyos samaradorligi (Scale efficiency-SE\_ ko'rsatkichi  $SE = TE_{CCR}(\text{technical efficiency CCR}) / TE_{BCC}(\text{technical efficiency BCC}) = (1/CCR \text{ eff}) / (1/BCC \text{ eff})$ ) formulasi asosida balanslashtirildi. Davlatlar kreativ mahsulotlari eksporti nuqtai nazaridan kelib chiqib, ushbu tadqiqotda samaradorlik texnologiyasi kreativ eksport mahsulotlarini (output) maksimallashtirishga yo'naltirilgan chiziqli dasturlash modeli sifatida tavsiflanadi. Tadqiqotimiz natijasiga ko'ra, Janubiy Koreya (BCC eff=2.067 va CCR eff=2,337), Buyuk Britaniya (BCC eff=1,026 va CCR eff=1,105), Singapur (BCC eff=1,000 va CCR eff=1.000) va BAA (BCC eff=1,067 va CCR eff=1,258) ga tengligi aniqlandi. Miqyos samaradorligi ushbu davlatlar uchun mos ravishda Janubiy Koreya (SE=0,886), Buyuk Britaniya (SE=0,928), BAA (SE=0,848) va Singapur (SE=1) ni tashkil qilgan. Shu o'rinda qayd etish lozimki, agar  $SE < 1$  bo'lsa, miqyos samaradorligi bilan bog'liq muammo mavjud. Faqatgina Singapur uchun bu ko'rsatkich shkala jihatdan normada ya'ni 1 ga teng. Miqyos samaradorligi 1 dan kichikligi, Janubiy Koreya, BAA va Buyuk Britaniya uchun o'zgaruvchan qaytish asosida BCC-OU modelning mos kelishini belgilaydi. Ya'ni modelda  $u_0$  ni hisobga olish lozim. Shunga ko'ra davlatlar "DEA-BCC-OU" modeliga ko'ra kreativ eksportini oshirish samaradorligining matematik tenglamasi quyidagicha:





Janubiy Koreya:

$$BCC_{SoKo} = \frac{9964 \cdot u_1 + u_0}{35670 \cdot v_1 + 91,91 \cdot v_2 + 186,24 \cdot v_3}$$

Buyuk Britaniya:

$$BCC_{UK} = \frac{16370 \cdot u_1 + u_0}{49940 \cdot v_1 + 91,76 \cdot v_2 + 17,41 \cdot v_3}$$

BAA:

$$BCC_{UAE} = \frac{19302 \cdot u_1 + u_0}{49850 \cdot v_1 + 96,02 \cdot v_2 + 273 \cdot v_3}$$

Singapur uchun esa miqyos samaradorligi 1 ga teng bo'lganligi sababli "DEA-CCR-OU" modeli to'g'ri keladi. Demak model umumiy tenglamasi:

$$CCR_{Sing} = \frac{12374 \cdot u_1}{85410 \cdot v_1 + 93,55 \cdot v_2 + 1,62 \cdot v_3}$$

asosida quriladi. Ya'ni model samaradorligini oshirish uchun miqyos samaradorligini etiborga olish shart emas.

Olingan faktorlar va output ya'ni kreativ mahsulotlar eksporti bo'yicha DEA modeli qurilganda Buyuk Britaniya va Singapur samaradorlik ko'rsatkichi 1 ga teng chiqdi va ushbu mamlakatlar mavjud imkoniyatlardan 100% foydalanmoqda deyish mumkin. DEA-BCC-OUda Efficiency\_Score < 1 bo'lsa, u holda shu DMU uchun outputni oshirish koeffitsienti taxminan:

$$\text{Output multiplier} \approx \frac{1}{\text{Efficiency\_Score}}$$

Demak, taxminiy oshirish foizi:

$$\text{Potential (\%)} \approx \left( \frac{1}{\text{Efficiency\_Score}} - 1 \right) \times 100$$

ga ko'ra hisoblanadi.

Kreativ mahsulotlar eksporti qariyb 1 mlrd dollarga teng(9964 mln dollar) va samardorlik ko'rsatkichi 0,484 ni tashkil etganda Janubiy Koreya uchun 106,6% atrofida oshirish, ya'ni target outputni 20586,8 mln dollarga yetkazish imkoniyati mavjud. Huddi





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shu tartibda BAA uchun 6,7% va target outputni 19302 mln dollardan 20599,8mln dollarga yetkazish imkoniyati mavjud.

**Xulosa**

Dunyoning ilg'or davlatlari (jumladan, Singapur, Janubiy Koreya, BAA va Buyuk Britaniya) ma'lumotlari asosida R dasturida qurilgan DEA-CCR-OU va DEA-BCC-OU modellari natijasida quyidagi xulosalarga kelindi:

Olingan faktorlar va kreativ mahsulotlar eksporti bo'yicha DEA modeli qurilganda Buyuk Britaniya va Singapurning samaradorlik ko'rsatkichi 1 ga teng chiqdi, bu esa ushbu mamlakatlar mavjud imkoniyatlardan 100% foydalanmoqda degan xulosani beradi.

Miqyos samaradorligi (Scale efficiency) bo'yicha tahlillar faqatgina Singapur uchun bu ko'rsatkich shkala jihatdan normada, ya'ni 1 ga tengligini va unga DEA-CCR-OU modeli to'g'ri kelishini ko'rsatdi.

Janubiy Koreya, BAA va Buyuk Britaniya uchun miqyos samaradorligi 1 dan kichikligi aniqlandi, bu ushbu davlatlarga o'zgaruvchan qaytish asosidagi BCC-OU modeli mos kelishini belgilaydi.

Samaradorlik ko'rsatkichini oshirish potentsiali hisoblanganda, hozirgi kreativ mahsulotlar eksporti qariyb 1 mlrd (9964 mln) dollarga teng bo'lgan Janubiy Koreya uchun maqsadli outputni (target output) 20586,8 mln dollarga yetkazish (ya'ni 106,6% atrofida oshirish) imkoniyati mavjudligi aniqlandi.

Xuddi shu tartibda BAA uchun joriy ko'rsatkichni 6,7% ga oshirib, maqsadli outputni 19302 mln dollardan 20599,8 mln dollarga yetkazish imkoniyati borligi tasdiqlandi.

**Foydalanilgan adabiyotlar ro'yxati**

1. UN Trade and Development (UNCTAD). Creative Economy Outlook 2024 (hisobot) va unga doir metodik materiallar.





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2. Korea Creative Content Agency (KOCCA). Rasmiy ma'lumotlar va dasturlar (kocca.kr).
3. UNCTAD rasmiy veb-sayti. <https://unctad.org/news/k-pop-blueprint-drawing-inspiration-south-koreas-creative-industries>.
4. US News Rankings. <https://www.usnews.com/news/best-countries/rankings/power>.

**1-ilova**

DMU (Decision Making Unit): bu yerda har bir mamlakat alohida DMU sifatida olinadi.  
Tanlangan o'zgaruvchilar:

- Output (natija): Creative\_export (mlrd.dollar)<sup>1</sup>
- Inputs (kirishlar): GDP\_PC (\$) <sup>2</sup>, ICT\_use(%)<sup>3</sup>, Patents(mlrd.dollar)<sup>4</sup>

**DEA tahlili uchun ma'lumotlar jadvali<sup>5</sup>**

| Economy    | Creative_export | GDP_PC | ICT_use | Patents |
|------------|-----------------|--------|---------|---------|
| Armenia    | 555             | 8159   | 86.82   | 25.00   |
| Cambodia   | 2112            | 2430   | 81.76   | 1.00    |
| Egypt      | 999             | 3460   | 77.08   | 695.00  |
| India      | 20595           | 2530   | 81.45   | 49.86   |
| Indonesia  | 9505            | 4880   | 84.60   | 1.55    |
| Japan      | 8516            | 33840  | 92.11   | 218.81  |
| Jordan     | 917             | 4470   | 79.85   | 25.00   |
| Kazakhstan | 89              | 12880  | 87.96   | 782.00  |
| Kyrgyzstan | 48              | 2149   | 83.80   | 75.00   |

<sup>1</sup> <https://unctadstat.unctad.org/datacentre/dataviewer/US.CreativeGoodsValue>

<sup>2</sup>

<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2024&start=2024&view=map&year=2023>

<sup>3</sup> <https://www.wipo.int/gii-ranking/en/indicators/312>

<sup>4</sup> <https://www.wipo.int/gii-ranking/en/indicators/611?sort=country&dir=ASC>

<sup>5</sup> Muallif tomonidan rasmiy manbalar asosida tuzildi.





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|-------------|-------|-------|-------|--------|
| Malaysia    | 9845  | 11386 | 92.00 | 843.00 |
| Morocco     | 275   | 3810  | 84.33 | 310.00 |
| Pakistan    | 829   | 1360  | 74.66 | 459.00 |
| Philippines | 1967  | 3800  | 78.28 | 786.00 |
| Singapore   | 12374 | 85410 | 93.55 | 1.62   |
| South Korea | 9964  | 35670 | 91.91 | 186.24 |
| Sri Lanka   | 261   | 3800  | 77.12 | 185.00 |
| Turkiye     | 15811 | 13380 | 84.91 | 9.05   |
| UAE         | 19302 | 49850 | 96.02 | 273.00 |
| UK          | 16370 | 49940 | 91.76 | 17.41  |
| Uzbekistan  | 273   | 2880  | 80.03 | 518.00 |

