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Особливості правових відносин, які виникають в мережі Інтернет

Features of Legal Relations that Arise on the Internet

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Анотація. У статті на основі методології системного аналізу досліджуються особливості правових відносин, які виникають в мережі Інтернет. Зазначено, що інтернет-правовідносини – це регульовані правом суспільні відносини, що знаходяться під охороною держави, які виникають на основі цифрових технологій у віртуальному просторі. Вказано, що в Інтернеті діє безліч суб'єктів, які можна об'єднати в групи: технічні суб'єкти, відповідальні особи за роботу Інтернету; індивідуальні суб'єкти, користувачі; колективні, серед яких державні, що забезпечують нормативно-правове регулювання відносин в Інтернеті, розробку та реалізацію політики; недержавні суб'єкти – бізнес; громадянське суспільство, зацікавлені особи в розширенні можливостей Інтернету і розвитку інфраструктури; міжнародні організації, які забезпечують координацію питань, розробку технічних і правових стандартів, пов'язаних з Інтернетом. Охарактеризовано правосуб'єктність суб'єктів інтернет-відносин. Зазначено, що суб'єкти реалізують права, які спрямовані на певні групи інтересів: послуги, товари, інформацію; специфіка інтернет-правовідносин полягає в тому, що в залежності від об'єкта, на який спрямовані інтереси суб'єктів, будуть діяти норми права адміністративного, інформаційного, цивільного, кримінального тощо.

Ключові слова: правові відносини; Інтернет; суб'єкти правовідносин; об'єкти правовідносин; правосуб'єктність.

Abstract. Based on the methodology of system analysis, the article examines the features of legal relations that arise on the Internet. It is defined that Internet legal relations are legally regulated public relations under the state's protection, which arise based on digital technologies in cyberspace. It is stated that there are many entities on the Internet which can be grouped into: technical entities, people responsible for the functioning of the Internet; individual subjects and users; collective subjects, among which are the governmental entities, which provide legal regulation of relations on the Internet, policy development and implementation; non-governmental entities - business; civil society, stakeholders in the expansion of the Internet and infrastructure development; international organizations that coordinate issues, develop technical and legal standards related to the Internet. The legal personality of the subjects of Internet relations is described. It is noted that the subjects exercise the rights that are aimed at

certain interest groups: services, goods, information. The specifics of the Internet legal relations are that the rules of administrative, informational, civil, criminal law, etc. will be applied, depending on the object to which the subjects' interests are directed.

Keywords: legal relations; the Internet; subjects of legal relations; objects of legal relations; legal personality.

ВСТУП

Поняття «правові відносини» виступає одним з найбільш затребуваних в юридичній науці, є вихідним пунктом і об'єднуючою засадою характеристики права у процесі реалізації його потенціалу. Розвиток суспільства ініціював появу нового виду правових відносин – відносини у мережі Інтернет. Україна зіткнулася з проблемами регулювання інтернет-відносин порівняно недавно. В останнє десятиліття держава активно включилася в процеси впливу на відносини в соціально-віртуальному просторі. Інтернет-відносини мають ключове значення для правознавства, без їх поглибленого вивчення неможливий перехід до теорії права ХХІ століття в умовах світової глобалізації механізму дії права і розвитку інформаційних технологій.

Значний вклад у розвиток теорії правових відносин у мережі Інтернет внесли такі вчені і практики, як О. Баранов, В. Брижко, О. Голобуцький, М. Демкова, С. Дубова, О. Ємельяненко, П. Клімушина, І. Клименко, І. Коліушко, А. Новицький, І. Куспляк, К. Линьова, Ю. Машкарова, А. Серенок, О. Орлова, В. Пархоменко, О. Радченко, О. Шевчук та інші. Розвиток і впровадження нових інформаційно-комунікаційних технологій сприяє виникненню правових відносин у мережі Інтернет, що вимагає теоретико-правових досліджень з метою забезпечення ефективного правового регулювання зазначених суспільних відносин.

Метою статті є дослідження особливостей правових відносин, які виникають в мережі Інтернет.

РЕЗУЛЬТАТИ ДОСЛІДЖЕННЯ

Право як особливий (соціальний) офіційний державний регулятор суспільних відносин надає їм особливу правову форму, завдяки чому такі соціальні зв'язки знаходять новий вид – стають правовими і втілюються в юридичну оболонку. Право – це найбільш ефективний, владний, примусовий, цивілізований

регулятор. Суспільні відносини стають правовідносинами тільки за умови формування на базі юридичних норм і відповідно до них.

П. Рабінович у праці [1] вказує, що головним в правовідносинах є те, що вони виникають на основі правових норм, їх учасники фізичні і юридичні особи виступають як носії взаємно кореспондуючих юридичних прав і обов'язків. Зв'язок між правом і обов'язком, а точніше між носіями, є правове відношення.

Правовідносини можна визначити як суспільні відносини, врегульовані правом, учасники якого виступають носіями прав і обов'язків. Взв'язавши за основу загальнотеоретичну дефініцію правовідносин, розглянемо категорію «інтернет-правовідносини».

Так, інтернет-правовідносини виникають, змінюються та припиняються при наявності певних передумов, серед яких можна виділити загальні та спеціальні. Спільними передумовами виникнення інтернет-правовідносин є: наявність інтересу у користувачів Інтернету, під впливом яких вони вступають у відповідні правовідносини у віртуальному просторі і обумовлюють об'єктивну необхідність правового регулювання інтернет-відносин; наявність суб'єктів інтернет-правовідносин; наявність об'єкта правовідносин, з приводу якого особи вступають в інтернет-правовідносини.

До спеціальних передумов виникнення інтернет-правовідносин можна віднести: наявність норм кримінального, цивільного, адміністративного і іншого права, які поширюють дію на суб'єктів правовідносин в Інтернеті; суб'єкти інтернет-правовідносин мають правоздатність і дієздатність; наявність певних обставин, тобто юридичного факту, у межах якого між суб'єктами виникають, змінюються або припиняються інтернет-відносини.

У реальному світі люди вступають у правовідносини у результаті виникнення певного інтересу, дії в Інтернеті залежать від бажань користувачів. Інтерес виступає як первинний елемент будь-яких правовідносин, від якого в

подальшому буде залежати об'єкт і суб'єкт правовідносин.

Суб'єктами правовідносин у загальній теорії права є окремі фізичні і юридичні особи, які на підставі юридичних норм можуть бути учасниками правовідносин, носіями суб'єктивних прав і обов'язків. Що стосується інтернет-правовідносин, то в науковій, навчальній та спеціальній (довідковій) літературі немає єдиної думки (точки зору) щодо їх складу. У науковій літературі виділяють три групи суб'єктів: творці програмно-технічної частини інформаційної структури мережі Інтернет – розробники мереж, засобів зв'язку, телекомунікацій, програмних засобів тощо; суб'єкти, які виробляють і поширюють інформацію у мережі Інтернет, власники інформаційних ресурсів, інформаційних продуктів, власники інформаційних систем і засобів забезпечення, які надають послуги з доступу до мережевих ресурсів; споживачі інформації, інформаційних ресурсів, інформаційних продуктів, інформаційних послуг: фізичні і юридичні особи, які підключаються до мережі Інтернет для отримання інформації і її використання у власній діяльності.

Крім наведеної класифікації, виділяють провайдера, юридичну особу, у якої є ліцензія на надання послуг в Інтернеті та користувача віртуального простору, який звертається до Інтернету у власних інтересах.

Є. Харитонов і О. Харитонova виділяє наступних суб'єктів інтернет-відносин: оператори зв'язку, постачальники послуг доступу до Інтернету, постачальники інформації, користувачі [2, с. 35].

На наш погляд, наведені класифікації охоплюють повною мірою всіх суб'єктів інтернет-правовідносин. Водночас тут необхідно також зазначити, що управління ними включає участь різних сторін, які мають експертні знання з наукової та технічної сторін, у тому числі міжнародні організації.

Загальносвітова громадська організація “Товариство Інтернету” (*Internet Society, ISOC*) ввела термін «екосистема Інтернету», під яким розуміють організації та спільноти, які допомагають Інтернету працювати та розвиватися, серед яких: технологи, архітектори, інженери, винахідники, організації, які здійснюють загальну координацію і допомагають впроваджувати відкриті стандарти; глобаль-

ні та місцеві організації, які управляють ресурсами, що забезпечують можливості глобальної адресації, наприклад, ICANN, реєстри та реєстратори доменних імен; оператори, інженери і постачальники, які забезпечують послуги мережевої інфраструктури, зокрема, такі як служба іменування доменів, мережеві оператори та точки обміну трафіком; користувачі Інтернету, які використовують Інтернет для обміну інформацією один з одним, а також для надання послуг; заклади освіти, які навчають і створюють ресурси для розробки та використання інтернет-технологій. Кожен з перелічених учасників інтернет-відносин займає певну нішу, є володарем або носієм певних прав і обов'язків в Інтернеті.

Подібний перелік учасників інтернет-правовідносин, що враховує інтереси, пріоритети та можливості зацікавлених сторін у галузі вирішення питань управління Інтернетом, знайшов відображення в статті 49 Декларації принципів “Побудова інформаційного суспільства – глобальне завдання у новому тисячолітті” [3], в якій передбачено визначальну роль для основних сторін: держави – політичні повноваження, які пов'язані (у сукупності) з Інтернетом і питаннями державної політики, включаючи міжнародні аспекти; приватний сектор – розвиток Інтернету в технічній і економічній сфері; громадянське суспільство – його значення у питаннях (вирішенні проблемних аспектів або розвитку), які пов'язані з Інтернетом, особливо на рівні населення; міжурядові організації – координація питань державної політики, які пов'язані з Інтернетом; міжнародні організації – розробка технічних стандартів і пов'язаної відповідної політики з Інтернетом [3].

Таке різноманіття суб'єктів інтернет-правовідносин можна об'єднати у групи: технічні, індивідуальні, колективні, міжнародні.

Технічні суб'єкти відповідають за роботу Інтернету, інфраструктури та компонентів. До них відносяться: технологи, архітектори, інженери, організації, які здійснюють загальну координацію і допомагають впроваджувати відкриті стандарти тощо. Специфікою цієї групи суб'єктів є те, що вони не можуть здійснювати роботу без відповідного дозволу органів державної влади.

До індивідуальних суб'єктів інтернет-правовідносин відносяться фізичні особи, користувачі Інтернету.

К. Беляков вводить в обіг поняття “віртуально-інформаційні правові відносини”, під яким рекомендує розуміти “взаємні відносини двох чи більше осіб із приводу майнових благ, що породжуються обставинами виникнення та існування в інформаційно-технологічному просторі, як результат комунікації та обміну даними в електронно-цифровій формі, що визначається наднаціональними ознаками на засадах юридичної рівності та автономії волі їх суб’єктів” [4, с. 61–62].

Для того, щоб бути суб’єктом інтернет-правовідносин, вони повинні володіти правоздатністю. Правоздатність в Інтернеті – це здатність особи мати юридичні права та нести юридичні обов’язки у віртуальному просторі. В процесі діяльності в Інтернеті, люди вступають у різні відносини: трудові, майнові відносини, пов’язані з членством у громадській організації та інші. Звертаючись до правосуб’єктності в Інтернеті слід зазначити про її особливість.

Тільки після отримання провайдером відповідної ліцензії він наділяється правом діяльності в Інтернеті. Даним прикладом підкреслюється специфіка правосуб’єктності, яка полягає в тому, що всі три здатності – правоздатність, дієздатність і деліктоздатність у розглянутого суб’єкта можуть виникати та припинятися одночасно. Дієздатність є можливістю учасника інтернет-відносин певними діями здійснювати права та виконувати обов’язки.

Залежно від тяжкості вчиненого правопорушення встановлюється здатність особи відповідати за дії, які визначаються поняттям “правопорушення у мережі Інтернет”. У чинному кримінальному законодавстві України юридична відповідальність за кримінальні правопорушення, в тому числі і в Інтернеті, настає після досягнення особою 16 років, а за найбільш тяжкі з 14. Однак, в інтернет-правовідносини можуть вступати різні категорії громадян, у тому числі недієздатні, психічно хворі та інші. Суб’єкт правовідносин повинен бути осудним, у той час, коли віртуальний може імітувати таку якість.

В Інтернеті доказів присутності або відсутності у віртуального суб’єкта психологічних дефектів немає, поки людина не буде визначена. Тому одним із важливих питань інтернет-правовідносин є ідентифікація суб’єкта.

Загальною передумовою правосуб’єктності є зовнішня відособленість, персоніфікація, здатність виробляти, виражати та здійснювати персоніфіковану волю. Законодавство передбачає можливість участі в правовідносинах, а також може пов’язувати з різними якостями: стать, вік, стан здоров’я, місце роботи, сімейний стан, громадянство тощо.

При вирішенні даного питання в Інтернеті виникає ряд труднощів, оскільки суб’єкти не перебувають у безпосередньому контакті. Визначення конкретної особи у віртуальному просторі, незважаючи на наявність ніка (від англ. nick) або псевдоніма, можливо лише при інтеграції технічних і політичних можливостей, що є складним завданням.

Питання про ідентифікацію користувача на сьогоднішній день є найбільш актуальним, оскільки збиток, який може бути заподіяно певними особами, інформацію про яких неможливо отримати, може бути непоправним. Зазначене питання розглядалось на парламентських слуханнях “Національна кібербезпека та кіберзахист України, у тому числі у сфері критичної інфраструктури” [5].

Коллективні суб’єкти інтернет-правовідносин представлені юридичними особами. Як суб’єкти правовідносин, юридичні особи можуть бути державними та недержавними. До державних відноситься Міністерство цифрової трансформації України, основним завданням якого є вироблення і реалізація державної політики та нормативно-правове регулювання у сфері інформаційних технологій, електрозв’язку, масових комунікацій і засобів масової інформації, а також Інтернету [6]. Важливу роль у розвитку Інтернету займає громадянське суспільство, зокрема – науковці, а також бізнес-співтовариство, зусиллями яких створюється технологічна інфраструктура, комп’ютери, мережі, програмне забезпечення тощо. Особливе місце в інтернет-правовідносинах також займають міжнародні організації, серед яких найбільш значущим є Міжнародний союз електрозв’язку (*International Telecommunication Union, ITU*). Його діяльність спрямована на надання допомоги у розвитку інформаційно-комунікаційної інфраструктури та послуг, розвитку людського потенціалу та новітніх технологій.

Об’єктом правовідносин виступає те, з приводу чого або заради чого суб’єкти правовід-

носин вступають у правовий зв'язок і реалізують суб'єктивні права і юридичні обов'язки. У науковій літературі це питання є дискусійним. П. Рабінович як об'єкти правовідносин виділяє явища і предмети навколишнього світу, на які спрямовані суб'єктивні юридичні права і обов'язки. Водночас О. Іоффе дотримується думки, що об'єктом правовідносин може виступати тільки поведінка його учасників [7, с. 677].

У ст. 177 Цивільного кодексу України закріплено перелік об'єктів цивільних прав, до яких відносяться: "речі, у тому числі гроші та цінні папери, інше майно, майнові права, результати робіт, послуги, результати інтелектуальної, творчої діяльності, інформація, а також інші матеріальні і нематеріальні блага" [8].

Об'єктом правовідносин, який пов'язаний з інтересом уповноваженої сторони є блага, що знаходяться у розпорядженні і охоронювані державою. Вважаємо за можливе і доцільне використовувати наведений перелік, який визначений і встановлений законодавством України до інтернет-правовідносин з урахуванням особливостей останніх.

Наприклад, специфіка укладання договорів в Інтернеті передбачає наявність: значно більших технічних засобів, ніж вчинення телефоном; ширших можливостей дискусії і уточнення істотних умов договору; різноманітних методів фіксування умов договору; різні варіанти виконання договору стороною. В Інтернеті з'являється можливість для здійснення певних дій між особами, які фізично знаходяться у різних країнах світу. Однак, багато вчених та практиків розглядають інтернет-правовідносини як різновид інформаційних правовідносин.

Ю. Янчук зазначає, що інтернет-відносини є частиною інформаційних відносин, що виникають, змінюються і припиняються в кіберпросторі [9, с. 154].

Об'єктом інформаційних правовідносин, на думку О. Сидоренко, є певна інформація (дані і/або відомості) або безпосередньо пов'язаний з інформацією результат поведінки учасника правовідносин [10, с. 175].

Під об'єктом інформаційних правовідносин розуміють: програмно-технічні комплекси, інформаційні системи, засоби зв'язку і телекомунікацій; інформацію, інформаційні ресурси, інформаційні послуги; доменні імена; інформаційні права та свободи; інтереси особи,

суспільства, держави в інформаційній сфері; інформаційну цілісність і інформаційний суверенітет держави; інформаційну безпеку.

Інформація виступає центральним елементом інформаційних правовідносин, і є тим, з приводу чого виникають права і обов'язки учасників правовідносин. Тоді як об'єкт інтернет-правовідносин – матеріальні блага; нематеріальні блага; продукти творчості; результати дій учасників відповідних правовідносин; цінні папери і документи тощо.

Коло дій, на які можуть бути спрямовані інтереси суб'єктів інтернет-правовідносин значно ширше. Вони формуються навколо головного елемента Інтернету, який постає як особливий простір, місце реалізації цілей, де мережі виступають як засіб для передачі даних на рівні з комп'ютером, телефоном, поштовим повідомленням.

Людина не просто користується телекомунікаційними мережами, вступаючи у правові відносини, відчуває правове регулювання у віртуальному просторі. Інтернет-правовідносини не можна виділити з числа інформаційних.

Специфіка інтернет-правовідносин полягає в тому, що в залежності від об'єкта, на який спрямовані інтереси суб'єктів, будуть діяти норми відповідного права (цивільного, кримінального, адміністративного, інформаційного). Їх регулювання не обмежується засобами однієї галузі законодавства, їм притаманний комплексний характер.

Регулювання інтернет-правовідносин відбувається в процесі реалізації суб'єктивних прав і юридичних обов'язків. Суб'єктивне право є гарантовані нормою права вид і міра можливої поведінки, яке надає можливість носію вчиняти певні дії, тоді як юридичний обов'язок – закріплена правовими нормами необхідність, обов'язок виконати певні завдання.

Формування правовідносин важливий етап правового регулювання інтернет-відносин, необхідний елемент досягнення юридичних цілей.

ВИСНОВКИ

Інтернет-правовідносини – це регульовані правом суспільні відносини, що знаходяться під охороною держави, які виникають на ос-

нові цифрових технологій у віртуальному просторі, мають особливості:

- Інтернет не існує сам по собі, у ньому діє безліч суб'єктів, які можна об'єднати в групи: технічні суб'єкти, відповідальні особи за роботу Інтернету; індивідуальні суб'єкти, користувачі; колективні, серед яких державні, що забезпечують нормативно-правове регулювання відносин в Інтернеті, розробку та реалізацію політики; недержавні суб'єкти – бізнес; громадянське суспільство, зацікавлені особи в розширенні можливостей Інтернету і розвитку інфраструктури; міжнародні організації, які забезпечують координацію питань, розробку технічних і правових стандартів, пов'язаних з Інтернетом;
- для вступу у правовідносини суб'єкт повинен володіти правосуб'єктністю, що можливо

при інтеграції технічних можливостей, зумовлених правовим регулюванням;

- формуються за допомогою технічних суб'єктів, які обслуговують роботу Інтернету – оператори, провайдери і інші;
- вступаючи в правовідносини в Інтернеті, суб'єкти реалізують права, які спрямовані на певні групи інтересів: послуги, товари, інформацію; специфіка інтернет-правовідносин полягає в тому, що в залежності від об'єкта, на який спрямовані інтереси суб'єктів, будуть діяти норми права адміністративного, інформаційного, цивільного або кримінального. Регулювання відносин не обмежується засобами однієї галузі законодавства, їм притаманний комплексний характер.

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Pursuing National Security by Iran is Not Equal to Being Paranoid about the USA

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Abstract. In most countries of the world where there is a strong western influence, there has been a persistent narrative that Iran is paranoid about the United States of America. It will not spare any grain to ensure the destruction of the mighty American nation. But according to the leaders of Iran, their actions are about the safeguarding of their country national security interest. Yet, there have been limited studies to respond to whether Iran is paranoid about the USA or if it is all about national security. Hence this study sought to illustrate the dangers of appeasing the USA when your national policies are in contract. The study selected a few countries and scenarios: Vietnam, Afghanistan, Iraq-Iran war, the Axil of Evil phrase, Iraq, and Syria for the illustration. The study has shown that the USA will not relent to pursue its national interest against those opposing it, notwithstanding the consequences on the recipients. This USA trend will continue to manifest to the unforeseeable, thereby putting Iran in danger that befell other nations who had opposed the USA. Based on the findings, the study concludes that Iran is not paranoid about the USA but is concerned with preserving its national security and interests.

Keywords: national security; paranoid; sanctions; terrorism; war.

INTRODUCTION

National security revolves around the neo-realism ideals, according to which worldwide policies are mostly a struggle between states to acquire power under conditions of anarchy, as they contest for their national interests. In this environment, states are dependent on their military supremacy to assure those interests, countering the threats arising from other states [21]. This way, national security is protected by distributing the balance of power and national sovereignty between the different States. This traditional National Security ideal is the sustained capability of a country to pursue the advancement of its inner being without severe interference, or threat of interference, from foreign powers [24]. Therefore, national security has to be a state's ability to maintain its sovereignty and independence, assuring its people and protecting their properties.

According to Gleeson, paranoia describes a "destructive-obstructive" personality that makes

others feel uneasy, and whom themselves feel under threat and who does not perceive events at face value but instead is mistrustful of others and their motives and making wildly untrue allegations [18]. Consequently, this kind of paranoia state is likely to be dangerous and violent. Therefore, this study will be relating to whether Iran has these "destructive-obstructive" personality towards the USA or not.

Sanctions have remained a significant element of USA policy on Iran ever since Iran's 1979 Islamic Revolution that toppled the Shah of Iran, Mohammad Reza Pahlavi, a critical American ally. The USA first enforced sanctions on Iran on 14th November 1979, freezing Iranian state assets in America in reaction to Iran's confiscation of the USA embassy and US diplomats in Tehran. In the following decades of the 1980s and 1990s, USA sanctions on Iraq were meant to attempt to coerce Iran to desist from being supportive of terrorism acts and minimise Iran's strategic influence in the Middle East [11].

But strangely enough, during the 1980-88 Iran-Iraq hostilities, the USA state often insisted that it was neutral in the war. However, the Reagan administration in January 1981 discretely permitted Israelis, bitter foes of Saddam Hussein, to provide numerous billion dollars' worth of USA produced arms and spare parts to Iran [33].

During the 2014-17 "Operation Inherent Resolve", when the USA and its allies were fighting the Islamic militant ISIS, it is significant to remember that Iran played a crucial role in the fight. The Iranian army and its backed militias pushed ISIS back in Iraq and Syria [34]. The warfare was coordinated surgically without any incidents of friendly fire from the sworn enemies. This notwithstanding that Iran was under sanctions from the side, it gave a boost to this showcased the geopolitical power and influence extend of influence that the Shia powerhouse Tehran held in the Middle East region.

After the mid-2000s, the USA and some international nations concentrated mainly on convincing Iran to approve to abandon its nuclear ambition. Hence, President Obama indicated that the USA allies in the Persian Gulf and Iran require to discover a practical way to share the neighbourhood and introduce some cold peace [36]. The Obama Administration in 2015 waived appropriate sanctions and annulled some executive orders (EOs). The remaining American sanctions were: USA trading with Iran, Iran's support for regional armed factions, Iran's human rights abuses, Iran's determinations to obtain missile and more developed conventional arms expertise [14]. The USA, European Union (EU) and other nations sought to retain the economic gains of the JCPOA, benefitting Iran to persuade Iran to remain in the nuclear accord and reduce her pursuit for the middle East domination. And Iran was baited to accept the 2015 multilateral nuclear accord due to the broad sanctions relief the arrangement brought.

The Trump administration decided to discard the agreements made between the USA, its allies and Iran. It re-imposed by going beyond economic bounds, and included Iran's foreign minister Mohammad Javad Zarif in its sanctions program, and labelled the Islamic Revolutionary Guard Corps (IRGC) as a terrorist group [39]. As all these transpired, Tehran continued in complete compliance with the JCPOA for an entire year after the USA had withdrawn from the accord [11; 39]. The EU and other nations had strived to

keep the economic gains of the JCPOA going to Iran to encourage Tehran to continue with the nuclear accord. But Tehran withdrew and continued to develop its missile armament while declining to restart dialogues with the USA on a reviewed JCPOA.

From the overview above, this relationship between Iran and the USA has undermined sanctions as a diplomatic means, strengthening the beliefs of those in Tehran who certainly did not have faith in the commitment. And it has inspired the Iranian hardliners towards other aggressive Iranian national security policies. Notwithstanding, there have also been incidents in the global politics and relations involving the USA that would keep any leader or most nations wary. The supreme leader Ayatollah Khomeini must have learned from them over the years. Consequently, this paper sets out to discuss the incidents to Iran and the USA over the years to confirm whether Iran is paranoid of the USA or whether its national security guides it.

RESULTS AND DISCUSSION

The Vietnam Lesson

The Vietnam War was a civil war between the pro-Western South and the communist North. Other countries, including the United States, intervened, bolstering both sides, especially South Vietnam, with troops and armaments [38]. The practical American participation in the war commenced in 1954, although the continuing skirmish in the region had spread backwards for several decades. It followed the Japanese defeat in World War II in 1945, and Japan withdrew its military from Vietnam, conceding for the French-educated Emperor Bao Dai to be in charge [17]. Looking to recapture the territory's charge, the French supported Bao Dai and set up Vietnam's nation in July 1949, with Saigon as the capital.

Ho's Viet Minh forces saw a chance to grasp command and instantly rose and took over Hanoi's city and proclaimed the Democratic Republic of Vietnam, with Ho as the president. But while the Soviets and Chinese supported Ho and his supporters to model their nation under communism, Bao and many others supported a close economic and cultural Vietnamese tie to the capitalist [27]. The armed war between Ho's communist military in the North and Bo's capitalist

army in the South was decided by Viet Minh's triumph in the Battle of Dien Bien Phu in May 1954. At a Geneva conference in July 1954, a treaty was signed that split Vietnam along the latitude known as the 17th Parallel (17 degrees north latitude), with Bao in control of the South and Ho in control in the North [32]. But both parties were seeking the same objective of a unified Vietnam.

As the Cold War heightened globally, the USA toughened its policies against the Soviet Union allies. In 1955, President Eisenhower guaranteed his support to Diem, the strongly anti-communist politician who had pushed Emperor Bao aside and South Vietnam. With guidance and materials from the USA armed forces and the CIA, Diem's military force hunted down those who sympathised for Viet Minh, arresting thousands of people, and many were viciously tortured and executed [3]. The USA has permanently hardened its policies on whoever is not their ally, especially those who topple their allies. Ever since Iran's 1979 Islamic Revolution that toppled the Shah of Iran, Mohammad Reza Pahlavi, a critical American ally, it has always been a matter of when and not if. The supreme leader of Iran, Ayatollah Khomeini and his administration will therefore not be waiting for a possibility of thousands of arrests, and many of whom will be brutally tortured and executed, as was the case in Vietnam. Instead, the leaders in Tehran will be engaged in bolstering their national defences, not excluding the pursuance of weapons of mass destruction.

During the 1957-60 period, Diem's many opponents, both communist and non-communist within South Vietnam, established resistance to his repressive regime. Washington thought that Hanoi was supporting it. Under the "domino theory," which Washington held that, if any South-east Asian nation leaned to communism, several others might follow, the USA committed a military intervention [8]. But by 1962, the US military presence in South Vietnam had reached some 9,000 troops, compared with fewer than 800 during the 1950s [20]. The continued Iranian influence in the Persian Gulf might lead to the "domino effect" as other Middle East players fall to Iranianism, for example, the Houthis who are Zaydi Shiites, or the Zaydiyyah in Yemen, and the Hezbollah, the Shiite movement in Lebanon who became a role model and mentored for the Houthis. Therefore, this predisposes Iran to the USA, committing a large scale military intrusion to curtail it.

The intrusion might also predispose Iran to the 'Westmoreland policy' of attrition. The American-South Vietnamese battle in the South was battled predominantly on land, mainly under General William Westmoreland's leadership, in collaboration with General Nguyen Thieu's regime, pursued a policy aimed at killing as many enemy soldiers as probable rather than striving to capture territories [12]. As a rational leader, Ayatollah Khomeini knows that they have a responsibility to protect their people and territory against what their enemy is known to be capable of undertaking. Therefore, Tehran bolsters its defences in what the western media refers to as aggressive measures.

After years of war, approximately 2 million Vietnamese died, whereas 3 million were injured, and an additional 12 million became refugees [6]. The war had entirely devastated the nation's infrastructure. The devastation of war is what most sensible leaders would pursue to prevent. They would achieve the same through deterrence and the mutual assurance of destruction of the enemy. For that reason, the pursuance of weapons of mass destruction and other clandestine manoeuvres are ways by which Tehran pursues to preserve its million people and the nation's infrastructure against the USA.

The Afghanistan Lesson

A USA and allied armed forces coalition intruded into Afghanistan weeks after the 11th September 2001 coordinated strikes in the United States. The military campaign was against Al Qaeda and punished and ousted the Taliban government for harbouring and supporting Al-Qaeda leaders who were the mastermind [11]. The ultimate objective of USA determinations in Afghanistan was to ensure that the country is never used as a hub for planning and preparing attacks against the USA. But the incursion has left the country on the verge of irreparable destruction, which serves as a lesson to Ayatollah Khomeini.

Following the departure of the Soviet military in 1989, the nation descended into civil war as the Mujahedeen leaders turned on each other. The Afghans and the rest of the world, exhausted from persistent conflict, began to look to the Taliban to restore order and security and create national reconciliation quickly. The Taliban enforced progressively stricter laws grounded in conservative understandings of Islam. Despite

the Taliban justice being bloody due to the imposition of Sharia law enforced by the Taliban Religious Police, Afghans were moderately safeguarded from the physical insecurities of conflicts [16]. The Afghans' security was safeguarded on the frontiers of Severe Insecurity, Weakened Public Health System, Inaccessible Education, Climate-induced vulnerability and Forced Displacement until the Taliban government was uprooted and replaced by the leaders who could not reconcile the whole country.

According to the Advanced Training Program on Humanitarian Action, the civilian population in Afghanistan have been drawn in cycles of violence and destruction that have considerably distorted the nation's economic, political and social structures [2]. Economic growth is crucial to Afghanistan's long-term firmness, although there are mixed future development pointers. Years of conflict have inhibited the growth of most internal manufacturing establishments, including mining [11]. Nonetheless, Afghanistan's economic and political future still looks unclear, and in so way negative, due to continuing conflicts.

The nation's security condition is more unstable and delicate currently than at the beginning of the USA incursion [30]. It has been estimated that complex suicide attacks are the primary source of civilian fatalities, mostly in urban regions.¹ These assaults are allegedly targeting the state and the USA and allies, but they instead result in many civilian casualties. Therefore, the citizens residing in town and cities are exposed to a recurrent upsurge in violence that interferes with their access to livelihoods services. The enduring targeting of civilians and the infrastructure has resulted in prevalent susceptibilities for people. This aspect has been widespread in the health sector due to intentional targeting of health amenities hence weakening an already weak health sector [1].

Currently, Afghanistan is among the countries with the lowest literacy rates for the ages above 15. The literacy rate of men at 62% and women at 18% (the median for developing countries is 70% for males and 57% for females) [2]. Estimates had indicated that, by the end of 2017,

around 507,000 Afghans were to be forced to run away from their homes as a result of war over the year [10]. The war-affected zones have stimulated most people to flee to urban areas, where possibilities of livelihoods and access to services are much higher.

Since 2009, there had been a general certainty amongst the commentators that Afghanistan was headed towards disorder and that the USA and its allies lacked appropriate counterinsurgency (COIN) strategy [3]. From security to health, the citizens of Afghanistan are afflicted at every single angle of their lives. Up to date, the USA and its allies have not been able to conceive a COIN approach. Consequently, the country broke down, and it has never stabilised. This serves as a good lesson for Tehran's leadership, who realised that a weakened military force would be a temptation for the USA and its allies to invade the country and never get to fix it. Therefore, in its pursuit of avoiding going the Afghanistan route, Iran has been labelled a rogue nation that is allegedly obsessed with the USA's destruction.

The Iran-Iraq War Lesson

During the 1980-88 Iran-Iraq war, the USA government often insisted that it remained neutral. However, the Reagan government discretely resolved moments after taking office in January 1981 to permit Israelis, bitter foes of Saddam Hussein, to supply numerous billion dollars' worth of USA manufactured weapons and spare parts to Iran [33]. That intervention and the resolve to assist Tehran aided it in disregarding initial expectations of a rapid Iraqi triumph and attaining significant achievements early in the conflict, which had commenced with an Iraqi assault in September 1980.

In 1982, the Reagan Administration secretly resolved to hand over highly classified information to President Saddam Hussein. They also authorised the USA-made war weapons to assist Iraq in forestalling an impending loss in Iran's conflict. The USA decision to supply pivotal help to Baghdad was reached after the USA intelligence organisations cautioned that Baghdad was on the brink of actually being overrun by Tehran, whose military had been reinforced the year earlier by clandestine cargoes of the USA-made weapons [33].

The Americans were supplying both parties to ensure that neither party domineers the strategic

¹ United Nations. (2018). The situation in Afghanistan and its implications for international peace and security. Retrieved from https://unama.unmissions.org/sites/default/files/sg_report_on_afghanistan_6_june.pdf

oil region. And it resulted in enormous loss of human lives, billions of dollars of expenses and depleted infrastructures for both the feuding nations. When nations are not distinctively militarily strong, they are vulnerable to manipulation by the USA for its benefits, for instance, ensuring its uninterrupted oil supplies. That is a lesson that Tehran learned, and it has been trying to rectify it so that, now and in future, it will not be manipulated to engage in a non-decisive war where it is relying on a discreet external supply of weapons.

On Thursday, 20th September 2001, President Bush of the United States of America, while addressing a joint session of Congress and the nation, drew a red line by telling the world that, "Either you are with us or you are with the terrorists". The assumption was that the division between Us and Them had been equated with the division between Good and Evil. Consequently, in such a dualistic impression of the world, the USA represents Good and that anything it chooses to undertake is Good. In contrast, all others that offend or inconveniences it are Evil [19].

In less than five months after the 11th September 2001 Al-Qaeda attacks in Washington and New York, President Bush, in the 2002 State of the Union Address, made a proclamation referring to three nations: Iraq, Iran and North Korea, as "axis of evil". According to Bush, these three rogue nations financed, harboured and aided terrorists and subsequently threatened the world's peace. Hence, this idiom of "axis of evil" characterised a hallmark of Bush's government foreign policy, even though none of the attackers was citizens of the three nations [37].

Granting Iran membership in the 'Axis of Evil' was probably first, the usage of the phrase Axis of Evil was a redefining of the American "War on Terror," as it shifted focus from Osama bin Laden and Al-Qaeda together with their allies and bases, whose association ranged from minimal to non-existent [19]. The Shiite cleric's general hostility to the United States (opposition to Good must necessarily be Evil) that Tehran does not recognise the Palestinians' struggle against the Israelis as constituting terrorism, and explicitly it's backing of Hezbollah. After Shiite clerics gripped authority during the 1979 revolution, Iran became a wealthy nation supporter of 'terrorism' in its ability [9].

Second, it also shifted focus on those possessing chemical and biological weapons because they could sell or give them to terrorists to attack

Americans. Ironically, those already possessing nuclear weapons are immune from an imminent American attack, for instance, Pakistan, whose military intelligence service was the main backer of the Taliban, and perhaps North Korea [19]. Hence the focus is primarily on the states possessing chemical and biological weapons and may, in the future, acquire nuclear weapons. They may, in the future, perhaps be tempted to give or sell to terrorists. Under these criteria, Iran qualifies that it is considered a rogue state, has chemical and biological weapons and strives to achieve a nuclear program.

Third, the division between Us and Them had been equated with the division between good and Evil. Consequently, in such a dualistic impression of the world, the USA represents the enforcer of Good and that anything it chooses to undertake is Good. In contrast, all others that offend or inconveniences it are Evil [19]. Because Iran is pursuing its divergent aspirations and philosophies, it is an evil that must be overcome.

The Iraq Lesson

In approximately five months after the 11th September 2001 coordinated attacks on Washington and New York, President Bush in 2002 proclaimed referring to three states: Iraq, Iran and North Korea, as "axis of evil". The phrase "axis of evil" consequently was confined to perceived hostile countries that may, at some time in the future, attain nuclear weapons which they may, at some time in the future, perhaps be tempted to offer to terrorists [19].

By mid-September 2002, officials in the USA and her allies had impressed their leadership that Iraq was in pursuance of weapons of mass destruction. It was alleged that there was evidence of Iraqi development of ballistic missiles during that time, its ability to produce biological weapons in a mobile laboratory and of chemical capabilities [4]. If the USA were going to change Iraq's establishment, it would create a new blueprint of democracy in the Middle East [15]. Iran most definitely qualified under these criteria in that it has a nuclear program, and its rhetoric and actions have never proved that it will not offer out these weapons. The same can be said of Iraq.

The Iraq war, sometimes known as the "Iraqi Freedom Operation", began on 20th March 2003, with the USA and its allies' incursion into Iraq. The War in Iraq brought to reality what a super-

power in a region can and cannot achieve. The world watched as a regional superpower was gradually weakened in its self-image and before the world. The National Intelligence Estimate of January 2007 on Iraq published a blatant depiction of a polarised and violent state overwhelmed by acts of terror, an insurgency, a widespread unorganised and organised criminality, a civil war and a failed state [31]. Whether an individual approves of America's assault on Iraq, it is evident that its mismanagement has borne a civil war that has left any little military or political alternatives.

The current American administration emphasises that Iran has the burden to prove that it is not pursuing after acquiring nuclear weapons and that neither the USA nor the UN needs to prove that Tehran does not have those ambitions. This is precisely the situation Saddam Hussein found himself before the trumpets of war sounded that left Iraq in turmoil. And subsequently, it was alleged that any evidence presented was fake [19]. It should be remembered that every measure the UN ever took against Baghdad with the inclusion of the cease-fire after the Gulf war, the inspections regime, and sanctions had been binding on every member of the world body as a matter of international law [23]. Did Tehran learn any lesson from the history of America dealing with Saddam Hussein? The leaders in Tehran must have caught a lesson or several, and the lessons are currently informing their relation and handling of the USA.

The Syrian Lesson

State of the Union speech by Bush in 2002 listed Iran and Iraq, and North Korea as part of Evil's axis. During that year, John Bolton, the then under-secretary of state, included Syria to the list [7]. The USA also declared Syria as a target for regime change [29]. The fear that the USA and its allies would switch their focus to topple their governments after they were finished with Iraq pushed the Syrians and Iranians to increase security collaboration with one another. They also began supporting diverse insurgent blocs in Iraq to preoccupy the USA military not to be attacked [35].

Fast forward, on 17th December 2010, Al-Tayeb Bouazizi, a Tunisian vegetable retailer, set himself ablaze outside a government building to protest against corruption. Bouazizi's self-

immolation catalysed uprisings in the months that followed, first in Tunisia and then in Bahrain, Egypt, Iraq, Libya, Syria, and Yemen in what is popularly known as the Arab uprising [35]. As Syria slide into civil conflict in the coming years, the CIA began to train and arm some Syrian rebels [22] secretly. Although Washington coordinated to support specific rebel forces in the Syrian civil war, they were fighting ISIS and at the same time waging war on Assad in Syria, even when ISIS was battling Bashar al-Assad [28]. Therefore, they battled ISIS to weaken them from battling with Syria, whereas Syria was battling the USA supported allies. This may sound insane, but it is insane for the reason that it is outrageous. But the same is not outrageous for the American policymakers who were being informed by their own 'national security. That national security they were pursuing had already blared to Tehran leadership that, when the USA and the allies are finished with Syria, they will get involved in Iran.

Consequently, Iran will be expected to bolster its economic, political, cultural, religious, and military values in anticipation of a direct attack or proxy attacks from the USA and its allies. Tehran has been sending special forces, agents, weapons, and nonmilitary support to Damascus. And the Iran-supported Lebanese Hezbollah had dispatched advisers and then military units to help Al-Assad clump on the uprising [25; 40]. And in case of a protracted stalemate in the civil war, then Syria might perish a slow death, as the rebels control some areas and others held by the government [26]. The rebels sponsored by the USA and its allies are as tough to beat as a nation-state.

Food security in Syria is seriously destabilised due to infrastructure damage and massive population displacement, which has left more than half of the population living in poverty [5]. Due to the current stalemate in the war, the situation in Syria is desperate. Just to quote David Lesch, professor of history at Trinity University in San Antonio, Texas.

"Putrid piles of garbage lie on streets because basic services have ceased operating. Running water and electricity are either unavailable – by design, as a form of collective punishment, or due to disruption – or else are available only sporadically. Storefronts are shuttered, battered and broken. The stores themselves are empty of both people and products, as either the retailers have

deliberately removed the stock, storing it for a safer day, or else – more likely – vandals have pilfered the goods on one or either side of the conflict. Shells and bullets pockmark the walls of buildings. Many streets are deserted, littered with debris and marked with the occasional bloodstain" [26].

Civil warfare continues to impact Syria, which is currently a playground for both the state and non-state actors. The Syrian conflict is no longer a clear situation of one party battling the other. Consequently, Iran is not paranoid but is informed by its need for self-preservation, not desiring to go the Syrian way.

CONCLUSION

The dualistic East-West division disappeared and was substituted by a divide between states committed to the USA and the "rogue nations" with divergent aspirations and philosophies. North Korea, Iran, Iraq, China, Syria, Russia and Sudan were in the latter camp. Each one had possession or aspired to possess 'weapons of mass

destruction, and they were labelled as sponsors of terrorism. Consequently, defending and deterring against rogue nations has historically been a national security objective of the USA and its allies. Since the end of World War Two, the USA has been embroiled in civil wars, revolutions, and political uprisings in nonaligned and third world countries on the pretext that it has strategic, economic, and ideological interests the regions [8].

In the current neo-realism world, Iran cannot trust the USA, as shown from the discussion and must always be prepared to gear up for conflict. Iran can only act to serve moral purposes when its security interests are not being threatened. Its scepticism should be filled the USA and allies producing more "just and humane policies". There is no nation on earth desiring to be burdened or yearning for enslavement as it peacefully looks forward to the night bombs and invasions into its territory. Consequently, Iran is not paranoid of the USA but is concerned that its national security and national interests are being threatened.

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Model Indicators and Evaluation Criteria of Strength Readiness of Highly Qualified Arm-Wrestlers

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Abstract. In the arm-wrestling technique, the main element is the attack phase, which aims to achieve a quick superiority over the enemy. Researchers Zhivora and Usanov classified four main attack methods: top attack, hook attack, push attack, and side attack. During a side attack, a great deal of stress is placed on the flexors of the hand. In connection with this, four strength exercises were selected as test indicators: flexion of the fingers, stretch with a hammer, hook and bending of the hand. These exercises were chosen to determine the level of strength readiness of highly qualified arm-wrestlers. The work aimed to determine the model indicators of strength readiness of highly qualified arm-wrestlers of different weight categories. The study involved 24 arm-wrestlers, 8 in the weight category up to 80 kg, 8 – from 80 to 100 kg and 8 – over 100 kg. Three test athletes are world champions in arm-wrestling, 7 are winners of European and world championships, 9 are participants in European and world championships, 5 are winners of national championships of Ukraine. The following research methods were used in work: theoretical analysis and generalization of scientific, methodological and notable information, pedagogical observation, pedagogical experiment, methods of mathematical statistics. The analysis of the strength capabilities of highly qualified arm-wrestlers and their strength readiness models made it possible to develop assessment criteria for the level of strength readiness of highly qualified arm-wrestlers of three weight categories. Three levels of strength readiness have been identified: low ($\bar{x} - \sigma$), high ($\bar{x} + \sigma$) and medium – more ($\bar{x} - \sigma$), but less ($\bar{x} + \sigma$).

The conducted research allowed to establish the peculiarities of the levels of strength readiness development among highly qualified arm-wrestlers by weight categories. Model indicators of strength readiness of highly qualified arm-wrestlers were also determined. The analysis made it possible to state that athletes of lightweight categories (up to 80 kg and 80-100 kg) are more harmoniously developed according to the test results. Heavy arm-wrestlers (over 100 kg) showed worse results than expected.

Keywords: arm-wrestling; model characteristics; weight categories; power indicators.

INTRODUCTION

According to the analysis of competitive exercises' fulfilment, arm-sport belongs to the sports group of a speed-strength nature. The structure of competitive movements and the value of overcoming the opponent's resistance indicates the need for full dynamic manifestation and in-

creased resistance from the opponent, static efforts [1, 8].

The nature of dynamic efforts when overcoming resistances can be different: explosive, fast, slow. Explosive strength is characterized by overcoming resistances that do not reach the limit values with maximum acceleration.

The fast nature of efforts, or fast force, manifests itself during overcoming resistances that do not reach their limit values with acceleration below the maximum. The slow nature of efforts, or slow force, manifests itself during overcoming boundary resistances at a constant speed [9].

It is essential to distinguish that explosive strength is manifested only with overcoming muscle work. Rapid strength is manifested in both overcoming and yielding movements, also during their combination. Quiet strength is manifested during overcoming or yielding muscle work [10]. During slow force manifestation, the limiting stresses' duration is more excellent than during explosive force manifestation.

Sports and special studies' practice indicates no direct connection between developing certain dynamic and static strength types. [5]. Research results have shown that high static force does not allow for its rapid manifestation [12]. Comparing individual indices of manifestation of static and dynamic strength indicates no direct connection between developing certain muscle strength types in athletes. Thus, from a methodological point of view, this means that the effective development of any strength in highly qualified athletes' training involves using a specialized methodology [6]. In this regard, the determination of the ability to show strength capabilities in various strength exercises allows you to control and correct the training process to develop strength effectively.

Several studies [4, 11, 16] determine the structural orientation of special strength training, thereby determining arm-wrestlers' particular strength development structure. The study results show that the structure of exceptional strength training ensures the predominant development of specific muscle groups. Structurality also contributes to technical improvement, which helps increase the magnitude of the manifestation of strength.

It was found that highly qualified arm-wrestling athletes have a relatively equally high level of technical readiness. Therefore, the fight's result will mainly depend on strength readiness level [13, 14, 16].

In the arm-wrestling technique, the main element is the attack phase, which aims to achieve quick superiority over the opponent. According to [22], there are three primary attacks: top attack, hook attack and push attack. A questionnaire survey of specialists and research by [4]

showed that highly qualified athletes use hook attack in 55% of cases, top roll attack in 40 % and push attack in 5 %. It was found that when performing a hook attack, the tremendous load is applied to the flexors of the hand and forearm. Top roll attack requires excessive flexor force of the fingers and hand. During the push attack, the most excellent load falls on the elbow joint and fingers. Authors [20] classified the fourth method of attack – a side attack. During this technique, a great deal of stress falls on the flexors of the hand.

In connection with the above, four strength exercises were selected as test indicators: flexion of the fingers, stretch with a hammer, hook and bending of the hand. These exercises were chosen to determine the level of strength readiness of highly qualified arm-wrestlers.

The work *aimed* to determine the model indicators of strength readiness of highly qualified arm-wrestlers of different weight categories.

MATERIALS AND METHODS

The study involved 24 arm-wrestlers, 8 in the weight category up to 80 kg, 8 – from 80 to 100 kg and 8 – over 100 kg. Three test athletes are world champions in arm-wrestling, 7 are winners of European and world championships, 9 are participants in European and world championships, 5 are winners of national championships of Ukraine.

The following research methods were used in work: theoretical analysis and generalization of scientific, methodological and noteworthy information, pedagogical observation, pedagogical experiment, methods of mathematical statistics.

Based on the analysis of the results of the study [14, 21], questioning the coaches and athletes, four strength test exercises were identified that have a significant impact in wrestling on the hands: flexion of the fingers, stretch with a hammer, hook and bending of the hand. The strength of the flexors of the fingers was measured using a dynamometer DK-140 (Ukraine). Strength indices in the last three test exercises were measured in a static mode with an electric tenzodynamometer of the FBk series (Poland) with an accuracy class up to 100 g, fixed on a specialized arm-wrestling table using a specially made block device - "Device ARM1". During the measurement of the arm muscles' strength, the subject stood facing the table, grabbed the instrument holders with his hand, and squeezed them with maxi-

imum force without lifting the elbow of the working hand from the table. The distance between the device holders was easy to change and was selected individually for each athlete. A particular computer program AXIS FM made it possible to process measurement data in real-time (on-line) and previously collected data from the memory of an electric tenzodynamometer (off-line). AXIS FM is compatible with Windows 7, 10 operating systems.

Statistical analysis of the obtained data was carried out using the licensed program STATISTICA 10. Statistical Analysis calculated the following parameters: arithmetic mean (\bar{x}), standard deviation (σ), error of representativeness (m) and the coefficient of variation (V). Based on the obtained digital data, three strength readiness levels were determined: low, medium and high.

RESULTS AND DISCUSSION

Comparative analysis in the studied test exercises shows that most arm-wrestlers do not accidentally use a hook attack during the competition. Because in all weight categories in this exercise, athletes demonstrate the highest strength indicators compared to the data of other strength exercises (Table 1).

Analysis of the coefficient of variation (V) indicates that the results of test exercises of all groups of athletes were homogeneous. This is confirmed by the fluctuation of the numerical reflections of the static population's variability from 2.03 % to 5.84 % (Table 1). Comparison of the overall final indicators of the coefficients of variability (V) allows us to note that athletes weighing from 80 to 100 kg are distinguished by the most remarkable homogeneity ($\Sigma V = 28,88$ %). The most significant variability characterizes the group weighing more than 100 kg in strength indicators ($\Sigma V = 34,50$ %).

Table 1 – Model indicators of the strength readiness of highly qualified arm-wrestlers (n=24)

Arm	Weight category (kg)	Strength indicator \bar{x} (kg)	m	σ	V (%)
Flexion of the fingers					
left	< 80	44,34	0,89	2,52	5,68
	80-100	54,23	1,10	3,11	5,74
	> 100	50,69	0,93	2,63	5,19
right	< 80	45,55	0,94	2,66	5,84
	80-100	56,81	0,91	2,57	4,53
	> 100	54,48	1,14	3,22	5,02
Stretch with a hammer					
left	< 80	47,08	0,68	1,92	4,09
	80-100	62,24	0,91	2,57	4,14
	> 100	57,52	0,45	1,27	2,21
right	< 80	47,86	0,44	1,24	2,61
	80-100	64,98	0,92	2,60	4,01
	> 100	60,88	0,81	2,29	3,76
Hook					
left	< 80	59,64	0,82	2,32	3,89
	80-100	84,65	0,69	1,95	2,31
	> 100	75,85	1,19	3,36	4,44
right	< 80	64,46	0,81	2,29	3,56
	80-100	87,98	0,84	2,38	2,70
	> 100	80,28	0,98	2,77	3,4
Bending of the hand					
left	< 80	47,16	0,55	1,56	3,31
	80-100	69,67	0,50	1,41	2,03
	> 100	60,54	1,04	2,94	4,86
right	< 80	48,74	0,39	1,10	2,27
	80-100	73,73	0,89	2,52	3,42
	> 100	64,93	1,05	2,97	4,57

So, for athletes in the weight category up to 80 kg, the difference ranges from 25 % to 40 %, in the weight category from 80 to 100 kg – from 25 to 55 % and by 25-50 % - in athletes weighing over 100 kg (Table 2).

Table 2 – Generalized indicators of strength capabilities in test exercises of highly qualified arm-wrestlers (n=24)

Test exercise	Weight category, kg					
	< 80		80-100		> 100	
	left hand	right hand	left hand	right hand	left hand	right hand
flexion of the fingers, kg	44,34	45,55	54,23	56,81	50,69	54,48
stretch with a hammer, kg	47,08	47,86	62,24	64,98	57,52	60,88
hook, kg	59,64	64,46	84,65	87,98	75,85	80,28
bending of the hand, kg	47,16	48,74	69,67	73,73	60,54	64,93
Σ indicators of arm strength, kg	198,22	206,61	48,74	283,50	244,60	260,57
General indicator of arm strength, kg	404,83		554,29		505,17	
Total indicator, V %	31,25		28,88		34,50	

According to comparing the strength capabilities of the left and right hands in athletes of the group over 100 kg, an increased difference in strength indicators of the left and right hands is observed. Power capabilities of the right hand are higher by 15, 97 kg (10.91%). In other weight categories (up to 80 kg and 80-100 kg), the difference, respectively, was 8.39 kg (4.23%) and 12.71 kg (4.69%). Thus, athletes' indicators up to 80 kg and 80-100 kg are stable and homogeneous.

In athletes weighing up to 80 kg, the immediate results of testing the left hand ranged from 44.34 ± 0.89 kg to 59.64 ± 0.82 kg; right - from 45.55 ± 0.94 kg to 64.46 ± 0.81 kg. In the weight category from 80 to 100 kg, the strength of the left hand ranged from 54.23 ± 1.10 kg to 84.65 ± 0.69 kg; right - from 56.81 ± 0.91 kg to 87.98 ± 0.84 kg. In athletes weighing over 100 kg, the strength indices of the left hand ranged from 50.64 ± 0.93 kg to 75.85 ± 1.19 kg; right - from 54.48 ± 1.14 kg to 80.28 ± 0.98 kg. The data obtained indicate that athletes weighing 80-100 kg demonstrate high strength indicators compared to athletes' strength data in the heavyweight category. Thus, this group's overall indicator is better by 9.7% (554.29 kg versus 505.17 kg) (Table 2).

The analysis of the strength capabilities of highly qualified arm-wrestlers and their strength readiness models is presented; it is possible to develop assessment criteria for the strength readiness of highly qualified arm-wrestlers of three weight categories (Table 3). Three levels of strength readiness have been identified: low ($\bar{x} - \sigma$), high ($\bar{x} + \sigma$) and medium - more ($\bar{x} - \sigma$), but less ($\bar{x} + \sigma$).

Table 3 – Evaluation criteria for the level of strength readiness of highly qualified arm-wrestlers

Arm	Weight category, kg	Low level, kg	Medium level, kg	High level, kg
Flexion of the fingers				
left	< 80	< 41,82	41,82 - 46,86	> 46,86
	80-100	< 51,12	51,12 - 57,34	> 57,34
	> 100	< 48,08	48,08 - 53,22	> 53,22
right	< 80	< 42,89	42,89 - 47,08	> 47,08
	80-100	< 54,24	54,24 - 59,38	> 59,38
	> 100	< 51,26	51,26 - 57,70	> 57,70
Stretch with a hammer				
left	< 80	< 45,08	45,08 - 48,92	> 48,92
	80-100	< 59,64	59,64 - 64,81	> 64,81
	> 100	< 56,25	56,25 - 58,79	> 58,79
right	< 80	< 46,62	46,62 - 49,10	> 49,10

Arm	Weight category, kg	Low level, kg	Medium level, kg	High level, kg
	80-100	< 62,38	62,38 - 67,58	> 67,58
	> 100	< 58,59	58,59 - 63,17	> 63,17
Hook				
left	< 80	< 57,32	57,32 - 61,96	> 61,96
	80-100	< 82,70	82,70 - 86,60	> 86,60
	> 100	< 72,49	72,49 - 79,21	> 79,21
right	< 80	< 62,17	62,17 - 66,75	> 66,75
	80-100	< 85,60	85,60 - 90,36	> 90,36
	> 100	< 77,51	77,51 - 84,05	> 84,05
Bending of the hand				
left	< 80	< 45,60	45,60 - 48,72	> 48,72
	80-100	< 68,26	68,26 - 71,08	> 71,08
	> 100	< 57,60	57,60 - 63,48	> 63,48
right	< 80	< 47,64	47,64 - 49,84	> 49,84
	80-100	< 71,21	71,21 - 76,25	> 76,25
	> 100	< 61,96	61,96 - 67,90	> 67,90

Comparative analysis of the ratios of different levels of strength indicators allowed to establish that there are completely low or high levels of strength indicators among highly qualified arm-wrestlers in none of the weight categories.

But in the weight category of 80-100 kg, one athlete in all test exercises recorded the average level of strength indicators. In athletes weighing up to 80 kg, 12 cases out of 64 (18.8%) of low level, 37 - medium (57.8%) and 15 - high (23.4%) were recorded (Table 4).

Table 4 – Ratios of strength readiness levels of highly qualified arm-wrestlers (n = 24)

Level	Flexion of the fingers	Stretch with a hammer	Hook	Bending of the hand	Σ, un.	Σ, %
< 80 kr						
low	1 2	1 2	2 2	1 1	12	18,8
medium	6 5	5 4	3 4	5 5	37	57,8
high	1 1	2 2	3 2	2 2	15	23,4
80-100 kr						
low	2 1	1 2	1 1	1 1	10	15,6
medium	4 5	5 4	6 6	6 6	42	65,6
high	2 2	2 2	1 1	1 1	12	18,8
> 100 kr						
low	1 1	1 3	3 3	3 3	18	28,1
medium	5 5	5 4	3 2	3 3	30	46,9
high	2 2	2 1	2 3	2 2	16	25

In the weight category of 80-100 kg, a low level was registered in 15.6% (n = 10) cases, a medium level in 65.6% of indicators (n = 42), and a

high level in 18.8% (n = 12). In the heavy weight category (over 100 kg) 28.1% (n = 18) indicators of low level, 46.9% (n = 30) - medium and 25% (n = 16) - high (Table 4).

Thus, the comparison of the ratios of the levels of strength capabilities of athletes of three weight categories shows that athletes weighing from 80 to 100 kg have the highest indicators of strength training. These figures are achieved through an overall increase in mid-level strength indicators.

Arm wrestling refers to sports in which performance directly depends on strength readiness, particularly arm strength development. It was confirmed that the main predictions of success in hand wrestling include: muscle development, physical strength, the value of conditional moments of the strength of limb segments [18]. Strength fitness in many sports is used to assess athletes' physical fitness [5, 11]. According to [21], in arm wrestling, the strength component is of decisive importance in highly qualified athletes in competitive exercises.

Confirmed data based on ergonomic approaches by [15] that high-level arm-wrestlers have a significantly higher hand strength indicator, hand flexion, forearm muscle strength, arm pronation and supination.

Hand strength indicators are the most important in hand wrestling. All athletes are characterized by high results of hand power indices, and the higher the results of these indices, the higher the success of a competitive activity. Similar data are provided by [19]. The results of [2] also confirm that the indicators of arm muscle strength are a

significant predictor of success in arm-wrestling [19].

Victory largely depends on the athlete's ability to squeeze the opponent's hand as much as possible. This technique was used by Iermakov et al. [7] to predict success in martial arts.

CONCLUSIONS

The conducted research established the peculiarities of strength readiness development levels among highly qualified arm-wrestlers by weight categories. Model indicators of strength readiness of highly qualified arm-wrestlers were also determined. The analysis made it possible to state that athletes of lightweight categories (up to 80 kg and 80-100 kg) are more harmoniously developed according to the test results. Heavy arm-wrestlers (over 100 kg) showed worse results than expected. This group of athletes has not fully realized in terms of strength capabilities. These arm-wrestlers need to improve the training methodology, considering the organism's anthropo-physiological and weight characteristics.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Impact of Facilities and Service Quality on Patient Relatives Satisfaction and Patronage in University of Maiduguri Teaching Hospital, Borno State, Nigeria

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Abstract. The study aimed at evaluating the impact of facilities and service quality in the University of Maiduguri Teaching Hospital. The study assesses the level of service quality and facilities provided to the patient's relative satisfaction and patronage. The study adopted a quantitative approach, and data were collected through a questionnaire survey from 225 patients relative to the UMTH proportionately selected from the target population in the Borno metropolis. The data collected were subjected to descriptive and inferential statistics with mean ranking, frequency distribution and Partial Least Square – Structural Equation Model (PLS-SEM) to achieve the research aim. The study indicated that service quality has the most potent effect on patronage, followed by satisfaction with a significant effect and facilities provided with a small size effect. The study also indicated hypothesised path relationship between service quality and patronage is statistically significant. The study reported that hypothesised path relationship between satisfaction and patronage is statistically significant. The study demonstrated that hypothesised path relationship between facilities provision and patronage is not statistically significant. It can be depicted that service quality and satisfaction are both moderately strong predictors of patronage, but facilities provision does not predict patronage directly. The study finally recommended that management intervenes through the provision of maintenance culture, enhancing the quality of services and facilities for satisfaction and patronage.

Keywords: patronage; service quality; facilities provision; hospital and satisfaction.

INTRODUCTION

The service sector is a rapidly growing area of the world economy, and health service organisations play a pivotal role in such development. Service quality is essential, especially in customer's retention. Customers have become quality conscious and expect all services to be of high quality. Competition plays a vital role in upgrading quality and patient's satisfaction in health care institutions. In environments where there is no competition significantly when demand exceeds supply, hospitals offer their patient's unsatisfactory service due to the idea that patients

have no other alternative and they would comply with the present service unconditionally. Hospitals provide differentiation based on the quality of service. To have a consistent competitive advantage, service sectors like hospitals argue against providing excellent services to their customer.

To win today's market place entails building customer relationship and not just building the products; building customer relationship means delivering superior value over competitors to the target customers. Evaluating the company's service quality is mainly based on the customers; it

is evident that customers play essential roles in the organisational process. Whether an organisation provides good service quality or not will depend on the customers' feedback on the satisfaction they get from consuming the products since higher quality levels lead to higher customer satisfaction levels.

The organisation that focuses on customer satisfaction can build loyal clients who promote the organisation further through vital word of mouth advertising referrals. The private health care sector (including unqualified providers) also deserves scrutiny as 70 % of the patients seek medical care from this sector [15]. A study suggested that the overall utilisation rate for public health care service is as low as 30 %. Studies also maintain that public hospitals' service quality is better than private hospitals. Another study reveals that private hospitals' quality is better than in public health facilities. Furthermore, a lot of grievances regarding health care delivery have been directed towards government hospitals.

Literature review

Facilities are primarily physical, social, and institutional forms of capital, enhancing production, distribution, consumption activities, and ultimately, life quality. It constitutes essential services without which primary, secondary and tertiary productive activities cannot function. Facilities form the necessary ingredients for motivating people to be more productive and achieve relative self-reliance. In other words, facilities are elements in the package of basic needs which a community would like to procure for better living. It is viewed as those facilities and services that are needful to improve people's quality of life. Some authors put facilities to include the system of physical, human, and institutional forms of capital, enabling rural residents to perform their production, processing better, and distribution activities and improving the overall quality of life. Also, facilities can be better understood as specialised elements in the development process that bring about improvements in the masses' socio-economic welfare. Moreover, they are catalysts of development, and at the same time, their presence can be an indicator of the development level.

Some authors have assisted in categorising the facilities to include - economic such as credit, loan, production support; physical infrastruc-

tures such as roads, electricity, irrigation facilities; capacity building in terms of training, information dissemination; and support service namely, market services, and access to essential social services. Some researchers had attempted the classification of the facilities into three, namely, first: physical facilities consisting of roads, bridges, storage facilities, dams, irrigation, water facilities, and other forms of processing facilities. Second, social facilities such as health and medical facilities, educational facilities and third, institutional facilities consist of cooperative societies, farmers' unions, financial institutions like banks, agricultural extension and training services. This classification is of immense importance because people's socio-economic status largely depends on the quality of infrastructural facilities provided with good maintenance culture.

Moreover, the author [3] shared a similar opinion that the provision of basic facilities is a prerequisite for developing economies to stimulate economic growth and reach the state of economic recovery and poverty alleviation through increasing and diversifying agricultural outputs.

Also, authors [15, 24] observed that facilities are part of an integrated development strategy that combines various society areas, including agricultural, educational, health, nutrition, electrification, water supply and cooperatives simultaneously. The same vein had remarked that adequate facilities provision could reduce the production cost, affecting productivity, output, and employment.

Service quality has also been defined as customer perception of how well a service meets or exceeds its expectations. In defining service quality, some authors argue that it is a consumer's overall mental picture of the relative inferiority or superiority of the organisation and its services. Therefore, the service quality is interpreted as the impression of a customer's judgment concerning the service provided. Service quality is influenced by expected service and perceived service. If services are received as expected, the service quality is satisfactory. Still, if the services exceeded their expectations, customers will be delighted and perceive service quality as excellent and vice versa. Some authors refer to service quality focuses specifically on dimensions of service.

Some studies on service quality have been carried out in the health sector; however, no single definition can adequately delineate what health

is all about. The World Health Organization Constitution defines health as a complete physical, mental, social well-being and not merely the absence of disease or infirmity [36]. Also defined health care quality as the kind of care that is anticipated to maximise an inclusive measure of patient welfare after taking account of the process of care in all its parts [22]. Some authors define health care quality by underscoring the importance of life, stating that which consistently contributes to the betterment or maintenance of the quality or duration of life. They further highlight the relevance of disease prevention, health promotion, informed participation of patients and efficient use of resources as critical variables in healthcare quality. Highlights desired outcome consistent with professional knowledge. According to [31], it is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

Some authors define quality considered the needs of patients and the financial resources of a

facility; and argued that it is fully meeting the needs of those who need the service most, at the lowest cost to the organisation within bounds and directive of higher authorities and purchasers. According to [31], even though there are several definitions of healthcare service quality in literature, it is still a complicated and indistinct concept. Fuentes [4] concurs to [31] opinion by stating that the quality of healthcare service is a multidimensional concept that reflects a judgment about whether the services provided for patients were appropriate and whether the relationship between doctors and patients was proper. One of the traditional medical approaches to the definition of quality of healthcare focuses on healthcare services' outcome from the service provider's point of view. In contrast, another approach emphasises healthcare from the patient's perspective. In general, researchers define the quality of healthcare services along two dimensions; technical service and interpersonal care of service.

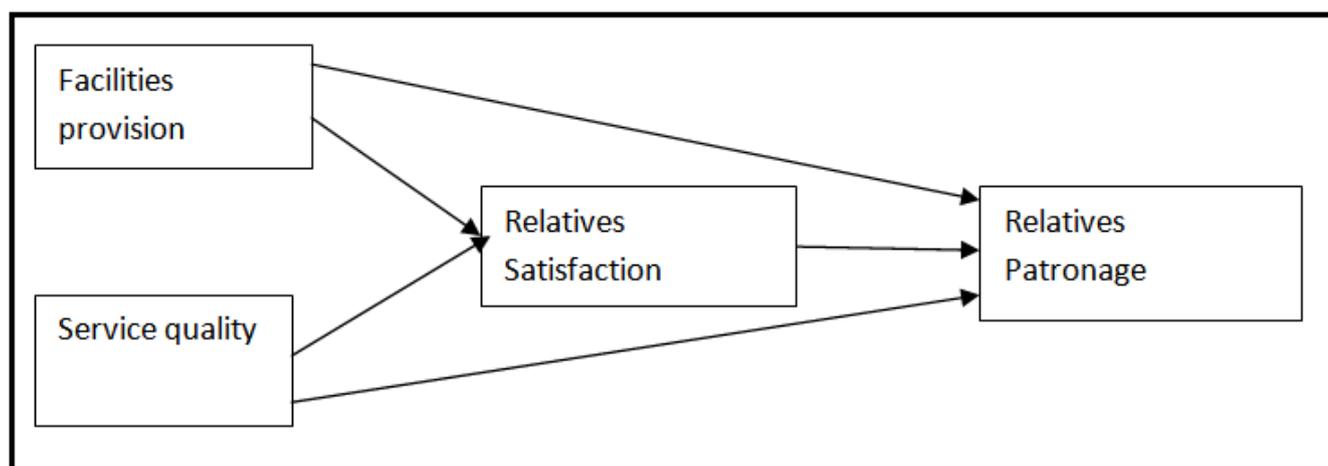


Figure 1 – Study conceptual framework

MATERIALS AND METHOD

The study population is the target respondents to the study that fulfil the requirement to supply information needed for the research. This study's target population are patient relatives in University Maiduguri Teaching Hospital (UMTH) who are staying with the patients.

The sample frame is the total number of target respondents. The sampling frame refers to a complete list of all units in the population under study and determines the inquiry structure. Some authors define a sample as "a proportion of a population". This study's sample frame is the

total number of two patient relatives per 533-bed capacity, which are 1066.

The sample size is an essential feature of any empirical study in which the goal is to make inferences about a population from a sample. In practice, the sample size used in a study is determined based on the expense of data collection and the need to have sufficient statistical power. The sample size is 306 based on a sample frame of 1066 patient relatives. The sample size for this study was determined using Bartlett's table.

As the University Maiduguri Teaching Hospital comprises six (6) wards with a total bed capacity of 533, and since the hospital management al-

lowed only two (2) patients relative to stay with the patients (as presented in Table 1), the sample size will be proportionally assigned.

Table 1 – Demographics of the respondents

No	Attributes	Options	Frequency	Percentage
1	Gender	Male	110	48.9
		Female	115	51.1
			225	100
2	Age	Under 30 years	99	44.0
		30 to 60 years	94	41.8
		Above 60 years	32	14.2
			225	100
3	How often do you visit this hospital	Most of the time	57	25.3
		Some times	122	54.2
		First time	46	20.4
			225	100
4	Occupation	Civil servant	47	20.9
		Business	50	22.2
		Farmer	47	20.9
		Student	60	26.7
		None of the above	21	9.3
			225	100
5	Educational Qualification	Informal/ Primary Education	21	9.3
		Secondary certificate	86	38.2
		Diploma	98	43.6
		Degree	13	5.8
		Master degree and above	7	3.1
			225	100

The procedure for choosing the sample units from a population is known as sampling. While the study population may be finite or infinite, the sample is finite. There are various techniques for selecting units that make up the sample, categorised into probability and non-probability techniques. In respect of this study, a random sampling technique was used to collect unbiased data from each ward, while a purposeful sample was adopted to administer the questionnaire.

For this research, the questionnaire was adopted to collect data from the respondents in the study

area. The design incorporated the use of only close-ended questions. The close-ended question had more than one response options and five (5) Likert scale used for the variables items to ease assessing the responses.

This study used structured questionnaires to generate quantitative data from the respondents. The study employed the use of descriptive statistic (Mean Ranking) and inferential statistic (Partial Least Squares (PLS)) to analyse the data collected. SPSS was used to analyse the data generated from the questionnaire survey.

Table 2 – Sample Frame and Sample Size

Ward/Dept.	Number of Bed (sample frame)	No. of Patients Relative (sample size)
Obstetrics and Gynaecology	136	57
Medicine`	141	60
Surgery	145	61
Paediatric Medical	88	37
Amenity	19	8
Intensive Care Unit	4	2
TOTAL	533	225

There are many kinds of validity, but they all refer to whether the data being measured truly reflects what it ought to be. Reliability refers to consistency and the ability to obtain the same answer each time a measure is used. There are three types of reliability test: inter-ratter, internal consistency, and test-retest. The validity test determines if a measurement truly reflects the concept being studied. There are three common types of validity: internal, external, and construct. Reliability test determines the consistency that researchers should obtain the same answer each time a measure is used. It is concerned with how consistent the result obtained with the instruments is. The instrument gives similar, close or the same result if the study is replicated under the same assumptions and conditions. The reliability of the constructs was analysed by finding Cronbach's alpha, as Pallant suggested. Overall, Cronbach's alpha for the questionnaire was 0.853. This means that the questionnaire as a whole is reliable and acceptable.

Table 3 – Reliability results

Constructs	Cronbach's Alpha	N of Items
Service quality	.848	13
Facilities provision	.853	13
Satisfaction	.842	13
Patronage	.674	5

The results presented in the table above indicated that the Cronbach's alphas obtained for each of the constructs, facilities provision having the highest score of 0.853 and the patronage having the lowest value of .674. However, all the results were above the acceptable range of 0.7 except for patronage.

RESULTS AND DISCUSSION

What is the level of service quality in University Maiduguri Teaching Hospital? Descriptive statistical analysis was used to explore service quality in the University of Maiduguri Teaching Hospital Borno State.

Table 4 shows the level of service quality in the University of Maiduguri Teaching Hospital.

Table 4 – Level of service quality

No	Variables	Mean	St. deviation	Ranking
1	Internet connectivity	3.22	1.154	1st
2	Hygiene services	2.90	1.111	2nd
3	Recreational services	2.88	1.126	3rd
4	Laundry services	2.86	1.125	4th
5	Security service	2.85	1.091	5th
6	Electricity supply	2.79	1.118	6th
7	Sales services	2.77	1.003	7th
8	Response service	2.72	1.041	8th
9	Transportation	2.63	.992	9th
10	Cleaning services	2.55	1.070	10th
11	Communication services	2.55	1.073	11th
12	Safety services	2.44	.972	12th
13	Water supply	2.22	1.057	13th

It shows that the service quality provided most, based on a five-point measurement scale, was Internet connectivity, with a mean score of 3.22 ranked 1st. In contrast, electricity with the mean value of 2.79 ranked 6th.

What is the level of facilities provided in the University of Maiduguri Teaching Hospital? A descriptive statistical analysis was used to identify

the level of facilities provided in the Teaching Hospital.

Table 5 shows the level of facilities provided in the University of Maiduguri Teaching Hospital. It shows that the facilities provided most, based on the five-point measurement scale, were security services with a mean score of 3.05 ranked 1st.

Table 5 – Level of facilities provision

No	Variables	Mean	St. deviation	Ranking
1	Security service	3.05	1.205	1st
2	Recreational services	2.88	1.126	2nd
3	Electricity supply	2.83	1.068	3rd
4	Response service	2.82	1.068	4th
5	Communication services	2.81	1.045	5th
6	Internet connectivity	2.75	1.131	6th
7	Hygiene services	2.72	1.069	7th
8	Cleaning services	2.71	1.122	8th
9	Transportation	2.68	.974	9th
10	Sales services	2.64	1.082	10th
11	Laundry services	2.58	1.103	11th
12	Safety services	2.58	.984	12th
13	Water supply	2.26	1.075	13th

What is the level of patient relative satisfaction with facility provision and service quality in the study area? A descriptive statistical analysis was used to identify the level of satisfaction with the facility's facility in the University of Maiduguri Teaching Hospital.

Table 6 shows satisfaction with facility provision and service quality in the University of Maiduguri Teaching Hospital. It shows that the satisfaction with facility provision and service quality provided most, based on the five-point measurement scale, was security service with a mean score of 3.14 ranked 1st.

Table 6 – Level of facilities provision

No	Variables	Mean	St. deviation	Ranking
1	Security service	3.14	1.159	1st
2	Recreational services	2.96	1.070	2nd
3	Internet connectivity	2.86	1.137	3rd

No	Variables	Mean	St. deviation	Ranking
4	Response service	2.86	1.055	4th
5	Electricity supply	2.80	1.099	5th
6	Communication services	2.72	1.090	6th
7	Laundry services	2.71	1.181	7th
8	Transportation	2.68	1.021	8th
9	Hygiene services	2.67	1.100	9th
10	Cleaning services	2.66	1.086	10th
11	Safety services	2.53	.987	11th
12	Sales services	2.52	.973	12th
13	Water supply	2.23	1.029	13th

To what extent are patient relative willing to patronise the study area? A descriptive statistical analysis was used to identify the extent are patient relative willing to patronise.

Table 7 shows the level of patient relative patronage in the University of Maiduguri Teaching Hospital. It reported that willing to be visiting the hospital with a mean score of 2.91 ranked 1st.

Table 7 – Patient relative willing to patronise

No	Variables	Mean	St. Deviation	Ranking
1	Willing to be visiting the hospital	2.91	1.138	1st
2	Willing to recommend the hospital for people to come	2.76	1.078	2nd
3	Willingness to stay long outside the wards	2.76	1.085	3rd
4	Willing to invite your	2.68	.997	4th

Table 8 – Average Variance Extracted (AVE)

Variables	Indicators	Factor Loadings	Cronbach's Alpha	Composite Reliability	AVE
Facilities provision	F1	0.763	0.814	0.866	0.519
	F2	0.800			
	F4	0.736			
	F8	0.626			
	F9	0.664			
	F13	0.763			
Service Quality	SQ1	0.725	0.837	0.877	0.507
	SQ2	0.771			
	SQ3	0.693			
	SQ4	0.767			
	SQ5	0.734			

	relatives and friends to visit the hospital			
5	Willingness to stay long inside the wards	2.40	1.146	5th

What are Facilities Provision and service quality on patient's relative satisfaction and patronage in the study area? To determine the effect of facilities provisions and service quality on patient's relative's satisfaction and patronage in the study area, the Partial Least Squares-Structural Equation Modelling (PLS-SEM) was used.

Some authors suggested that some essential elements should be covered for an initial assessment of the PLS-SEM model.

These include an explanation of target endogenous variable variance, Inner model path coefficient sizes and significance, Outer model loadings and significance, Indicator reliability, Internal consistency reliability, Convergent validity, Discriminant validity and Checking the Structural Path Significance in Bootstrapping, which was presented below.

The convergent validity of the outer (measurement) models was assessed using the factor loadings, Average Variance Extracted (AVE) and composite reliability. Convergent validity was achieved whenever the factor loadings are high and statistically significant. The average variance extracted (AVE) is recommended to be above 0.5, while composite reliability is recommended to be above 0.6 [33]. The use of Average Variance Extracted (AVE) to measure the convergent validity ensures that each measurement model measures what is supposed to measure.

Variables	Indicators	Factor Loadings	Cronbach's Alpha	Composite Reliability	AVE
	SQ7	0.638			
	SQ8	0.643			
Satisfaction	SFPH1	0.809	0.774	0.846	0.526
	SFPH2	0.751			
	SFPH3	0.698			
	SFPH4	0.705			
	SFPH5	0.652			
Patronage	WPH1	0.813	0.637	0.805	0.580
	WPH2	0.752			
	WPH3	0.717			

It can be seen that all of the indicators have individual indicator values that are much larger than the minimum acceptable level of 0.6 and close to the preferred level of 0.7. Cronbach's alpha is used to measure internal consistency reliability, but it tends to provide a conservative PLS-SEM measurement. Prior literature has suggested using "Composite Reliability" as a replacement [33]. Such values are shown to be larger than 0.6, so high internal consistency reliability levels have been demonstrated among all the constructs.

From table 8, it is found that all of the AVE values are greater than the acceptable threshold of 0.5, so convergent validity and reliability is confirmed.

The discriminant validity was assessed using the constructs' correlation and the constructs' cross-loadings. Some authors suggest that AVE's square root in each construct can be used to establish discriminant validity, as indicated in Table 9 below. The cross-loading among the constructs ensured that none of the constructs is loading more in another construct than itself [33].

As seen in table 8 Above, Facilities provision AVE is 0.519; hence its square root becomes 0.824. For service Quality, the AVE is 0.507, and its square roots are 0.761; for satisfaction, the AVE is 0.526, and its square root is 0.725 service quality on the other and has an AVE of 0.580, and its square roots are 0.712. The result shows that the highest correlation matrix was between Facilities provision and patronage 0.761. It further shows that none of the research constructs is cross-loading more on another construct than itself. It can be concluded that the discriminant validity is well established as the square roots of the AVE are more significant than the correlation values in their respective column and rows. Therefore, the model is suitable for Partial least squares (PLS) regression analysis.

Table 9 – Discriminant Validity

	Facilities provision	Patronage	Satisfaction	Service quality
Facilities provision	0.721			
Patronage	0.695	0.761		
Satisfaction	0.418	0.627	0.725	
Service Quality	0.682	0.553	0.691	0.712

The structural model assessed the effect of facilities provision and service quality on satisfaction and patronage in the study area using the smart PLS 3 interface shown in Figure 2.

The coefficient of determination, R^2 , is 0.661 for the patronage endogenous latent variable. This means that the three latent variables (Facilities provision, service quality, and satisfaction) moderately explain 66.1% of the patronage variance. Facilities provision and service quality together explain 0.690, i.e. 69.0% of the variance of satisfaction.

The inner model suggests that:

- 1) Service quality has the most potent effect on patronage (0.471), followed by satisfaction (0.332) and facilities provision (0.060).
- 2) The hypothesised path relationship between service quality and patronage is statistically significant.
- 3) The hypothesised path relationship between satisfaction and patronage is statistically significant.
- 4) However, the hypothesised path relationship between facilities provision and patronage is not statistically significant. This is because its standardised path coefficient (0.060) is lower than 0.1.

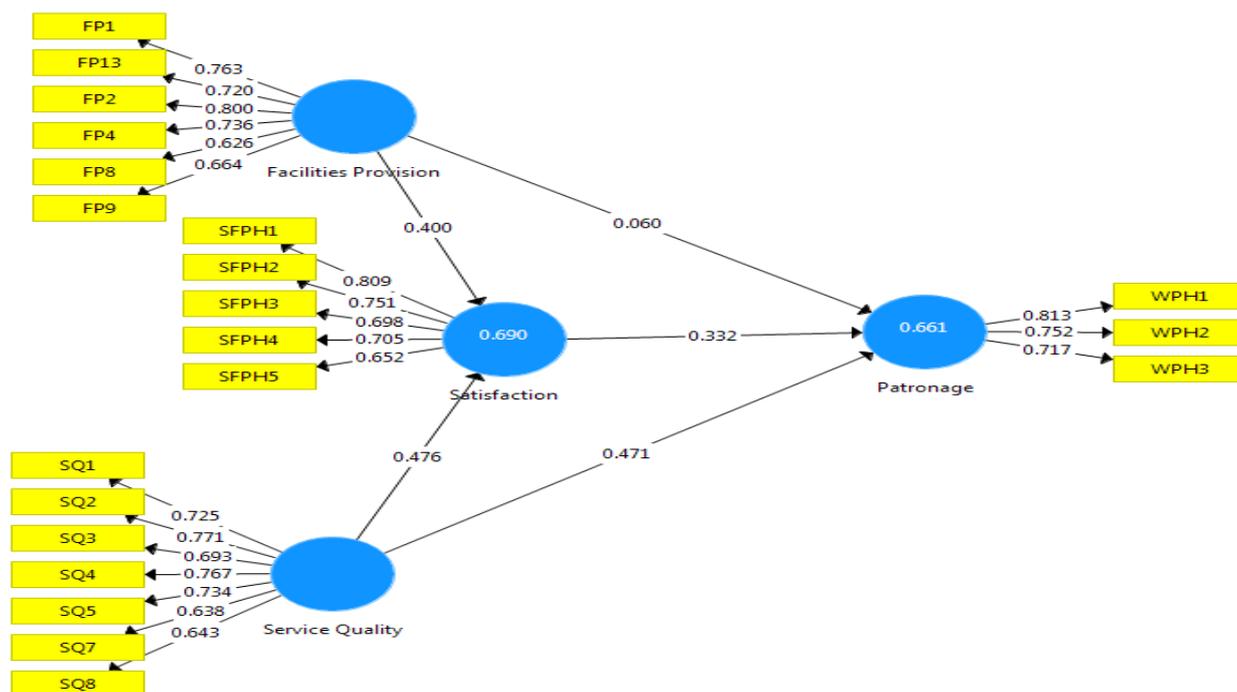


Figure 2 – Effect of Facilities provision and service quality on satisfaction and patronage

Thus, service quality and satisfaction are moderately strong predictors of patronage, but facilities provision does not directly predict patronage.

Figure 3 shows the t-statistics of each construct and indicator.

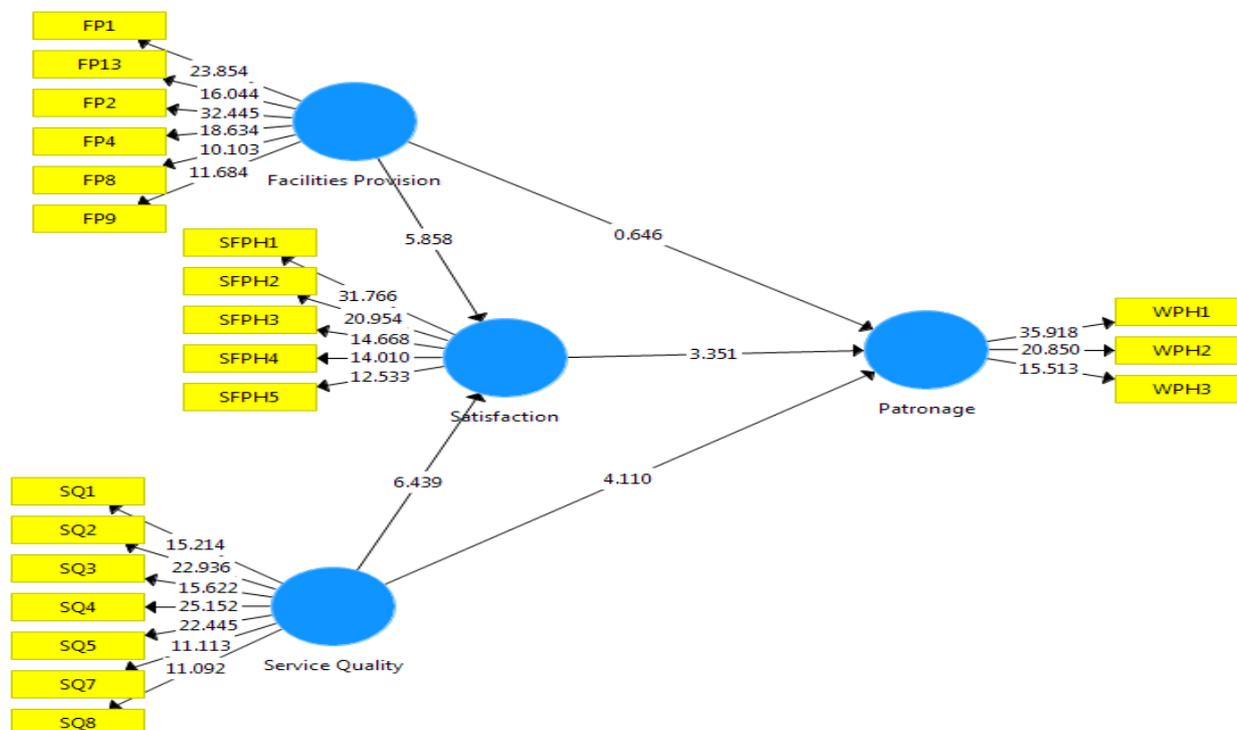


Figure 3 – T-statistics of path coefficients

The hypothesised relationship's statistical significance was assessed using a two-tailed t-test with a significance level of 5%. The result shows the effect of Facilities provision and service quality on satisfaction and patronage in the study area.

It can be seen that only "facilities provision – Patronage" linkage with t statistics of 0.646 is not significant because it indicated t-statistics below a minimum threshold of 1.96. However, all other path coefficients, i.e. "satisfaction- patronage linkage" with t-statistics of 3.351, "service quality – patronage" linkage with t-statistics of 4.110, "facilities provision – Satisfaction" linkage with t-statistics of 5.858, "service quality – Satisfaction" Linkage with t-statistics of 6.439 "satisfaction – Patronage".

Linkages with t-statistics of 3.351 in the inner model are statistically significant as it indicates t-statistics above the minimum threshold of 1.96.

Table 10 – t-statistics of path coefficient

	T-statistics
Facilities provision > Patronage	0.646
Facilities provision > satisfaction	5.585
Service quality > satisfaction	6.439
Service Quality > patronage	4.110
Satisfaction > Patronage	3.351

The t-statistics of each of the outer loadings in the structural equation modelling is presented in the table below.

Table 11 – t-statistics of outer loadings

	t-statistics
FP1	23.854
FP2	32.445
FP4	18.634
FP8	10.103
FP9	11.684
FP13	16.044
SQ1	15.214
SQ2	22.936
SQ3	15.622
SQ4	25.152
SQ5	22.445
SQ7	11.113
SQ8	11.092

SFPH1	31.766
SFPH2	20.954
SFPH3	14.668
SFPH4	14.010
SFPH5	12.533
WPH1	35.918
WPH2	20.850
WPH3	15.513

Table 11 shows the t-statistics of the external loadings indicating a value above the minimum threshold of 1.96.

CONCLUSION

It can be concluded that the most service quality in the University of Maiduguri Teaching Hospital were hygiene services, recreational services, laundry services and Security service, and the minor service quality was safety services and water supply. The significant facilities provided were security service, recreational services, electricity supply, response service, communication services and internet connectivity. The satisfied facilities provided were security service, recreational services, internet connectivity, response service, electricity supply, and most minor satisfying facilities. The study indicated that patient relatives were willing to visit the hospital, willing to recommend the hospital for people to come, and willing to stay long outside the wards. The study indicated that service quality has the most potent effect on patronage, followed by satisfaction with significant effect and small size effect facilities. The study also indicated hypothesised path relationship between service quality and patronage is statistically significant. The study reported that hypothesised path relationship between satisfaction and patronage is statistically significant. The study demonstrated that hypothesised path relationship between facilities provision and patronage is not statistically significant. It can be concluded that service quality and satisfaction are moderately strong predictors of patronage, but facilities provision does not directly predict patronage.

This study recommended that management intervenes through the provision of maintenance culture, enhancing the quality of services and facilities for satisfaction and patronage.

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End-Users Housing Requirements in Tumfure Housing Estate in Gombe Metropolis, Nigeria

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Abstract. One of the critical success indicators of projects is to meet the requirements of end-users on which their satisfaction depend upon. This study aimed to examine end-users housing requirements in a Tumfure housing estate in Gombe metropolis, Nigeria, to improve end-user satisfaction. The study objectives were: To identify end-users housing requirements in Tumfure housing estate in Gombe metropolis. The survey design was used to collect responses from occupants of the estate using a structured questionnaire that produced a 65 % response rate. The collected data was analysed using descriptive statistical tools of tables and means. The research found that end-users basic housing requirements in the Tumfure housing estate were the flow of natural ventilation and illumination, rooms suitable for a family unit, modern convenience, circulation spaces, and adequate security. The research recommended that end-users requirements and their peculiarities be the primary consideration in designing and developing public housing estate to ensure higher end-user residential satisfaction.

Keywords: end-users; housing requirement; housing estate; satisfaction and post occupancy.

INTRODUCTION

Housing encompasses the totality of the environment and infrastructure that provide shelter, human comfort, enhance people's health and productivity, and enable them to sustain their psycho-social or psycho-pathological balance in their environment [2]. Public housing is "a form of housing tenure in which the property is owned by a government authority, which may be central or local. The Nigerian government's effort to provide public housing dates back to the colonial era [15]. The public housing policy structure tends to favour the architect's preferences, with an overall target of low costing, while there is a need for the buildings to meet the people who use them [15]. Post Occupancy Evaluation (POE) was opined by [30] as a process of evaluating building performance in an organised and thorough way after it has been in occupation for some time. The term POE was said to have originated from occupancy permission given to certify that a property is fit for occupation [26].

As a suitable technique, POE involves a careful & systematic approach to measuring a building's performance by involving each user group & each critical element of the building under examination [18]. POE in this context is used to evaluate occupants experience with public housing developments. The experience was also defined by [16] as "anything that emerges, coalesces, becomes a phenomenon or experiences out of the inner and outer stimuli that simultaneously impinge on people".

Although residential quality studies have gained increasing attention in recent times, over the years, many housing estates were developed by both the Public and Private sectors or a partnership of both in Nigeria. In addition to that, such housing estate developments were insufficient in terms of demands; do not reflect end-users requirements; in most cases, affordable but not qualitative; affected by insufficient electricity (power) and water supply for residential consumption etc. [31]. Some reasons may be ad-

duced on why buildings perform poorly in meeting users' needs and expectations. The major among them is the lack of adequate knowledge of users' changing needs and preferences by architects and other professionals who design, construct and maintain buildings.

There is a problem between the built environment professionals' design decisions and the building's performance and functionality as perceived by those who use the building in light of the above. Based on those above, there is an inadequate evaluation of housing end-users requirements that will serve as a basis for guiding future housing estate development's design decision to meet the end users' requirements.

LITERATURE

Public housing is a form of housing provision that relies on public funds in providing housing to citizens. Due to the intricate nature and diversity of stakeholders involved in public housing provision, a considerable quantum of research efforts has been directed to various aspects of public housing. These include public housing policy, the institutional framework for providing and managing public housing, public housing finance, public housing schemes and their outcomes. This section of the thesis examines the different perspectives public housing has been studied to identify specific aspects the current study is focusing on and situating it within the context of an existing body of knowledge on the subject matter.

One of the significant issues currently engaging the attention of administrators, scholars, and practitioners in public housing across the globe is the different housing policy frameworks or systems and their outcomes in public housing provisions. Public housing policy, in this context, relates to comprehensive statements of intentions, ideas, strategies, guiding principles and philosophies put forward by government and international organisations to address housing challenges [23]. According to [33], housing policy is a set of minimum standards and core policy guidelines in housing delivery that ensure that critical bottlenecks are addressed and basic needs are met. The above definitions suggest that public housing policy consists of decisions and action plans for implementing public housing programmes to achieve set goals in the community.

Authors [8] identified three basic housing policy systems within the global context. These are liberal, corporatist and social democratic policy systems. In liberal regimes, such as the United Kingdom and Ireland, housing provision is controlled by the market, with the government providing subsidies to stimulate demand rather than supply. In contrast, in the corporatist system (e. g. Germany, Austria, Switzerland) government acts as an enabler rather than a provider. Still, it may act as a provider where households' capacity to address housing challenges is inadequate [8]. This is opposed to the social-democratic system such as in Sweden, where State intervention in housing promotes equity.

Based on these different public housing policy systems identified above, several studies [7, 12, 24, 33] examined what constitutes appropriate public housing policy and trends in the evolution of public housing policy. These studies' findings show no panacea for housing policy formulation, nor any globally accepted housing policy that best addresses local and national needs and conditions. Authors [33] notably suggested that appropriate housing policy should simultaneously address supply constraints (by getting more land, cheap credit and materials into the markets), increase effective demand (by granting secure claims and boosting employment and income-generating activities), and ensures that interaction of supply and demand is not disadvantageous to any groups or lead to a high cost of housing. Moreover, the consensus is that appropriate housing policy should provide a practical framework for continuous decision making and a platform for maximising options available to all socioeconomic groups in meeting their housing needs without discrimination. On trends in the evolution of public housing policy, the author [12] noted that top-down strategies had given way to market and people-centred solutions, processes, and approaches, emphasising institutional capacity building. Authors [33] identified three major phases in the evolution of global housing policy since the 1960s to include:

Phase 1: Large scale public sector investment in mass housing production (e.g. direct construction of houses for the poor).

Phase 2: Aided self-help housing, e. g. upgrading, site-and-services and core housing

Phase 3: The enabling approach, which is the current global housing policy thrust, emphasising

the contributions of all stakeholders in collaboration on housing provision.

Another perspective public housing has been studied is assessing the institutional framework for public housing provision and management. In this study's context, the institutional framework consists of a system of interacting and interdependent organisations designed by people for productive collaboration within established norms, rules and constitutions [21]. In formulating relevant policies, efficiently implementing and monitoring them, the institutional framework has been identified as one of the vital components in public housing provision [33]. Author [6] noted that in three of the five different perspectives performance of the public housing sector can be examined by looking at housing producers, housing finance institutions, and governments who constitute critical institutions in the housing process. For this reason, the formation, structure, sustenance of formal and informal institutions, their role as actors and intermediaries in public housing, and the consequences their interactions generate in diverse settings have continued to engage the attention of scholars in housing studies. Consequently, some studies [1, 11, 27] had examined the institutional framework in public housing production and management in Developing Countries. These studies found that increasing housing challenges in many Developing Countries has a solid link to the inappropriate institutional framework.

Housing infrastructural provision refers to bringing into existence the basic amenities and services needed for a particular activity or pursuit. However, no nation can boast of significant development or an enhanced economy without providing the basic infrastructures for the citizens' well-being. The provision of adequate infrastructural facilities is not taken for granted in developed countries; however, it remains a significant challenge in developing countries, especially in Sub-Saharan Africa. The problem of housing has become an everyday discussion in all quarters of Africa's developing countries' public and private services [32].

It has become increasingly glaring that most urban populations live in a dehumanising housing environment while those who have access to average housing do so at an abnormal cost. Several authors have ascribed different definitions of the word infrastructure. Infrastructure is the basic physical and organisational structures needed

for society's operation like industries, buildings, roads, bridges, health services, governance, etc. It is the enterprise or the products, services, and facilities necessary for an economy to function [22]. Infrastructures can generally be described as interconnected structural elements that provide a framework supporting an entire development structure. It is an essential term for judging a country, region, state, and individual's developments/status. The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, national electrical grids, telecommunications, and so forth. It can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions" [14]. Authors [5] argued that infrastructure helps individuals cope with the different dimensions of poverty. It follows, therefore, that whenever people are deprived of basic infrastructures, the result is impoverishment.

A house is an evolutionary product of man's civilisation and a perfect reflection of the social system that creates it. Succinctly put, it is an externally expressed three-dimensional geometric structure, physically projected on the geographic space, internally organised and subdivided into differentiated but highly inter-related and communicating functional space [4]. A house, as explained, can also be seen as a dwelling place for human habitation, whether a crude hut or an elaborate mansion. The degree of intrinsic architectural interest, a house, provides shelter and acts as a focal point for day-to-day living [3]. The physical characteristics depend on the climate and terrain available, building materials, technological skills, and cultural determinants as the owners' social status and economic resources. A house is more than just a dwelling. It is a source of identity and status and a demonstrator or both to the outside world. It may become identified with assembly for a more comprehensive family or lineage that occupies it daily. It may also be a location for a business that provides the necessities of life or for one that augments the primary income [3].

Housing, on the other hand, as explained earlier, is a decisive integral of spatial formation, balanced development, and ecological unit. It is one of the most critical needs in man's life. Housing which used to be regarded as mere shelter, is now much more than that; thus, in today's parlance, housing is the totality of the house and the

environment in which it is situated and those infrastructural facilities which make a living in the convenient and safe [4].

The universality of the housing problem made the U.N declares the first Monday of October every year as World Habitat Day. On this day, it is expected that everyone reflects on the housing problems all over the world. It ponders over possible ways of solving these problems to housing the homeless and ensure healthy and decent housing for those living in substandard places. It has different meanings for different cultures, groups, and individuals. Author [29] sees housing as a strategic asset to man, irrespective of his/her socioeconomic status, colour, or creed. As such, there lies a passion and emotional attachment to housing in a traditional African setting. Nevertheless, despite the number of housing programmes and policies, Nigeria's housing production level is still at its lowest ebb.

Housing, therefore, is a fundamental product of every human effort irrespective of his or her financial standing. Provision of shelter is that passive and primary function of housing while its secondary function is creating an environment that is best suited to the way of life of a people; in other words, a social unit of space. Housing symbolises the family's social status to both the wider community and the nuclear family setting. Simultaneously, the quality and quantity of housing stock is a reliable barometer of measuring any nation's technology, culture, and civilisation level. It contributes to the general well-being of a people, race or community [13]. When we use the word quality in this study, its usage is on a broad base, encompassing various meanings defined by researchers in almost all fields. A house's quality determines the reference as home if it performs some fundamental function for the residents. A house with all its necessary physical attributes must have a rich set of evolving cultural, demographic and psychological meanings attached to it to be called a home.

The following attributes [19] have been identified as relevant dimensions of a house to transform into a home: order, haven, identity, warmth, connectedness, and physical suitability, as further expatriated below.

1. A home helps to know our place in the world. It is a centre from which we venture and return; it is one way to order our world's existence. This ordering is not only spatial but temporal. Home is strongly related to our sense of continuity.

2. A home is a haven that surrounds us with privacy, security, refuge, and protection from the slings and arrows of life outside it.

3. A home is central to our identity. As social creatures, the home includes for us a sense of family or kinship, ethnic belonging, and socio-economic status. Home is thus an essential part of who we are. Through self-expression and personalisation, the home comes to resemble or represent ourselves. We give the physical structure as we transform it from a mere residence into a home.

4. There is warmth in a home. It grows out of the preceding qualities but goes beyond them. The warmth is like that of a hearth but is symbolic and interpersonal.

5. Home means connectivity because the spatial and temporal order pattern helps us feel connected to certain people, the place, the past, and the future. We feel part of a family or group and part of a culture.

6. Home is physically suitable. This means more than the material physical aspects of the house. It means the form and structures of the house match our social and psychological needs.

The absence of the above components in a house will lead to diverse behavioural responses, including transformation through adaptive changes, to reach satisfaction with the dwelling.

METHODOLOGY

The study adopted exploratory and descriptive design because it will use objective methods to uncover its background and problems. The study approach considered most appropriate for this study is quantitative as numerical data will be collected and analysed. A survey research strategy that uses a questionnaire as an instrument of data collection was adopted in this research. This study evaluates, or explores, features and attributes that may improve future housing developments of end-users housing requirements. Therefore, the study will focus on the POE of Tumfure Housing Estate of 500 units of mix 2- and 3-bedroom semi-detached bungalow and one-bedroom blocks of flat. The housing Estate is located along Gombe – Bauchi between Tumfure and Lafiyawo settlement at about 5 km from Gombe City Centre. The site covers an area of 20.72 hectares. The POE will be based on the perspective of the residents of 'Tumfure' housing estate.

RESULTS AND DISCUSSION

Descriptive statistics based on the mean ranking was carried out to explore the facilities that end-users required most in Tumfure housing estate, Gombe State, Nigeria. The results in Table 1 showed the ranking, mean and standard deviation for each Item.

Table 1 – End-Users Housing Requirements

Housing requirements	Mean	Std. Deviation	Rank
Flow of natural ventilation & illumination	3.0357	0.8517	1st
Rooms suitable for the family unit	2.8705	0.8150	2nd
Modern convenience (toilet & bathroom)	2.8143	0.9023	3rd
Circulation space (courtyard, veranda, etc.)	2.6857	0.9677	4th
Adequate security (doors & windows)	2.4571	0.8845	5th
Estate perimeters	2.4143	0.8975	6th
Ceiling covering that meets thermal requirements	2.4071	0.8388	7th
Ease of communication within a building	2.4000	0.8293	8th
Adequate house functional units	2.3857	0.9250	9th
Internal/external aesthetics	2.3643	0.7976	10th
Garage/car park	2.0929	0.9127	11th
Adequate road network	2.0714	0.7924	12th
Water & storage facility	2.0429	0.8290	13th
Public power supply with a modern metering system	1.7929	0.7247	14th
Adequate waste management	1.7643	0.8277	15th
Landscape in an entire housing estate	1.7500	0.6361	16th
Recreational facilities	1.5714	0.6586	17th
Households shopping facilities	1.4071	0.5730	18th
Health care facilities	1.4000	0.5852	19th
Automated teller machine (ATM)	1.0929	0.3960	20th

Table 1 shows the end-users housing requirements in the Tumfure housing estate. It shows that the housing elements the required most, based on the five-point measurement scale, are

flow of natural ventilation and illumination, rooms suitable for the family unit, modern convenience, circulation spaces and adequate security with mean values of 3.0357, 2.8705, 2.8143, 2.6857 and 2.4571 ranked 1st to 5th respectively. The least required housing elements were automated teller machine, health care facilities, shopping facilities and landscaping with mean values of 1.0929, 1.4, 1.4071, 1.5714 and 1.75 and ranked 20th, 19th, 18th, 17th, and 16th, respectively in order of preference. Estate perimeters, ceiling covering that meets thermal requirements, ease of communication within the building, adequate house functional units, internal/external aesthetics, garage/park, good road network, and water and storage facilities, public power supply with modern metering system and adequate waste management were ranked 6th to 15th housing requirements by end-users in order of preference. Generally, end-users level of housing elements requirements was average, as indicated by 2.14 mean values.

However, information on end-users housing requirements was solicited from the respondents using a Likert scaled questionnaire. Respondents were asked to score their level of requirement of the housing elements variables on the Likert scale rating from 1–5 from very low to very high. The research outcome shows that the end-users housing elements required most, based on a five-point measurement scale, are flow of natural ventilation and illumination, rooms suitable for the family unit, modern convenience, circulation spaces, and adequate security ranked 1st to 5th, respectively. This result contradicts the results of [14] in their studies. The most substantial reason may be due to differences in the locations and periods of the researches. However, it is in agreement with that of [17].

Estate perimeters, ceiling covering that meets thermal requirements, ease of communication within the building, adequate house functional units, internal/external aesthetics, garage/park, good road network, and water and storage facilities, public power supply with modern metering system and adequate waste management were ranked 6th to 15th housing requirements by end-users in order of preference. This result is in line with [17, 25, 28, 29]. However, research conducted by [14] does not consider internal/external aesthetics as end-users housing requirement. The difference may be due to differences in geographical locations and the research context.

However, the least required housing elements were automated teller machine, health care facilities, shopping facilities and landscaping and ranked 20th, 19th, 18th, 17th, and 16th, respectively, in order of preference. These are environmental and neighbourhood amenities that make the estate functional. This may be contrary to the suggestions of [20] that public estate requires a basis of public infrastructure. This result shows that Tumfure housing estate end users are more concerned with house elements than neighbourhood amenities and services.

Therefore, a questionnaire was sent to potential respondents to reveal their opinions. The ten most essential housing requirements of end-users in Tumfure housing estate were confirmed based on their average mean values.

The flow of natural ventilation and illumination, rooms suitable for the family unit, modern convenience, circulation spaces and adequate security ranked first to fifth. Estate perimeters, ceiling covering that meets thermal requirements, ease of communication within the building, adequate house functional units, internal/external aesthetics, garage/park, good road network, and water and storage facilities, public power supply with modern metering system and adequate waste management were ranked six to fifteen housing requirements by end-users in order of preference. However, the least required housing elements were automated teller machine, health care facilities, shopping facilities and landscaping and ranked twenty, nineteen, eighteen, seventeenth, and sixteenth, respectively, in order of preference. These are environmental and neighbourhood amenities that make the estate functional.

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CONCLUSION

This research examined the end-users housing requirement in Tumfure housing estate Gombe to suggest ways of improving end-users housing satisfaction.

The research found that end-users basic housing requirements in the Tumfure housing estate were the flow of natural ventilation and illumination, rooms suitable for the family unit, modern convenience, circulation spaces, and adequate security.

This is followed by Estate perimeters, ceiling covering that meets thermal requirements, ease of communication within the building, adequate house functional units, internal/external aesthetics, garage/park, good road network, and water and storage facilities, public power supply with modern metering system and adequate waste management. The least required housing elements were automated teller machine, health care facilities, shopping facilities and landscaping.

The study recommended that developers of the public estate emphasise the flow of natural ventilation and illumination, rooms suitable for the family unit, modern convenience, circulation spaces, and adequate security to meet the housing estates' end-users requirements.

Similarly, emphasis should also be given to Estate perimeters, ceiling covering that meets thermal requirements, ease of communication within the building, adequate house functional units, internal/external aesthetics, garage/park, good road network, and water and storage facilities, public power supply with modern metering system and adequate waste management.

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Моніторинг економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельних підприємств

Monitoring the Economic Efficiency of Implementation of the System-Functional Approach in the Management of Innovative Development of Construction Enterprises

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Анотація. Мета статті полягає у розробленні рекомендацій із удосконалення механізму моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельних підприємств.

Під час дослідження застосовано: морфологічний аналіз – для структурування об'єкта дослідження; моделі та методи системного аналізу, інструментарій формування топологічних просторів і аксіоматику теорії множин – для пояснення логіки моніторингу об'єкта; рівняння Баєса – для оцінювання ймовірностей настання альтернативних подій.

У результаті виконаного дослідження морфологічно-структуровано об'єкт моніторингу, представлено топології для аналізу стану об'єкта моніторингу, а також побудовано рівняння для оцінювання ймовірностей настання альтернативних подій, які характеризують зміни в об'єкті моніторингу.

Наукова новизна виконаного дослідження полягає в удосконаленні механізму моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельних підприємств, який, на відміну від існуючих, базується на інструментарії морфологічного аналізу, ідентифікуванні топологічно-метричних просторів, побудові і розв'язанні системи рівнянь Баєса.

Практична цінність результатів дослідження полягає у розробленні методичного інструментарію із управління інноваційним розвитком будівельних підприємств на засадах системно-функціонального підходу, зокрема – в частині удосконалення механізму моніторингу. Авторські пропозиції можуть бути використані в практичній діяльності підприємницьких структур (будівельних підприємств) усіх форм власності.

Ключові слова: будівельне підприємство; моніторинг; інноваційна політика; факторні показники; результуючі показники; інноваційний розвиток; системно-функціональний підхід.

Abstract. The article aims to develop recommendations for improving the mechanism of monitoring the economic efficiency of implementing the system-functional approach in the management of innovative development of construction enterprises.

During the research, there was used morphological analysis – to structure the object of study, models and methods of system analysis, tools for forming topological spaces and axiomatics of set theory – to explain object monitoring's logic Bayesian equation – estimate the probability of alternative events.

As a result of the study, the object of monitoring is morphologically structured, topologies for analysis of the state of the object of monitoring are presented, and equations for estimating the probability of alternative events that characterize changes in the object of monitoring are constructed.

The scientific novelty of the study lies in improving the mechanism for monitoring the economic efficiency of the system-functional approach in the management of innovative development of construction enterprises, which, unlike the existing ones, is based on morphological analysis tools, identification of topological and metric spaces, construction and solution of Bayes' equations.

The practical value of the research results lies in developing methodological tools for managing the innovative development of construction companies based on a system-functional approach, particularly in terms of improving the monitoring mechanism. The author's proposals can be used in practical business structures (construction companies) of all forms of ownership.

Keywords: construction company; monitoring; innovation policy; factor indicators; the resulting indicators; innovative development; system-functional approach.

ВСТУП

Як відомо, під час здійснення моніторингу економічної ефективності за допомогою системно-функціонального підходу в управлінні інноваційним розвитком будівельного підприємства необхідно враховувати усі ризики, які пов'язані із впливом досліджуваних показників на економічну діяльність підприємства. Науковою основою для проведення моніторингу економічної ефективності запровадження інновацій є сукупність методів, підходів та прийомів. Здійснення моніторингу економічної ефективності запроваджених інновацій на будівельному підприємстві є досить затратною процедурою, оскільки при використанні різних підходів застосовуються також різні критерії та показники. Також можна з упевненістю стверджувати, що дослідження ефективності залучення інноваційних процесів з використанням якогось одного підходу чи показника є недостатнім (з точки зору системності і корисності його проведення), тому менеджерам в управлінні діяльністю підприємства потрібно використовувати моніторинг для дослідження декількох показників, щоб отримати ґрунтовні прогнози [1, 2, 3].

Для достовірності проведення моніторингу економічної ефективності в управлінні інноваційним розвитком потрібно правильно вибрати систему досліджуваних показників,

оскільки від правильності обраних показників залежатиме обраний комплекс управлінських заходів. Результати досліджень [4, 5, 6, 7, 8, 9] доводять, що кількість показників, які потрібно використовувати під час моніторингу не має бути надмірною, оскільки деякі недоліки та неточності можуть прикритися загальним успіхом кінцевого результату, а це, у свою чергу, може призвести до упущення дуже важливих моментів у кінцевому підсумку при прийнятті правильного і виваженого управлінського рішення.

Метою статті є представити теоретичні і практичні аспекти удосконалення механізму моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельних підприємств.

РЕЗУЛЬТАТИ ДОСЛІДЖЕННЯ

Ідентифікування та аналізування причинно-наслідкових зв'язків є найбільш доречним на основі застосування морфологічного аналізу. У праці [4] зазначено, що "... параметри системи управління ... підприємством утворюють певні топологічні і метричні простори, в межах яких можна локалізувати фактори, які впливають на кількісні і якісні характеристики систем управління. Морфологічна декомпозиція ідентифікованих факторів забезпечує

відслідковування причинно-наслідкових зв'язків між ознаками параметрів систем управління. Ситнезування результатів морфологічного аналізу шляхом застосування методу «чорної скрині» як інструментарію інформаційно-потокowego підходу в сучасному менеджменті є інструментарієм для виокремлення резервів підвищення ефективності управління підприємством...» [4]. Морфологічний аналіз починається з певного (конкретного) рівня знань про певний (окремий) об'єкт, що досліджується. Застосування морфологічного методу ставить перед експертами (фахівцями, спеціалістами) задачу про те, що сьогодні потрібно відмовитися від звичних (типових) стереотипів мислення і максимально використати свою ерудицію і знання для генерування нових (сучасних) оригінальних ідей, якщо навіть вони (подані ідеї) на перший погляд і парадоксальні. При побудові морфологічного ящика мета не повинна обов'язково зводитися тільки до певного знаходження окремих поточних рішень. В результаті поглибленого морфологічного аналізу можна прийти до нових (сучасних) ідей щодо можливих (перспективних) рішень, а

звідси – до принципово нових напрямків (шляхів) удосконалення управління конкретними об'єктами або технічних рішень [10].

Фахівець Н. Нагорнюк [6] серед основних етапів застосування методу морфологічного аналізу виділяє такі: "... з'ясується мета завдання – пошук варіантів функціональних схем, або принципів дії, або структурних схем, конструктивних різновидів розроблюваної системи. ... 2. Виділяють вузлові точки ..., які характеризують розроблювану систему з позиції раніше сформульованої мети. Це можуть бути приватні функції підсистем, принципи їх роботи, їх форма, розташування, характеристики та властивості..." [3].

Розглянемо інструментарій цього виду аналізу у якості аналітико-інформаційної та методичної основи моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельного підприємства (на прикладі української будівельної компанії (БК) "Лев Девелопмент") (рисунок 1).

Рівні	Вектори		
	Інтегральний	Локальний	Факторний
Підприємство (X)	P_x	$P_x \supset (a_1, a_2, \dots, a_n)$	$a_1 = f(i_1, \dots, i_n);$ $a_2 = f(j_1, \dots, j_n);$
Підрозділ (Y)	P_y	$P_y \supset (b_1, b_2, \dots, b_n)$	$b_1 = f(k_1, \dots, k_n);$ $b_2 = f(l_1, \dots, l_n);$
Працівник (Z)	P_z	$P_z \supset (c_1, c_2, \dots, c_n)$	$c_1 = f(q_1, \dots, q_n);$ $c_2 = f(p_1, \dots, p_n);$

Рисунок 1 – Параметризовані морфологічні рівні і вектори моніторингу [3]

Примітка: Стрілками показано напрямки морфологічного аналізу.

Умовні позначення: P_x – інтегральні економічні показники, які характеризують розвиток будівельного підприємства (валовий дохід, прибуток, рентабельність власного капіталу тощо); P_y – локальні економічні показники, які характеризують розвиток окремих видів діяльності розвитку будівельного підприємства (валовий дохід від реалізації інноваційної продукції, надання послуг, виконання робіт; прибуток від реалізації інноваційної продукції, надання послуг, виконання робіт тощо); P_z – обсяг витрат коштів на інноваційну діяльність, обсяг витрат часу на розробку інноваційних технологій у будівництві, обсяг витрат на залучення фахівців, консультантів, менеджерів для освоєння і впровадження інновацій на умовах аутсорсингу тощо.

Як видно з рисунку 1, системно-функціональний підхід в управлінні інноваційним розвитком будівельних підприємств зобов'язує дотримуватись під час проведення моніторингу декомпозиції та полівекторності. Тому, нами виділено 3-и морфологічні рівні (рівень підприємства, рівень підрозділу, рівень окремих працівників) і 3-и вектори моніторингу (інтегральний, локальний та факторний). Це дозволяє будувати каузальні морфологічні граfi і максимально точно ідентифікувати резерви покращання результативних показників.

На рівні будівельного підприємства у якості інтегрального показника інноваційного розвитку можна розглядати, для прикладу, частку інноваційних технологій у загальній кількості технологій, які використовує підприємство або приріст цієї частки. Цей інтегральний вектор, з одного боку, є відображенням інновацій, над створенням яких працювали конкретні підрозділи підприємства (робочі групи, відділи тощо) і окремі працівники, а, з іншого боку, є відображенням конкретних інноваційних розробок, які, у сукупності, власне і є інновацією. Для поглиблення аналізу можливостей покращання значення інтегрального показника необхідним є ідентифікування і ретельний аналіз факторів, які мали вплив на значення як інтегрального, так і локальних показників. У нашому випадку, такими факторами можуть бути такі, як [3, 11, 12, 13]: 1) обсяг витрат коштів на роботу інженерів-технологів, які створювали інноваційну технологію; 2) обсяг витрат коштів на проведення необхідних експертиз; 3) обсяг витрат часу на створення і впровадження інноваційної технології; 4) рівень автоматизації застосування технології; 5) наявність на підприємстві достатньої кількості кваліфікованих кадрів, які здатні застосовувати розроблену інноваційну технологію; 6) співмірність витрат на застосування інноваційної технології та економічного ефекту від неї тощо.

На рис. 2–4 представлено морфологічні граfi для 3-ох рівнів декомпозиції – X, Y, Z. У побудованих морфологічних графах можна простежити виникнення топології інтегральних показників на локальні. При цьому бачимо, що інтегральні показники фактично є над множинами, які включають в себе множину локальних і факторних показників. У даному випадку має місце перетин над множинами із

множинами факторних показників на локальному рівні.

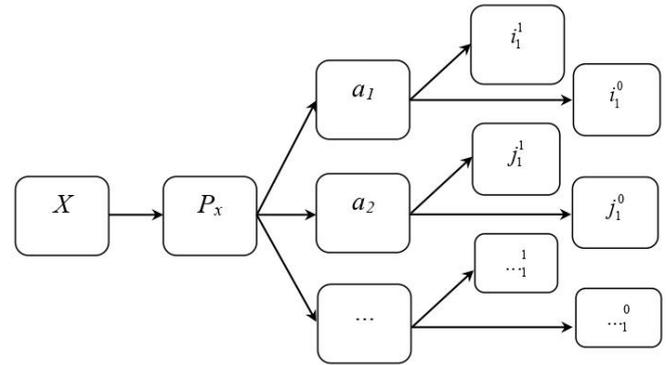


Рисунок 2 – Морфологічний граф для моніторингу БК “Лев Девелопмент” стосовно рівня X

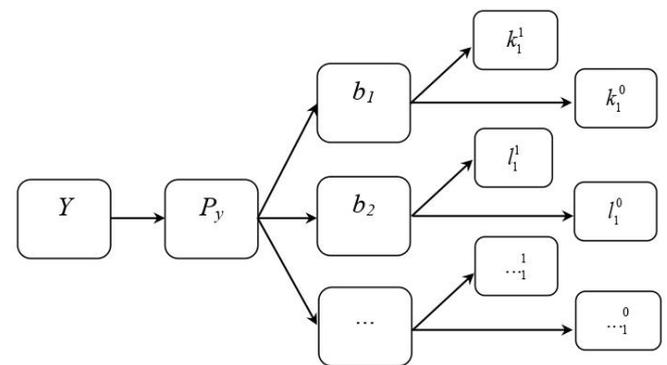


Рисунок 3 – Морфологічний граф для моніторингу БК “Лев Девелопмент” стосовно рівня Y

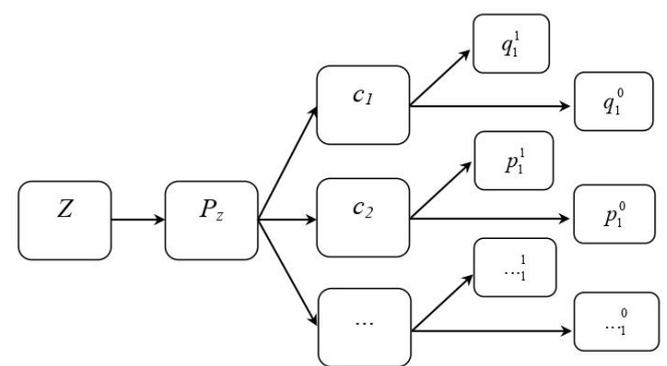


Рисунок 4 – Морфологічний граф для моніторингу БК “Лев Девелопмент” стосовно рівня Z

Саме цей факт вказує на каузальність процесу моніторингу, що відбувається на основі морфологічного аналізу. Таким чином, у даному випадку, утворилось 3-и топології (Λ_1 , Λ_2 і Λ_3) – формули (1):

$$X \supset P_x \equiv \Lambda_1;$$

$$P_x \times \begin{cases} (i_1 \dots i_n) \\ (j_1 \dots j_n) \end{cases} = \begin{cases} a_1 | a_1 \in P_x \wedge a_1 \in (i_1 \dots i_n); \\ a_2 | a_2 \in P_x \wedge a_2 \in (j_1 \dots j_n); \\ \dots \dots \end{cases}$$

$$Y \supset P_y \equiv \Lambda_2;$$

$$P_y \times \begin{cases} (k_1 \dots k_n) \\ (l_1 \dots l_n) \end{cases} = \begin{cases} b_1 | b_1 \in P_y \wedge b_1 \in (k_1 \dots k_n); \\ b_2 | b_2 \in P_y \wedge b_2 \in (l_1 \dots l_n); \\ \dots \dots \end{cases} \quad (1)$$

$$Z \supset P_z \equiv \Lambda_3;$$

$$P_z \times \begin{cases} (q_1 \dots q_n) \\ (p_1 \dots p_n) \end{cases} = \begin{cases} c_1 | c_1 \in P_z \wedge c_1 \in (q_1 \dots q_n); \\ c_2 | c_2 \in P_z \wedge c_2 \in (p_1 \dots p_n); \\ \dots \dots \end{cases}$$

Оскільки йдеться про топології, то доцільним є побудувати матричні простори показників, які характеризують економічну ефективність застосування системно-функціонального підходу в управлінні інноваційним розвитком БК "Лев Девелопмент". Ці простори рекомендується побудувати у вигляді куль, які у формалізованому вигляді необхідно описати такими математичними виразами (2):

$$\begin{aligned} i_1^1 &\Leftrightarrow r; \\ a_1 \wedge i_1^1 &\equiv i_1^0 \in \alpha | d(i_1^1, i_1^0) < i_1^1, \end{aligned} \quad (2)$$

де r – радіус куль;

d – відстань між елементами множини.

На етапі прийняття рішень необхідно є побудова матриці взаємної узгодженості для виявлення ймовірності появи пар альтернатив розв'язання виявленої проблеми чи вставленої цілі. Як наслідок, отримується аргумент на користь вибору того чи іншого сценарію досягнення очікуваного значення інтегрального показника. Приклад такої матриці наведено на рисунку 5.

У даному випадку: "1" вказує на те, що конкретна альтернативи є синглетоном, тобто не приводить до появи якоїсь іншої альтернативи; "-1" означає неможливість появи певної події; "0" – поява тієї чи іншої альтернативи є незалежним; "0,5" вказує на те, що конкретна альтернативи хоча і є синглетоном, але може стати причиною появи якоїсь іншої альтер-

нативи, або відмінити її, якщо значення мінусове.

		Сценарій 1			Сценарій 2		
		$w_1^{(1)}$	$w_2^{(1)}$	$w_3^{(1)}$	$w_1^{(2)}$	$w_2^{(2)}$	$w_3^{(2)}$
Сценарій 2	$w_1^{(2)}$		0,5				
	$w_2^{(2)}$						
	$w_3^{(2)}$						
Сценарій 3	$w_1^{(3)}$		-1	-1			
	$w_2^{(3)}$					-0,5	
	$w_3^{(3)}$						0,5

Рисунок 5 – Матриця взаємної узгодженості для виявлення ймовірності появи пар альтернатив розв'язання виявленої проблеми чи вставленої цілі

Примітка: w – альтернативи, нижній індекс – порядковий номер альтернативи, верхній індекс вказує на пониженість події конкретного сценарію.

За допомогою рівнянь Баєса встановлюється відповідність між шансами альтернативних подій проти події до та після обумовлення іншою подією. Шанси до події є просто відношенням ймовірностей цих 2-х подій. Априорні шанси є відношенням безумовних або априорних ймовірностей, а апостеріорні шанси є відношенням умовних або апостеріорних ймовірностей за умови події. Це правило просто стверджує: апостеріорні шанси дорівнюють добуткові априорних шансів на коефіцієнт Баєса, необхідним є перерахувати ймовірності альтернатив. Система рівнянь матиме такий вигляд – формула (3):

$$\begin{cases} P(w_1^{(1)}) = P(w_1^{(1)} | w_1^{(2)}) \cdot P(w_1^{(2)}) + P(w_1^{(1)} | w_2^{(2)}) \cdot P(w_2^{(2)}); \\ P(w_2^{(1)}) = P(w_2^{(1)} | w_1^{(2)}) \cdot P(w_1^{(2)}) + P(w_2^{(1)} | w_2^{(2)}) \cdot P(w_2^{(2)}); \\ P(w_1^{(2)}) = P(w_1^{(2)} | w_1^{(1)}) \cdot P(w_1^{(1)}) + P(w_1^{(2)} | w_2^{(1)}) \cdot P(w_2^{(1)}); \\ P(w_2^{(2)}) = P(w_2^{(2)} | w_1^{(1)}) \cdot P(w_1^{(1)}) + P(w_2^{(2)} | w_2^{(1)}) \cdot P(w_2^{(1)}); \\ P(w_1^{(1)}) + P(w_2^{(1)}) = 1; \\ P(w_1^{(2)}) + P(w_2^{(2)}) = 1, \end{cases} \quad (3)$$

де $P(w_n^{(m)})$ – ймовірність настання альтернативи n сценарію m ;

$P(w_n^{(m)} | w_{n'}^{(m')})$ – умовна ймовірність настання альтернативи n сценарію m за умови, що сценарій m' набув значення n' .

I. Савченко зазначає "... для кожного параметра одне з рівнянь є надлишковим. Після виключення цих рівнянь кількість рівнянь і змінних збігатиметься. Наведена система рівнянь є нелінійною, найефективнішими для її розв'язання є ітераційні методи, оскільки система легко зводиться до необхідного вигляду, і початкові наближення є достатньо близькими до розв'язку. Розв'язавши систему, отримуємо морфологічну таблицю, що містить імовірності вибору альтернатив з урахуванням взаємозв'язків між параметрами морфологічної таблиці. Ці значення можуть бути використані для визначення найбільш важливих станів параметрів об'єкта, що розглядається, ранжування цих станів за ймовірністю виникнення, вибору найбільш імовірних конфігурацій..." [7].

Н. Панкратова та I. Савченко пропонують умовну ймовірність визначати за допомогою матриці взаємної узгодженості із урахуванням виконання таких умов – формула (4):

$$P(P_{nm} | P_{n'm'}) = \begin{cases} 0, & w_{nm,n'm'} = -1; \\ w_{nm}, & w_{nm,n'm'} = 0; \\ 1, & w_{nm,n'm'} = 1, \end{cases} \quad (4)$$

де P_{nm} – оцінена незалежна ймовірність появи альтернативи n сценарію m ;

$w_{nm,n'm'}$ – значення в матриці (див. рис. 5) для альтернативи n сценарію m і альтернативи n' сценарію m' [8].

В контексті вирішуваної проблеми доцільно підтримати думку В. Решетило і Ю. Федотової, які стверджують, що: "... сучасна теорія прийняття рішень використовує математичний апарат для вибору найкращої з відомих альтернатив для особи, що приймає рішення. Прийняття рішень в умовах ризику та невизначеності не є тотожним. Так, в умовах ризику розраховується його інтегральний пока-

зник, а в умовах невизначеності суб'єкт керується своєю ризиковою перевагою..." [9].

Звідси очевидно, а також враховуючи інформацію у працях [14, 15, 16, 17], що системно-функціональний підхід в управлінні інноваційним розвитком будівельних підприємств зобов'язує до того, щоб регулювання ефективності застосування цього підходу мало ознаки як системності, так і функціональності.

ВИСНОВКИ

Проведення моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельного підприємства є важливим аспектом фінансово-господарського розвитку. Успішне функціонування будь-якого будівельного підприємства залежить від вдалого запровадження інновацій. Проведений аналіз методичних підходів, за якими проводиться моніторинг економічної ефективності від запровадження інноваційного розвитку підприємства, має бути чітко розроблений і проаналізований в залежності від фінансово-господарського стану будівельного підприємства. Оскільки від достовірності проведення моніторингу залежить повна характеристика економічного стану та можливість спрогнозувати її зміни, то необхідно розробити прогнози для уникнення кризових явищ або економічних загроз.

На основі використання інструментарію морфологічного аналізу, ідентифікування топологічно-метричних просторів, побудови і розв'язання системи рівнянь Бееса аргументовано, що удосконалений механізм моніторингу економічної ефективності застосування системно-функціонального підходу в управлінні інноваційним розвитком будівельних підприємств доцільно застосовувати під час реалізації функції контролювання ходу виконання інноваційних проектів, що є передумовою прийняття регулювальних рішень.

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