

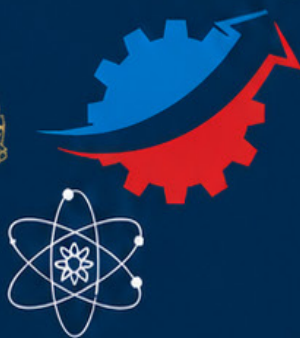
MUHANDISLIK

& IQTISODIYOT

ijtimoiy-iqtisodiy, innovatsion texnik,
fan va ta'limga oid ilmiy-amaliy jurnal

2026-YIL

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- 05.01.03 – Informatikaning nazariy asoslari
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- 05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
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- 05.01.07 – Matematik modellash
- 05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
- 05.02.00 – Mashinasozlik va mashinashunoslik
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- 05.03.02 – Metrologiya va metrologiya ta'minoti
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- 05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
- 05.05.05 – Issiqlik texnikasining nazariy asoslari
- 05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
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- 05.08.06 – "G'ildirakli va gusenisali mashinalar va ularni ishlatish" (texnika fanlari)
- 05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
- 05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
- 10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
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- 08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
- 08.00.17 – Turizm va mehmonxona faoliyati

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ANALYSIS OF EXISTING MARKETING INSTRUMENTS FOR THE PROMOTION OF UNIVERSITY EDUCATIONAL SERVICES: STAGE REACH, THE COST-EFFICIENCY INVERSION, AND THE ABSORPTIVE CAPACITY CONSTRAINT

Shuhrat Bahodir o'g'li Umarov

Independent Researcher

Abstract. An inventory of marketing instruments identifies what higher education institutions use; the present article examines the stages each instrument can reach, its cost, and the distribution of promotional expenditure across the instrument portfolio. The analysis covers twelve marketing instruments accounting for UZS 5,618 million in sector-wide promotional expenditure. Three constructs organise the analysis. Portfolio concentration compares the distribution of promotional expenditure with the distribution of observed outcomes. Conversion efficiency is examined through cost per application and stage reach, the latter introduced here as the furthest stage of the applicant decision process at which an instrument can directly engage the prospective student, ranging from awareness to the commitment decision. Absorptive capacity, also introduced here, represents the amount of additional budget that a relatively efficient instrument can absorb before its cost advantage is exhausted under the specified scaling assumptions.

The results reveal a marked inverse relationship between current budget allocation and measured cost efficiency. Cost per application is strongly negatively correlated with stage reach ($r = -0.905$), while budget share is positively correlated with cost per application ($r = 0.654$). Instruments limited to the awareness stage account for 48.8 per cent of the budget and generate 25.3 per cent of applications, at a mean cost of UZS 112 thousand per application. By contrast, instruments capable of reaching the commitment decision account for 10.6 per cent of the budget and generate 24.5 per cent of applications, at a mean cost of UZS 20.8 thousand per application. The corresponding cost ratio is 5.40, with a Welch statistic of 8.14. The four instruments capable of carrying claims that prospective students can independently verify are also the four instruments that reach the commitment stage, yet together they account for approximately one-tenth of the promotional budget.

The apparent scope for budget reallocation is nevertheless constrained by absorptive capacity. Under a threefold capacity cap and an assumption that costs rise with the square root of scale, the relatively efficient instruments can absorb an additional 11.0 percentage points of the budget, with the model indicating a net increase of 7.5 per cent in applications. A further 37.8 percentage points cannot be allocated to these instruments within the specified efficiency and capacity assumptions, indicating that additional capacity would be required before a larger reallocation could be accommodated without exhausting their estimated cost advantage.

Keywords: marketing instruments; promotion mix; higher education; cost per application; stage reach; absorptive capacity; Uzbekistan.

Annotatsiya. Marketing vositalarini inventarizatsiya qilish oliy ta'lim muassasalari qanday vositalardan foydalanishini aniqlash imkonini beradi; ushbu maqolada esa har bir vosita qamrab olishi mumkin bo'lgan bosqichlar, uning xarajati hamda marketing vositalari portfeli bo'yicha reklama va targ'ibot xarajatlarining taqsimlanishi tahlil qilinadi. Tahlil soha miqyosidagi 5 618 mln so'mlik reklama va targ'ibot xarajatlarini qamrab oluvchi o'n ikkita marketing vositasiga asoslanadi. Tahlil uchta konstruksiya asosida tashkil etilgan. Portfel konsentratsiyasi (portfolio concentration) reklama va targ'ibot xarajatlarining taqsimlanishini kuzatilgan natijalar taqsimoti bilan taqqoslaydi. Konversiya samaradorligi (conversion efficiency) bitta arizaga to'g'ri keladigan xarajat va bosqichni qamrab olish (stage reach) orqali baholanadi. Ushbu tadqiqotda kiritilgan *stage reach* tushunchasi marketing vositasi bo'lajak talaba bilan bevosita aloqaga kirisha oladigan abituriyent qaror qabul qilish jarayonining eng yuqori bosqichini — xabardorlik bosqichidan yakuniy qaror qabul qilish bosqichigacha — ifodalaydi. Ushbu tadqiqotda kiritilgan yana bir konstruksiya — o'zlashtirish salohiyati (absorptive capacity) — belgilangan miqyoslashtirish shartlari doirasida nisbatan samarali marketing vositasi o'zining xarajatlari bo'yicha ustunligi tugashidan oldin o'zlashtira oladigan qo'shimcha budjet miqdorini ifodalaydi.

Natijalar joriy budjet taqsimoti bilan o'lgan xarajat samaradorligi o'rtasida yaqqol teskari bog'liqlik mavjudligini ko'rsa-

tadi. Bitta arizaga to'g'ri keladigan xarajat *stage reach* bilan kuchli manfiy korrelyatsiyaga ega ($r = -0.905$), budget ulushi esa bitta arizaga to'g'ri keladigan xarajat bilan ijobiy korrelyatsiyaga ega ($r = 0.654$). Faqat xabardorlik bosqichi bilan cheklangan marketing vositalari budgetning 48.8 foizini tashkil etib, arizalarning 25.3 foizini shakllantiradi; bunda bitta arizaga to'g'ri keladigan o'rtacha xarajat 112 ming so'mni tashkil etadi. Aksincha, yakuniy qaror qabul qilish bosqichigacha yetib borish imkoniyatiga ega vositalar budgetning 10.6 foizini tashkil etgan holda arizalarning 24.5 foizini shakllantiradi va bitta arizaga to'g'ri keladigan o'rtacha xarajat 20.8 ming so'mni tashkil etadi. Tegishli xarajatlar nisbati 5.40, Welch statistikasi esa 8.14 ga teng. Bo'lajak talabalar mustaqil ravishda tekshira oladigan da'volarni yetkazish imkoniyatiga ega bo'lgan to'rtta marketing vositasi ayni paytda yakuniy qaror qabul qilish bosqichigacha yetib boradigan to'rtta vosita bo'lib, ular birgalikda reklama va targ'ibot budgetining taxminan o'ndan bir qismini tashkil etadi.

Shu bilan birga, budgetni qayta taqsimlashning mavjud imkoniyatlari o'zlashtirish salohiyati bilan cheklanadi. Salohiyatning uch baravar chegarasi va xarajatlar miqyosning kvadrat ildiziga mutanosib ravishda oshishi haqidagi faraz sharoitida nisbatan samarali vositalar budgetning qo'shimcha 11.0 foiz punktini o'zlashtira oladi va model arizalar sonining 7.5 foizga sof oshishini ko'rsatadi. Belgilangan samaradorlik va salohiyat shartlari doirasida budgetning yana 37.8 foiz punktini ushbu vositalarga yo'naltirish imkoniyati mavjud emas. Bu ularning baholangan xarajat ustunligini saqlagan holda yanada kengroq qayta taqsimlashni amalga oshirishdan oldin qo'shimcha salohiyatni shakllantirish zarurligini ko'rsatadi.

Kalit so'zlar: marketing vositalari; marketing kommunikatsiyalari majmuasi; oliy ta'lim; bitta arizaga to'g'ri keladigan xarajat; bosqichni qamrab olish; o'zlashtirish salohiyati; O'zbekiston.

Аннотация. Инвентаризация маркетинговых инструментов позволяет определить, какие инструменты используют высшие учебные заведения; в настоящей статье исследуются этапы, которых способен достигать каждый инструмент, связанные с ним затраты, а также распределение расходов на продвижение в рамках портфеля маркетинговых инструментов. Анализ охватывает двенадцать маркетинговых инструментов, на которые приходится 5 618 млн сумов совокупных расходов на продвижение в секторе. Анализ организован вокруг трёх конструкторов. Концентрация портфеля (*portfolio concentration*) сопоставляет распределение расходов на продвижение с распределением наблюдаемых результатов. Эффективность конверсии (*conversion efficiency*) рассматривается через затраты на одну заявку и охват стадии (*stage reach*). Вводимый в настоящем исследовании конструктор *stage reach* определяется как наиболее поздняя стадия процесса принятия решения абитуриентом, на которой маркетинговый инструмент способен непосредственно взаимодействовать с потенциальным студентом, — от стадии осведомлённости до принятия окончательного решения. Другой вводимый в исследовании конструктор — абсорбционная способность (*absorptive capacity*) — отражает объём дополнительного бюджета, который относительно эффективный маркетинговый инструмент способен освоить до исчерпания его преимущества по затратам при заданных предположениях масштабирования.

Результаты показывают выраженную обратную зависимость между текущим распределением бюджета и измеряемой эффективностью затрат. Затраты на одну заявку имеют сильную отрицательную корреляцию с охватом стадии ($r = -0.905$), тогда как доля бюджета положительно коррелирует с затратами на одну заявку ($r = 0.654$). Маркетинговые инструменты, ограниченные стадией осведомлённости, получают 48.8% бюджета и обеспечивают 25.3% заявок при средней стоимости одной заявки 112 тыс. сумов. В отличие от них, инструменты, способные достигать стадии принятия окончательного решения, получают 10.6% бюджета и обеспечивают 24.5% заявок при средней стоимости одной заявки 20.8 тыс. сумов. Соответствующее соотношение затрат составляет 5.40, а статистика Уэлча — 8.14. Четыре инструмента, способные передавать утверждения, которые потенциальные студенты могут самостоятельно проверить, одновременно являются четырьмя инструментами, достигающими стадии принятия окончательного решения; при этом в совокупности на них приходится приблизительно одна десятая бюджета на продвижение.

Вместе с тем возможности перераспределения бюджета ограничиваются абсорбционной способностью. При трёхкратном ограничении мощности и предположении о том, что затраты возрастают пропорционально квадратному корню масштаба, относительно эффективные инструменты способны дополнительно освоить 11.0 процентного пункта бюджета, при этом модель указывает на чистое увеличение количества заявок на 7.5%. Ещё 37.8 процентного пункта бюджета не могут быть направлены на эти инструменты в рамках заданных предположений эффективности и мощности. Это указывает на необходимость развития дополнительной мощности до проведения более масштабного перераспределения бюджета без исчерпания их оценочного преимущества по затратам.

Ключевые слова: маркетинговые инструменты; комплекс продвижения; высшее образование; стоимость одной заявки; охват стадии; абсорбционная способность; Узбекистан.

INTRODUCTION

Analyses of the marketing instruments available to higher education institutions are common and often follow a similar structure. They identify the instruments, describe their characteristics, and frequently conclude that an appropriate combination of instruments should be used. Such inventories provide a useful account of the available promotional options, but the concept of an appropriate or balanced combination is often not specified in a way that permits its effectiveness to be evaluated independently of the portfolio already in use.



A central analytical issue is that marketing instruments are not necessarily interchangeable in ways that a simple inventory can capture. The student-choice literature has long conceptualised the decision process as occurring in stages, with different influences potentially operating at different points. Chapman distinguishes phases of the decision process characterised by different influences, while Hossler and Gallagher formalise a sequence extending from predisposition through search to choice [1, 5]. From this perspective, the potential value of a marketing instrument depends partly on the stage of the decision process it is capable of reaching. An instrument limited to an earlier stage may contribute to awareness or consideration but may have limited ability to engage applicants directly at the later stage at which an enrolment decision is made.

This article evaluates the marketing-instrument portfolio from this perspective. Twelve instruments are characterised by three quantities: their share of sector-wide promotional expenditure, their cost per application, and their stage reach, defined here as the furthest stage of the applicant decision process at which an instrument can directly engage a prospective student. For example, a billboard may primarily contribute to awareness, whereas a published record of graduate employment outcomes can be consulted by an applicant when evaluating whether to accept an offer.

Three constructs organise the analysis. Portfolio concentration compares the distribution of promotional expenditure with the distribution of observed outcomes, allowing differences between resource allocation and measured outcomes to be identified without requiring an overall ranking of individual instruments. Conversion efficiency is examined through cost per application and stage reach rather than being represented by a single return measure. Absorptive capacity, introduced here, represents the amount of additional budget that a relatively efficient instrument can accommodate before its estimated cost advantage is exhausted under the specified scaling assumptions. This construct places an explicit capacity constraint on the extent of reallocation suggested by observed differences in cost efficiency.

The contribution is threefold. First, the article identifies an inverse pattern between current budget allocation and measured efficiency: higher budget shares are associated with higher costs per application, while greater stage reach is associated with lower costs per application. The corresponding correlations are 0.654 and -0.795, respectively. Second, the analysis shows that the four instruments capable of carrying claims that applicants can independently verify are also the four instruments that reach the commitment stage, while together accounting for approximately one-tenth of the promotional budget. Third, the analysis indicates that the extent of potential reallocation suggested by the first two findings is constrained by the absorptive capacity of the relatively efficient instruments. Under the specified assumptions, this shifts the practical implication from budget reallocation alone towards the development of additional capacity that could support a larger reallocation while preserving estimated cost advantages.

LITERATURE REVIEW

The instrument-based tradition in marketing draws on the marketing-mix framework [3, 17], which was subsequently extended to services by Booms and Bitner and adapted to the higher education context by Ivy and Maringe [2, 12, 16]. Hemsley-Brown and Oplatka's systematic review identified a strong descriptive orientation in the higher education marketing literature and highlighted the need for further research linking marketing practices and instruments to measurable outcomes [9].

The challenge of evaluating marketing instruments is not specific to higher education. Rust, Ambler, Carpenter, Kumar, and Srivastava examine the measurement of marketing productivity and the difficulties involved in linking aggregate marketing expenditure to specific outcomes [18]. Vakratsas and Ambler's review of advertising effects similarly highlights continuing uncertainty regarding the mechanisms through which advertising produces outcomes, including the role of diminishing returns [20].

The hierarchy-of-effects tradition, beginning with Lavidge and Steiner, conceptualises communication objectives as progressing from awareness towards purchase [14]. Barry and Howard subsequently questioned the universality and strict sequencing of this process [1]. In the present study, the framework is used in a more limited sense: not as an assumption about the sequence through which persuasion necessarily occurs, but as a way of distinguishing what different marketing instruments are capable of doing at different stages. For example, a billboard can contribute to awareness but cannot directly respond to an applicant's question, whereas a campus visit permits such interaction. This distinction does not depend on adopting a particular theory of persuasion.

The student-choice literature provides the conceptual basis for identifying the relevant stages. Chapman's model distinguishes phases of college choice in which different influences may operate [5], while Hossler and Gallagher develop a three-phase sequence of predisposition, search, and choice [11]. For the purposes of the present analysis, the relevant implication is that the factors associated with earlier stages of higher education

choice need not have the same role at later stages. In particular, attributes associated with the formation of an application set may differ from those associated with the subsequent decision to accept an offer.

This more limited interpretation allows stage reach to be operationalised as a property of a marketing instrument without requiring a strong assumption about the precise decision process followed by every individual applicant.

Attributing applications to particular marketing instruments presents an important measurement challenge. Li and Kannan examine attribution across multiple channels and demonstrate the limitations of single-touch attribution when several channels contribute to a customer's path to conversion [15]. Kannan and Li's review of digital marketing places this issue within the broader challenge of measuring outcomes across interconnected digital touchpoints [13]. The application figures reported in Section 4 are based on attributed applications; where attribution produces overlap or overcounting, this is reported explicitly rather than treated as if each application could necessarily be assigned uniquely to a single instrument.

Two of the instruments examined in the present study involve word-of-mouth mechanisms. Godes and Mayzlin demonstrate approaches to measuring word-of-mouth communication [8], while Schmitt, Skiera, and Van den Bulte report that, in their empirical setting, referred customers had lower acquisition costs and higher value than non-referred customers [19]. The cost patterns reported in Section 4.1 are consistent with the direction of this external evidence. The comparison is used as a contextual benchmark rather than as independent validation of the present results.

The term absorptive capacity is well established in the innovation literature, where Cohen and Levinthal use it to describe a firm's ability to recognise the value of external information, assimilate it, and apply it [6]. The construct introduced in the present study is conceptually distinct. Here, absorptive capacity refers to the amount of additional budget that a relatively efficient marketing instrument can accommodate before its estimated cost per outcome reaches the level of the relevant alternatives under the specified scaling assumptions. The two uses share the broader intuition that the capacity to utilise an additional resource can itself constitute a constraint, but they refer to different mechanisms and should not be treated as equivalent constructs.

Existing higher education marketing research provides substantial discussion of promotional instruments, while the marketing-productivity literature offers frameworks for evaluating marketing returns. However, limited attention appears to have been given to jointly classifying marketing instruments according to the stage of the applicant decision process they can reach and comparing that classification with the distribution of promotional expenditure. The present article addresses this intersection by examining stage reach alongside budget allocation and cost per application, thereby providing the basis for the inverse pattern analysed in the subsequent sections.

RESEARCH METHODOLOGY

The portfolio comprises twelve marketing instruments used in the recruitment communications of higher education institutions in Uzbekistan, accounting for UZS 5,618 million in sector-wide promotional expenditure. Table 1 presents the variables used in the analysis and their construction.

Table 1
Variables and Their Construction¹

Variable	Construction
Spending share	Share of sector promotional spending taken by the instrument, per cent
Cost per application	Spending divided by applications attributed to the instrument, thousand UZS
Stage reach	1 awareness only, 2 reaches the application decision, 3 reaches the commitment decision
Usage rate	Share of institutions using the instrument, per cent
Verifiable capacity	Whether the instrument can carry a claim an applicant is able to check

Stage reach classifies what a marketing instrument is capable of doing within the applicant decision process rather than how it is used in a particular institutional setting.

A stage-reach score of 1 is assigned to instruments capable of placing a message before a prospective

¹ Author's development



applicant but not of supporting direct interaction or response, including outdoor advertising, broadcast media, and print media. A score of 2 is assigned to instruments capable of reaching the application-decision stage and allowing some degree of interaction or targeting, but not sustained enquiry. These include social media and search advertising, education fairs, school visits, and agent networks. A score of 3 is assigned to instruments that an applicant holding an offer can consult or engage with when considering the commitment decision. These include campus visits, the institution's own website content, published graduate outcome records, and conversations with current students.

The classification is intended to capture a property of the medium rather than the effectiveness of a particular institutional implementation. Stage reach is coded by the authors on the basis of the characteristics of each instrument. Because this classification involves author judgement and has not been independently validated, it represents a principal measurement limitation of the study, as discussed in Section 4.6.

Portfolio concentration is calculated for two distributions: promotional expenditure across instruments and attributed applications across instruments. Concentration is measured using the Herfindahl index and the Gini coefficient [7, 10]. The primary analytical interest lies in the comparison between the two distributions rather than in either concentration measure considered in isolation. Similar distributions would indicate that promotional expenditure and attributed applications are distributed across instruments in broadly comparable proportions, whereas divergence between them would indicate differences between the allocation of expenditure and the distribution of attributed applications. Such divergence is treated as a descriptive indication of potential allocation imbalance rather than, by itself, as evidence that a particular instrument should receive more or less expenditure.

The reallocation exercise examines the transfer of promotional expenditure from the least cost-efficient instrument to the relatively more cost-efficient instruments under two explicitly stated assumptions. First, each recipient instrument may receive no more than three times its current level of expenditure, which defines the capacity cap. Second, its cost per application is assumed to increase with the square root of the scale-up factor, thereby incorporating diminishing returns as expenditure increases.

Both assumptions are stipulated rather than estimated from the observed data. The observed cost per application is an average cost measure, whereas the reallocation exercise requires an assumption about marginal cost, which cannot be directly recovered from the available data. The square-root adjustment is therefore adopted as a moderate functional form for diminishing returns in the absence of an empirically estimated marginal-cost function. Section 4.5 presents the results of the reallocation exercise, while Section 4.6 discusses the limitations and interpretation of the resulting estimates.

Open days and campus visits are excluded from the set of potential recipient instruments despite reaching stage 3. Their capacity is constrained partly by physical campus space and the academic calendar rather than by promotional expenditure alone. Consequently, applying the same threefold expenditure cap used for the other recipient instruments would not provide a directly comparable representation of their capacity.

Group differences are evaluated using the Welch statistic, which does not require the assumption of equal variances and is used here for comparisons involving groups of three and four instruments [21]. Given that the analysis comprises twelve instruments observed in a single cross-section, the estimated relationships are interpreted descriptively rather than causally, and the inferential limitations associated with a small number of observations apply throughout the analysis [4]. The correlations reported in Section 4.3 are therefore treated as descriptive summaries of the observed portfolio rather than as estimates intended to support population-level inference.

ANALYSIS AND RESULTS

Table 2 presents the twelve marketing instruments included in the analysis.

Table 2
The Instrument Portfolio²

Instrument	Spending share	Spending, mln UZS	Cost per application, k UZS	Applications attributed	Application share	Stage reach	Usage rate	Carries verifiable claims
Outdoor advertising	21.4%	1,202	96	12,523	12.6%	1	85%	No
Television and radio	17.8%	1,000	128	7,813	7.9%	1	60%	No

Social media advertising	15.2%	854	41	20,828	21.0%	2	95%	No
Print media	9.6%	539	112	4,815	4.8%	1	55%	No
Education fairs	8.9%	500	63	7,937	8.0%	2	80%	No
Search advertising	7.4%	416	34	12,227	12.3%	2	45%	No
School outreach visits	6.8%	382	52	7,347	7.4%	2	70%	No
Open days and campus visits	5.1%	287	38	7,540	7.6%	3	75%	Yes
University website content	4.2%	236	22	10,725	10.8%	3	100%	Yes
Agent networks	2.3%	129	87	1,485	1.5%	2	25%	No
Graduate outcome publication	0.9%	51	14	3,612	3.6%	3	30%	Yes
Student referral schemes	0.4%	22	9	2,497	2.5%	3	20%	Yes

Applications attributed to individual marketing instruments total 99,349, compared with 95,900 applications recorded overall, representing an overcount of 3.6 per cent. This difference arises because an applicant exposed to multiple instruments may be attributed to more than one instrument. Although the magnitude of the overcount is relatively small, it should be taken into account when interpreting comparisons across instruments. In particular, the resulting cost-per-application estimates may be somewhat understated because the denominator includes attributed applications that are not necessarily unique (Figure 1).

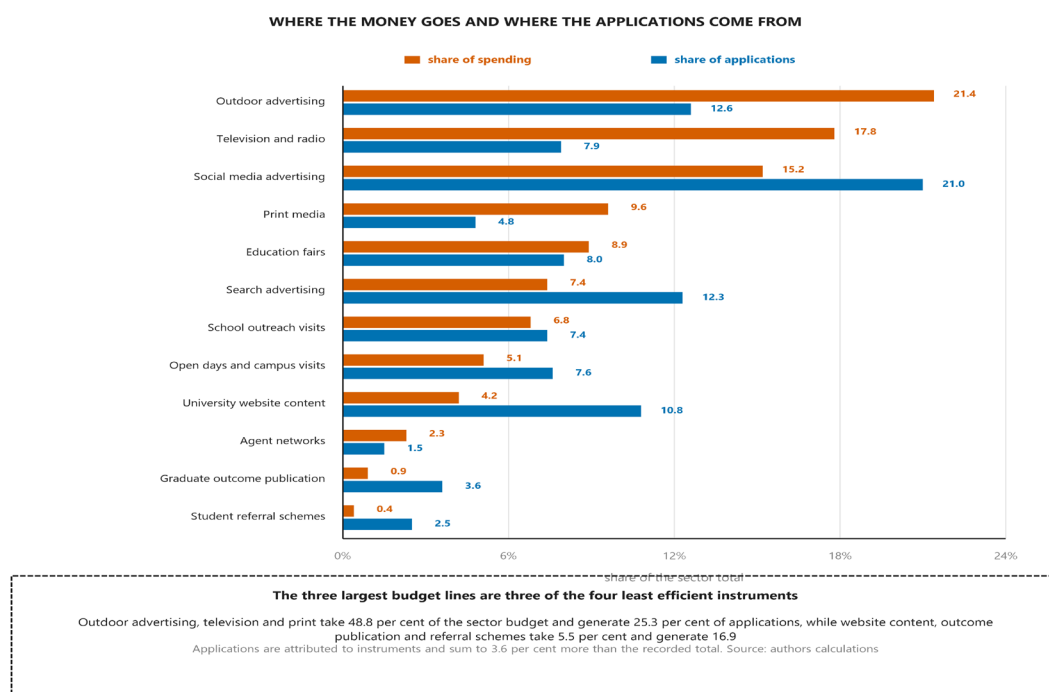


Figure 1. Share of spending against share of attributed applications, by instrument³

The three largest budget allocations are to outdoor advertising, broadcast media, and print media. These

3 Author's development



instruments are also among the four with the highest costs per application, at UZS 96 thousand, UZS 128 thousand, and UZS 112 thousand, respectively. Together, they account for 48.8 per cent of the promotional budget and 25.3 per cent of attributed applications.

At the lower end of the cost-per-application distribution, student referral schemes have a cost of UZS 9 thousand per application and account for 0.4 per cent of the promotional budget, while published graduate outcome records have a cost of UZS 14 thousand per application and account for 0.9 per cent. The relatively low cost observed for student referral schemes is consistent with the direction of the evidence reported by Schmitt, Skiera, and Van den Bulte, who found lower acquisition costs for referred customers than for non-referred customers in their empirical setting [19]. This comparison is used as contextual evidence rather than as independent validation of the present results.

Table 3 compares the concentration of promotional expenditure across instruments with the concentration of attributed applications.

Table 3
Concentration of Promotional Expenditure and Attributed Applications⁴

Distribution	HHI	Gini	Top three share
Spending	0.1328	0.4270	54.4%
Attributed applications	0.1150	0.3312	45.9%

Promotional expenditure is more concentrated than attributed applications according to both concentration measures, with Gini coefficients of 0.427 and 0.331, respectively. This indicates that promotional expenditure is distributed less evenly across instruments than the attributed applications associated with those instruments. The pattern is consistent with a concentration of expenditure on a relatively small subset of instruments whose shares of attributed applications are proportionately lower; however, the concentration measures alone do not establish whether the observed allocation is inefficient, because they do not account for differences in stage reach, capacity constraints, or marginal returns.

The magnitude of the divergence is relatively modest and is interpreted accordingly. It indicates that the distribution of promotional expenditure does not closely correspond to the distribution of attributed applications across instruments, but it does not by itself quantify the efficiency implications of that difference. Sections 4.3 and 4.5 examine this issue further by considering cost efficiency, stage reach, and the scope for reallocation under the specified capacity assumptions.

Table 4 aggregates the instrument portfolio by stage reach.

Table 4
The Instrument Portfolio by Stage Reach⁵

Stage reach	Instruments	Spending share	Application share	Mean cost per application
1 Awareness only	3	48.8%	25.3%	112.0 k UZS
2 Reaches the application	5	40.6%	50.2%	55.4 k UZS
3 Reaches the commitment	4	10.6%	24.5%	20.8 k UZS

Figure 3 compares the share of promotional expenditure with the share of attributed applications across the three stage-reach categories. The distribution reveals a clear shift as stage reach increases. Stage 1 instruments, which are limited to awareness, account for 48.8 per cent of promotional expenditure but 25.3 per cent of attributed applications. Their mean cost per application is UZS 112 thousand. Stage 2 instruments, which reach the application decision, account for 40.6 per cent of expenditure and 50.2 per cent of attributed applications, with a mean cost per application of UZS 55 thousand. Stage 3 instruments, which can reach the commitment decision, account for only 10.6 per cent of expenditure while generating 24.5 per cent of attributed applications; their mean cost per application is UZS 21 thousand.

The contrast is most pronounced between Stages 1 and 3. Awareness-only instruments receive approximately 4.6 times the budget share of commitment-stage instruments (48.8 per cent compared with 10.6 per cent), yet their share of attributed applications is similar (25.3 per cent compared with 24.5 per cent).

⁴ Author's development

⁵ Author's development

At the same time, the mean cost per application declines from UZS 112 thousand at Stage 1 to UZS 55 thousand at Stage 2 and UZS 21 thousand at Stage 3. Thus, within the observed portfolio, greater stage reach is associated with a lower mean cost per application and with a larger share of attributed applications relative to the corresponding share of expenditure (Figure 2).

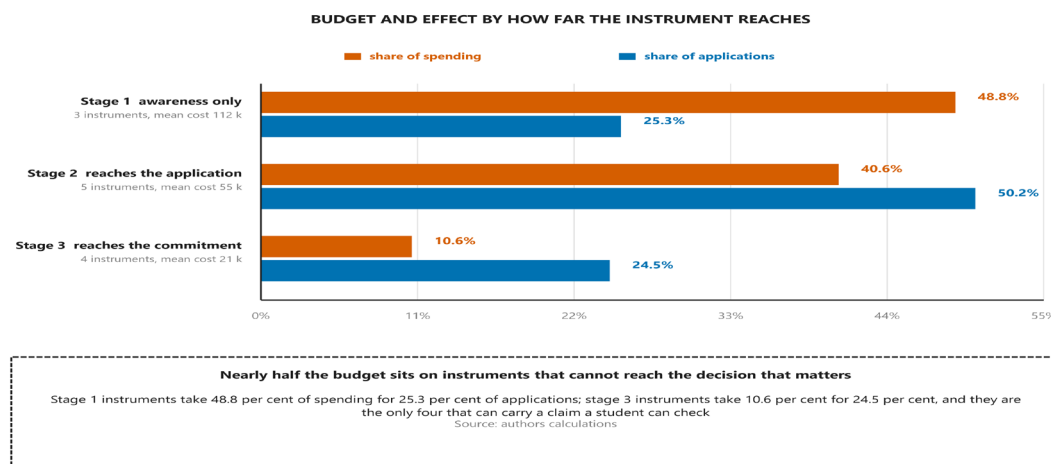


Figure 2. Spending share and application share by stage reach

Both series are monotone in stage reach and they run in opposite directions. Spending falls from 48.8 to 10.6 per cent as reach increases, while cost per application falls from 112.0 to 20.8 thousand UZS, a ratio of 5.40 with a Welch statistic of 8.14 on 3.8 degrees of freedom (Figure 3).

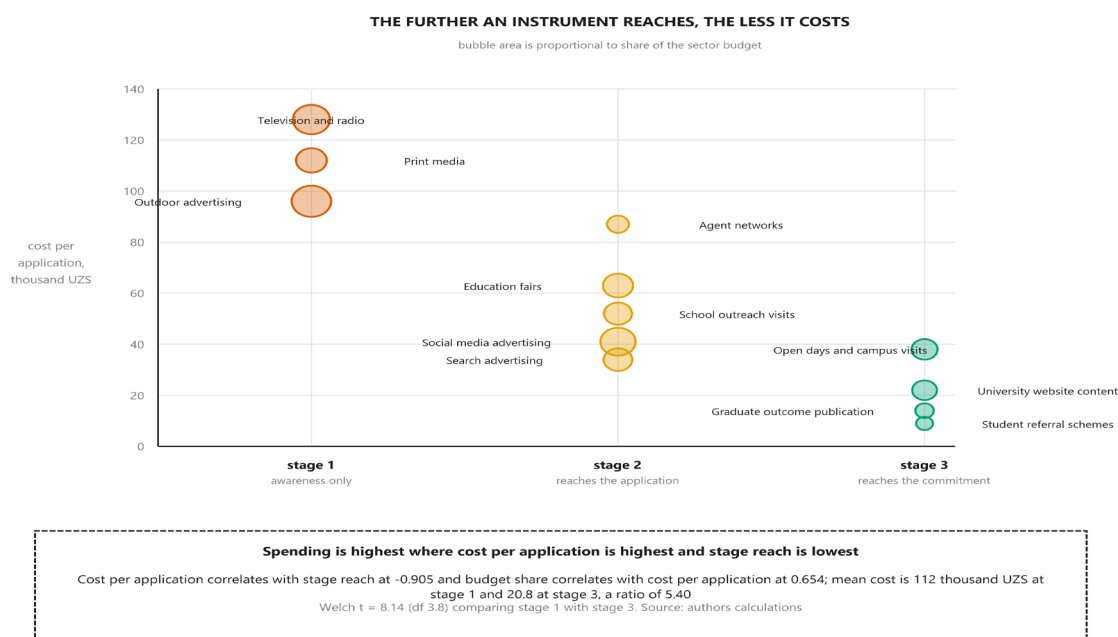


Figure 3. Cost per application against stage reach. Bubble area is proportional to share of the sector budget⁶



Table 5 reports the correlations that summarise the pattern.

Table 5
Correlations across the twelve instruments⁷

Pair	Correlation
Spending share and cost per application	0.654
Spending share and stage reach	-0.795
Cost per application and stage reach	-0.905
Usage rate and stage reach	-0.155
Usage rate and cost per application	0.086

The first three relationships characterise the cost-efficiency inversion. Within the observed portfolio, larger budget shares are associated with higher costs per application and with more limited stage reach. Cost per application and stage reach are themselves negatively associated, reflecting the fact that several of the relatively high-cost instruments are broadcast or mass-communication instruments whose direct engagement with prospective students is concentrated at earlier stages of the decision process.

The final two correlations are close to zero and provide a different type of information. Usage rate is only weakly associated with stage reach and cost per application, with correlations of -0.155 and 0.086 , respectively. Thus, within the observed portfolio, the prevalence with which instruments are used across institutions does not show a meaningful descriptive relationship with either their stage reach or their observed cost per application. These results provide limited evidence that patterns of instrument adoption systematically reflect the efficiency measures examined in the present study.

Four of the twelve instruments are capable of carrying claims that prospective students can independently verify: campus visits, the institution's own website content, published graduate outcome records, and conversations with current students. These are also the four instruments classified as reaching the commitment stage.

This complete overlap reflects a conceptual connection between stage reach and verifiability within the classification used in the present study. Instruments classified as reaching the commitment stage remain accessible to applicants when they are evaluating whether to enrol and allow information to be consulted, examined, or discussed. These characteristics also make such instruments capable of conveying claims that applicants can independently assess. Stage 3 reach and the capacity to carry verifiable claims are therefore closely related properties in the present classification, although they represent distinct analytical concepts: the former concerns the stage of the decision process that an instrument can reach, whereas the latter concerns the type of information that the instrument can convey and make available for verification.

These four instruments account for 10.6 per cent of the promotional budget and 24.5 per cent of attributed applications. Their mean usage rate is 56.3 per cent. Two relatively low-cost instruments within this group have comparatively low adoption rates: published graduate outcome records are used by 30 per cent of institutions, while the corresponding usage rate for the relevant referral mechanism is 20 per cent.

The overlap also has implications for interpreting the composition of the portfolio. If different factors become relevant at different stages of the applicant decision process, as suggested by the student-choice literature [5, 11], instruments that remain accessible at the commitment stage may provide opportunities for applicants to obtain or verify information relevant to that later decision. By contrast, instruments limited to the awareness stage primarily provide direct engagement earlier in the process. Awareness-only instruments currently account for 48.8 per cent of promotional expenditure. This distribution provides the basis for examining whether a greater allocation to later-stage instruments could improve measured portfolio efficiency, subject to the capacity constraints considered in the following section.

The results presented in Sections 4.3 and 4.4 indicate potential scope for reallocating part of the promotional budget from relatively high-cost, awareness-stage instruments towards relatively lower-cost instruments capable of reaching the commitment stage. The extent to which such a reallocation could be implemented while preserving the observed cost advantages, however, depends on the capacity of the recipient instruments to absorb additional expenditure (Table 6).

Table 6
Reallocation Under a Threefold Capacity Cap and Diminishing Returns⁸

Recipient	Spending now	Spending after	Cost now	Cost after		After	Gain
University website content	4.2%	12.6%	22	38.1	10,725	18,577	+7,852
Graduate outcome publication	0.9%	2.7%	14	24.2	3,612	6,255	+2,643
Student referral schemes	0.4%	1.2%	9	15.6	2,497	4,325	+1,828
Total absorbed	5.5%	16.5%			16,834	29,157	+12,323

The budget is drawn from television and radio, the least efficient instrument at 128 thousand UZS per application, which loses 4,828 applications. The net gain is 7,495 applications, or 7.5 per cent of the attributed base, and the share of budget on instruments reaching the commitment stage moves from 10.6 to 21.6 per cent (Figure 4).

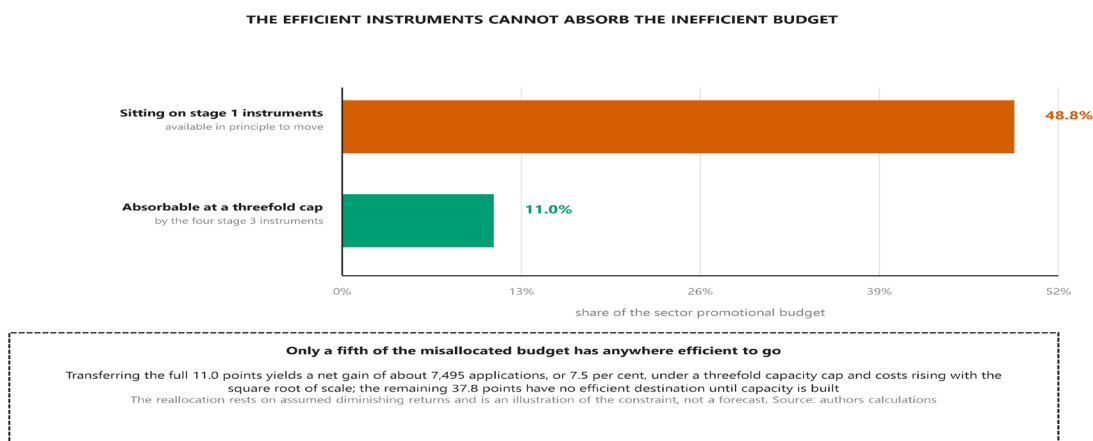


Figure 4. Budget sitting on stage 1 instruments against the amount the stage 3 instruments can absorb⁹

The capacity constraint is itself an important finding. Stage 1 instruments account for 48.8 per cent of the promotional budget, while the relatively cost-efficient recipient instruments can absorb an additional 11.0 percentage points under the specified assumptions, equivalent to 22.5 per cent of the Stage 1 budget currently available for potential reallocation. The remaining 37.8 percentage points cannot be reallocated to these recipient instruments while remaining within the specified capacity and efficiency assumptions.

This substantially qualifies the implications of the reallocation exercise. The observed allocation pattern need not reflect a reluctance by institutions to redirect expenditure towards relatively cost-efficient instruments. Rather, the capacity of these instruments to absorb additional expenditure may itself be limited, and several depend on institutional capabilities that cannot be expanded through promotional expenditure alone. Publishing graduate outcome information requires an operational system for collecting and maintaining relevant graduate data. Referral schemes depend on an appropriate cohort of current or former students and an administrative mechanism for engaging them. Effective website content similarly depends on the availability of relevant information and material that can be communicated to prospective students. Expanding these instruments may therefore require investment in the underlying institutional capabilities in addition to changes in promotional budget allocation.

The observed portfolio exhibits an inverse relationship between current budget allocation, cost per

⁸ Author's development

⁹ Author's development



application, and stage reach. This pattern can be interpreted without assuming that the existing allocation reflects ineffective institutional decision-making.

Broadcast and outdoor advertising are among the instruments capable of accommodating relatively large promotional expenditures over a short period. Their expansion depends primarily on purchasing additional media exposure and may require fewer complementary institutional capabilities than instruments that engage applicants at later stages. By contrast, instruments capable of reaching the commitment stage often depend on resources and capabilities that must already exist within, or be developed by, the institution. These may include reliable graduate outcome data, mechanisms for engaging current students and graduates, and relevant applicant-facing content. Consequently, institutions facing fixed promotional budgets and implementation deadlines may find some instruments easier to expand in the short term than others, even when the latter have lower observed costs per application.

This interpretation is broadly consistent with the marketing-productivity literature, which highlights the challenges involved in linking marketing expenditure to outcomes and in managing marketing performance through outcome-based measures [18]. The present analysis contributes to this discussion by quantifying the relationship between budget allocation, cost per application, and stage reach within the observed higher education marketing portfolio. It further shows that, in this portfolio, several instruments receiving relatively small budget shares are also among those with lower observed costs per application and greater stage reach.

CONCLUSION AND RECOMMENDATIONS

This article analysed twelve marketing instruments used in the promotion of higher education services in Uzbekistan, accounting for UZS 5,618 million in sector-wide promotional expenditure.

The results reveal an inverse relationship between current budget allocation, cost per application, and stage reach within the observed portfolio. Cost per application is strongly negatively correlated with stage reach ($r = -0.905$), budget share is positively correlated with cost per application ($r = 0.654$), and budget share is negatively correlated with stage reach ($r = -0.795$). Thus, larger shares of promotional expenditure are associated with instruments that have higher observed costs per application and more limited stage reach.

Instruments limited to the awareness stage account for 48.8 per cent of the promotional budget and 25.3 per cent of attributed applications, at a mean cost of UZS 112.0 thousand per application. By contrast, instruments capable of reaching the commitment decision account for 10.6 per cent of the budget and 24.5 per cent of attributed applications, at a mean cost of UZS 20.8 thousand per application. The corresponding cost ratio is 5.40, with a Welch statistic of 8.14.

Promotional expenditure is also more concentrated across instruments than attributed applications, with Gini coefficients of 0.427 and 0.331, respectively. This indicates that expenditure is distributed less evenly across the instrument portfolio than the applications attributed to those instruments, although the difference in concentration does not by itself establish inefficiency.

The prevalence with which instruments are used across institutions shows little descriptive relationship with either stage reach or observed cost per application. Usage rate is correlated with stage reach at $r = -0.155$ and with cost per application at $r = 0.086$. These near-zero correlations provide limited evidence that the observed pattern of instrument adoption systematically reflects the efficiency measures examined in the present study.

The four instruments capable of carrying claims that prospective students can independently verify are also the four instruments classified as reaching the commitment stage. This complete overlap reflects a close conceptual relationship between verifiability and stage reach within the classification used in the study: instruments accessible to applicants at the commitment stage can also provide opportunities to consult, examine, or discuss information relevant to that decision. Together, these instruments account for approximately one-tenth of the promotional budget. Among the relatively low-cost instruments considered in the analysis, published graduate outcome records have a cost of UZS 14 thousand per application and are used by 30 per cent of institutions, while referral schemes have a cost of UZS 9 thousand per application and are used by 20 per cent.

The reallocation exercise indicates that the scope for shifting expenditure towards relatively cost-efficient instruments is constrained by their absorptive capacity. Under the specified threefold capacity cap and the assumption that cost per application increases with the square root of the scale-up factor, the recipient instruments can absorb an additional 11.0 percentage points of the promotional budget. The model indicates a net increase of 7.5 per cent in applications under these assumptions. The amount that can be reallocated corresponds to 22.5 per cent of the budget currently allocated to Stage 1 instruments. A further 37.8 percentage points cannot be transferred to the specified recipient instruments while remaining within the assumed capacity

and efficiency constraints. Consequently, a larger reallocation would require the development of additional institutional capacity rather than a change in promotional expenditure alone.

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