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Dedication

It is our pleasure and great privilege to present the fifty-third issue of the Academic Journal of Research and Scientific Publishing to all researchers and doctors who published their research in the issue, and we thanks and appreciate to all contributors and supporters of the academic journal and those involved in the production of this scientific knowledge edifice.

Academic Journal of Research and Scientific Publishing

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COVID-19 and the Digital Transformation that Followed in the Kingdom of Saudi Arabia

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Abstract

This study examines the impact of the COVID-19 pandemic on the digital transformation landscape in the Kingdom of Saudi Arabia. Its main goal is to find out to what extent the pandemic has spurred digital technology adoption.

During the pandemic, Saudi Arabia has seen a rapid transition to digital solutions in various areas such as remote working, online education and e-commerce. And telemedicine. This study examines the factors that contribute to this transition and assesses its long-term consequences.

A quantitative, inductive and explanatory study design was selected for this study to analyze primary data collected from 247 respondents working in official UK organisations, ministries and agencies. Saudi Arabia through a survey questionnaire page. Statistical analysis tools were used to evaluate the conclusions of the results.

Key findings highlight the central role of government investments in digital infrastructure and highlight the challenges of digital literacy and data security. Ultimately, this study acknowledges that the pandemic has acted as a catalyst, reshaping traditional business models and service delivery. To build on this momentum, the recommendations call for sustainable investment in digital infrastructure, increasing digital literacy, and encouraging innovation through collaborative and responsive partnerships. Actively on network security issues.

Keywords: COVID-19, digital transformation, pandemic, technology adoption, remote work, online education, e-commerce, telehealth, digital infrastructure

1. Introduction

Today's world is surviving in a multifaceted, complicated technological evolution that is altering not only the lives of people but also the public, private, and academic realms of life. This technological transformation gives countries the chance to integrate their technologies with the goal of building a future that is more inclusive and centred on people (AbdulRahim and Mabrouk, 2020). The COVID-19 pandemic accelerated the transition of promoting and testing digital infrastructure in the Kingdom of Saudi Arabia, where government, as well as private entities, came together to develop and launch 19 digital applications and platforms to serve the public and provide health care services (Hassounah et al., 2020). The focus of Vision 2030 was to offer support through the development of digital infrastructure by offering high-speed coverage of broadband, strengthening the national digital transformation. This digital transformation facilitated Kingdom of Saudi Arabia in prompt response to COVID-19 pandemic by supporting e-learning within educational sector, telemedicine in the healthcare setting, and e-commerce boom in the retail industries, which was in congruence with the free-of-charge data services provided by the government to ensure seamless delivery during the crisis situation (Hassounah et al., 2020). Nonetheless, the country-wide mitigation measures caused by the COVID-19 measures expedited the smooth transition of the digital integration highlighting standing gaps for the decision-makers.

1.1. Research Problem

The Kingdom of Saudi Arabia now has a greater need for digital transformation than ever before as a result of COVID-19's strict social distance and physical contact regulations. With the launch of Vision 2030, digitization has gained attention; nevertheless, its practical consequences have slowed down as a result of the COVID-19 epidemic, which stopped the nation's economic growth (AbdulRahim and Mabrouk, 2020).

1.2. Research Questions

1. What is the impact of COVID-19 on the digital transformation and transition in Kingdom of Saudi Arabia?
2. How COVID-19 accelerated the digital reliance within the official institutions, ministries, and agencies in Kingdom of Saudi Arabia?

2. Literature Review

Digital Transformation is regarded as the backbone of sustainability, survivability, and competitive edge of the business through efficient utilization, innovation, and operational integration (Fletcher and Griffiths, 2020). McKinsey & Co. (2020) highlighted that a dramatic shift was observed towards digitalization during the COVID-19 due to online channels, which facilitated the businesses to stay afloat while sustaining customer interactions (See Fig.1).

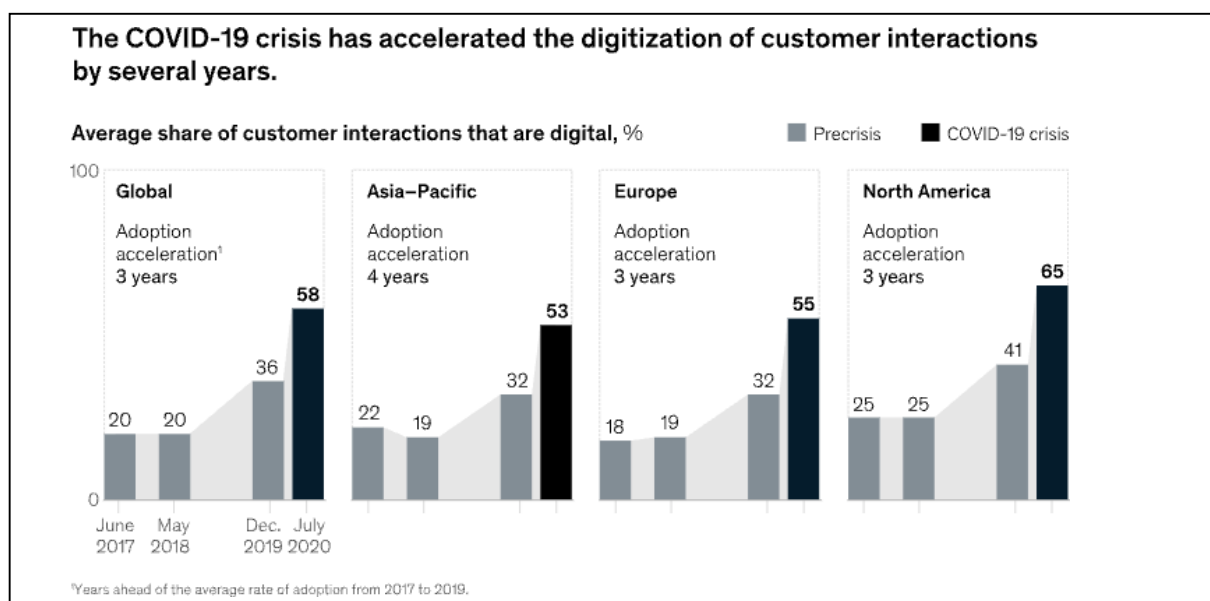


Figure 1: Digitalization during COVID-19 (Source: McKinsey & Co., 2020)

The key driver in this accelerated trend of digital transformation has been the active start-up ecosystem that forced people to use internet services (Lagendorf and Farley, 2021). A survey on digital transformation in Kingdom of Saudi Arabia reported that 42% of the respondents are readily prepared for digital transformation post- COVID-19 in Kingdom of Saudi Arabia (Puri-Mirza, 2021).

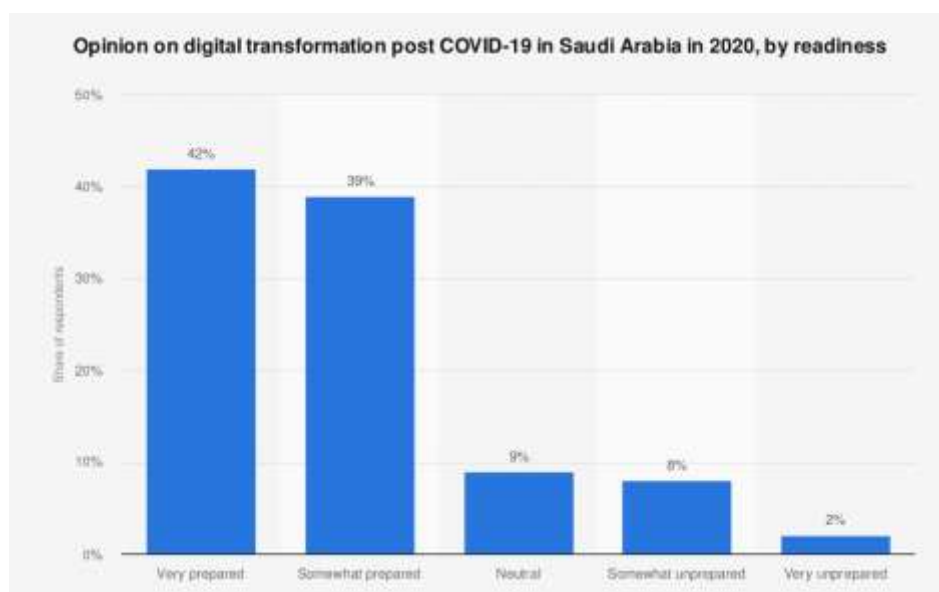


Figure 2: Digital transformation Post COVID-19 in Kingdom of Saudi Arabia (Source: Puri-Mirza, 2021)

Digital Transformation in Kingdom of Saudi Arabia in PostPandemic Scenario

The COVID-19 pandemic is accelerating the digital transformation, which is predicted to have a profound and immediate impact on the worlds of business and society long after the epidemic is over. The Kingdom of Saudi Arabia has been presented with numerous opportunities as a result of the increasing global focus on digital transformation in reaction to the COVID-19 outbreak. In order to enhance its ICT-focused and other broader start-up ecosystems, the nation can foster the digital innovation and start-up ecosystem (Little, 2021). More than 200 billion SAR in opportunity are presented by the digital economy, which should be seized by fully embracing technology.

Digital reliance in Kingdom of Saudi Arabia within official institution, ministries and agencies

The extensive use of technology has the potential to bring about a number of social and economic advantages. As a result of the digital transformation, both small and large businesses may compete globally by selling their goods and services online. The cabinet of ministers has approved the creation of the Digital Government Authority due to the Kingdom of Saudi Arabia's rising reliance on digital technologies. In order to regulate the work on digital government, the authority would collaborate with other authoritative authorities and take part in the development of a national plan for digital government.

The authority will assist government organisations in putting digital services into place and ensuring a seamless transition to new technologies (gov.sa, 2021). In 2018, the Saudi government was successful in increasing the maturity of e-government services to 71%, which is a major improvement from the previous year's 56 percent. The kingdom's national vision 2030 to build a digital government to boost the economy has resulted in creating such a vibrant digital society that has turned the kingdom into a globally competitive ICT hub (Muzafar and Jhanjhi, 2020). The inception of several e-government projects like Saudi portal, Yasser program, Amer and others are a perfect example of implementation of digital technologies at a governmental level.

3. Methodology

3.1. Research Approach

The present research utilised in the current study used inductive reasoning to address the study's aims, and a qualitative approach was also included. A particular phenomenon is studied from a general rather than a specific perspective using an inductive approach (Borgstede and Scholz, 2021).

3.2. Research Design

Followed by the inductive reasoning, explanatory research design has been selected which focuses on analyzing the descriptive information to assess the causal relationship between the variables of the research (Gray, 2013).

3.3. Study Tool

Close-ended questionnaire tool has been developed to collect information with defined responses.

3.4. Data Collection

The data collection procedure was based on reviewing the secondary data using online data sources and primary data collection was also being done using questionnaire.

Relevant to secondary analysis, a questionnaire was developed with defined codes indicating participant's responses against statements, i.e., 1 = Strongly Disagree and 5

= Strongly Agree. The questions were relevant to the integrated digitalization coordination, flexibility, remote working, business models, supply chain, and cost management. In this regard, present questionnaire gathered both qualitative and quantitative data (private companies) for review by analytical method.

3.5. Data Analysis

Data analysis was performed using quantitative methods that utilizes the statistical tools to generate results. More so, these results were presented in graphical form using illustrative tools. In congruence with this, qualitative data was discussed in thematic fashion to comprehend the responses and views of companies collected from secondary sources that discussed information in a way to keep focus of study intact (Nowell et al., 2017).

3.6. Ethical Consideration

Consent was obtained for the content of the questionnaire prior to the start of data collection by research supervisor, taking in consideration the confidentiality of the participants' information and opinions related to the research.

4. Results and findings

This chapter of the research focuses on the interpretation of the research findings in response to assess the impact of Covid-19 on digital transformation and transition in Kingdom of Saudi Arabia, and how digital reliance was accelerated by covid-19.

4.1. Demographic Analysis

The number of participants included in the research is 247. The basic questions regarding gender, age, education level, and their current position at the organization has been specified in the demographic analysis.

Table 1: Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	190	76.9	76.9	76.9
	Female	57	23.1	23.1	100.0
	Total	247	100.0	100.0	

The total number of respondents was 247 of which 76.9% of them were males, and only 23.1% were females. The following graph highlights the gender profile of the participants.

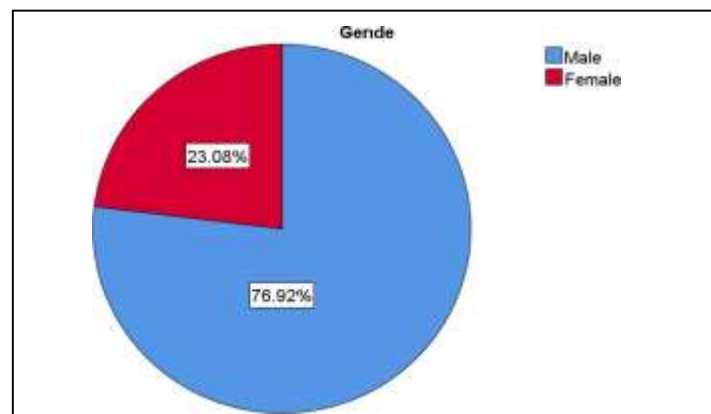


Figure 3: Gender

The next demographic analysis focuses on the age of the respondents which has been signified in Table 2.

Table 2: Age

Age					
		Frequency	Percent	Valid Percent	CumulativePercent
Valid	Less than 25 years old	23	9.3	9.3	9.3
	From 25- less than 45	190	76.9	76.9	86.2
	More than 45	34	13.8	13.8	100.0
	Total	247	100.0	100.0	

It was found that 9.31% of individuals aged less than 25 years, 13.77% aged more than 45 years, whereas the Majority aged between 25 to 45 years. The following graph indicates the ages of the participants.

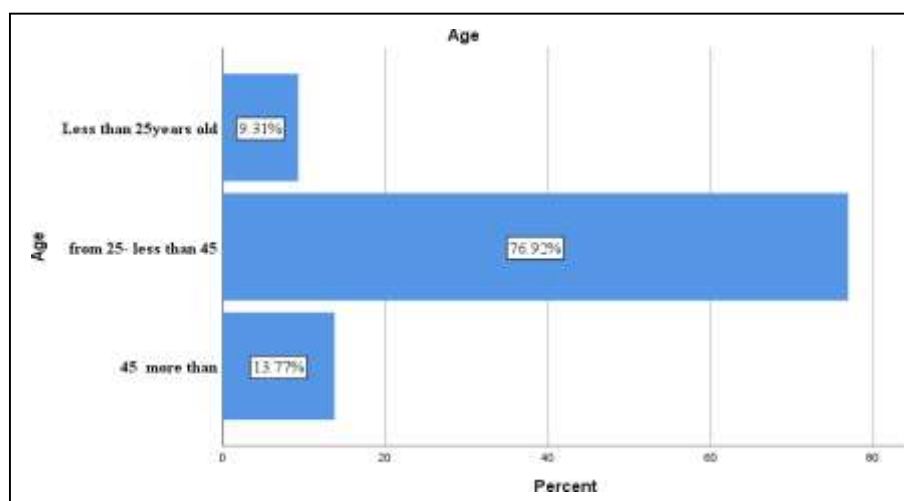


Figure 4: Age

The third variable in the descriptive analysis is the education which is specified in Table 3

Table 3: Education

Educational Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's	146	59.1	59.1	59.1
	Diploma	29	11.7	11.7	70.9
	Postgraduate	72	29.1	29.1	100.0
	Total	247	100.0	100.0	

T-test

The T-test is used to compare the difference between two groups' mean values. In result, such differences are then considered for hypothesis testing. This includes one sample statistics and one sample test. The one-sample statistics calculates the variation of the variables from mean value of the sample, (JMP, 2021). There are two groups of data namely digital reliance and digital transformation. The following results have been obtained indicating the deviation of each sample responses compared to mean value of sample.

Table 4: T-Test

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Digital Reliance	247	4.1454	0.66893	0.04256
Digital Transformation	247	3.9765	0.65447	0.04164

The factors influencing digital reliance had a mean of 4.1454. The factors influencing digital transformation had a mean of 3.97 after running a t-test. The results of both samples indicate that significant deviation is lying within samples mean values. The variation is about 66% in both samples compared to their mean value.

Table 5: One-Sample Test

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Digital Reliance	97.395	246	0.000	4.14541	4.0616	4.2292
Digital Transformation	95.490	246	0.000	3.97648	3.8945	4.0585

One-sample test shows the significance and confidence interval over the mean values of samples. The mean difference is of the variable is mentioned above. In addition, the confidence intervals of the difference of both digital reliance and digital transformation represent interesting numbers. Digital reliance has 4.0616 and 4.2292 confidence intervals lower and upper, respectively. The digital transformation has 3.8945 and 4.0585 confidence intervals lower and upper, respectively. It highlights that very significant mean value difference is lying between the variables. In addition, the mean value differences at 95% confidence interval measure the level of surety. In last, the findings indicate that the research is 95% confident that digital transformation and digital reliance improves the working proficiency of the government institutions at Kingdom of Saudi Arabia.

5. Discussion

Research question 1: The impact of COVID-19 on digital transformation and transition in Kingdom of Saudi Arabia

The purpose of the first research question was to determine how COVID-19 will affect digital transformation. Without a question, the pandemic has increased economies' reliance on digital technology and changes. E-commerce grew in popularity as a result of the closure of physical locations including offices, retail stores, and schools as well as the rise of remote learning and online shopping. The economies that embraced the digital transformation at a faster rate than corporations did were the ones who were able to withstand the COVID-19 pandemic's negative effects. In the digital sphere, the Kingdom of Saudi Arabia is also developing quickly. Most of the respondents reported that their firm either adopted digital infrastructure, tools and systems,

transitioned to cyber space, incorporated a remote and flexible employment structure, digitalized business model and supply chain channels or incorporated various platform development technologies like messaging application, networking platforms and alike. Even before the pandemic, the focus of the companies remained on investing and prioritizing technology. Prior to the pandemic, many companies viewed technology and digitalization as the means to save money and reducing the cost of doing business. However, with the outbreak of the novel COVID-19, digital transformation is viewed to offer tremendous business opportunities to innovate. Businesses now consider digital transformation as a source for modernizing their business capabilities, achieving a competitive edge and creating a culture that is built around digital technologies and outpaces the concerns regarding cost reduction (EHL Insights, 2020).

Research question 2: Reliance on digital transformation within the private and government institutions, agencies in Kingdom of Saudi Arabia

The second research question aimed at exploring whether the outbreak of COVID-19 increased the reliance of public and private sector on digital transformation focusing on organizations, government agencies and ministries. As part of its Vision 2030 strategy for a diversified economy, the Kingdom of Saudi Arabia has made the development of information, communication, and technology (ICT) a priority (ITU, 2020). In order to maintain the critical communication link and improve people's quality of life, the public and commercial sectors worked together to ease the deployment of ICT. This enabled an efficient response to the epidemic. Throughout the COVID-19 epidemic, ICT deployment has been essential for disseminating important information both within organisations and across the nation. The organisations and government agencies were able to inform employees and residents on how to respond to the crisis thanks to the developed communication infrastructure in the kingdom.

6. Conclusion

With the extensive review of literature and questionnaire response analysis, it can be stated that like the rest of the world, the outbreak of novel coronavirus accelerated the digital transformation in the Kingdom of Saudi Arabia and has significantly increased the reliance of government agencies as well as private sector on the digital technologies. The responses collected from respondents working in various different positions in the private sector revealed that each organization shifted to digital either by adopting digital tools, opting for telecommuting,

shifting the business model towards digital or redesigning their supply chain facilitated through digital means. In complying with the research aim, the objectives of this study were to assess how the COVID-19 accelerated the digital reliance within the official institutions, ministries, and agencies in Kingdom of Saudi Arabia. Literature findings revealed that digital transformation is the future in the post-pandemic scenario within the Kingdom of Saudi Arabia and investment is needed to derive digitalization through recruiting and retaining skilled professionals to ensure smooth transitioning at individual, organizational and kingdom wide level. The results comprised of descriptive statistics to determine the responses of the participants. The validity and reliability tests indicated that there was high digital reliance and transformation based on the Cronbach alpha's value which was found to be 0.7. On the other hand, there was insignificant variance between digital reliance and digital transformation based on ANOVA

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Universal service obligation (A comparison between the UK and Saudi Arabia)

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Abstract:

The field of communications has experienced a surge in importance within modern society, with the COVID-19 crisis serving as a clear testament to its significance. In order to address this need, governments worldwide have adopted the Universal Service Obligation (USO) as a means of ensuring that individuals have access to a reliable internet connection. While the interpretation and implementation of the USO may vary, both the UK and Saudi Arabia have embraced this concept to develop their communication sectors.

Nevertheless, there are notable distinctions between the UK and Saudi USO approaches. The UK USO is firmly rooted in the principles of citizen rights and socio-economic development, aiming to empower individuals and communities. On the other hand, the Saudi USO places a stronger emphasis on government provision and control. Many experts argue that involving stakeholders in the USO implementation process, as exemplified by the British model, can yield more significant outcomes.

In conclusion, the field of communications has gained immense importance, particularly evident during the COVID-19 crisis. The adoption of the USO by governments like the UK and Saudi Arabia demonstrates their commitment to developing communication infrastructure. However, the approach and emphasis may differ, with stakeholder involvement being seen as a crucial factor for success. Regular evaluation and updating of the USO are essential to ensure its adequacy and relevance in an ever-changing digital landscape.

Keywords: Communications Law, Telecommunications Universal Service Obligation (USO), Broadband Access, Public Policy, Human Rights, Implementation Strategies, Policy Evaluation, Comparative Law.

المستخلص:

شهد مجال الاتصالات زيادة كبيرة في الأهمية داخل المجتمع الحديث، حيث كانت أزمة كوفيد-19 بمثابة شهادة واضحة على أهميته، اعتمدت الحكومات منذ عقود في التزام الخدمة الشاملة كوسيلة لضمان حصول الأفراد على اتصال موثوق بالإنترنت. في حين أن تفسير وتنفيذ، فقد تبنت كل من المملكة المتحدة والمملكة العربية السعودية هذا المفهوم لتطوير قطاعات الاتصالات الخاصة بهما.

ومع ذلك، هناك اختلافات ملحوظة بين نهجي المملكة المتحدة والسعودية في مجال التزام الخدمة الشاملة. إن التزام الخدمة الشاملة في المملكة المتحدة متجذر بقوة في مبادئ حقوق المواطن والتنمية الاجتماعية والاقتصادية، بهدف تمكين الأفراد والمجتمعات. ومن ناحية أخرى، يركز اتفاق الخدمات الشاملة السعودي بشكل أقوى على توفير الحكومة ومراقبتها. يرى العديد من الخبراء أن إشراك أصحاب المصلحة في عملية تنفيذ التزام الخدمة الشاملة، كما يتضح من النموذج البريطاني، يمكن أن يؤدي إلى نتائج أكثر أهمية.

ولضمان كفاية وأهمية الالتزام العالمي للخدمات، يعد التقييم والتحديث المنتظم أمرًا بالغ الأهمية. ويشمل ذلك تقييم فعاليتها في تلبية الاحتياجات المتطورة للمجتمع والتكيف مع التقدم التكنولوجي. ومن خلال المراجعة والتحسين المستمرين لتعميم الخدمة الشاملة، يمكن للحكومات أن تعالج بشكل أفضل تحديات الشمول الرقمي وتسد الفجوة الرقمية.

في الختام، لقد أعيد تسليط الضوء على مجال الاتصالات وخاصة خلال أزمة كوفيد-19. إن اعتماد هذه الاستراتيجية من قبل حكومات مثل المملكة المتحدة والمملكة العربية السعودية يوضح التزامها بتطوير البنية التحتية للاتصالات. ومع ذلك، قد يختلف النهج والتركيز، حيث يُنظر إلى مشاركة أصحاب المصلحة على أنها عامل حاسم للنجاح. يعد التقييم والتحديث المنتظم لـ USO أمرًا ضروريًا لضمان ملاءمته وأهميته في المشهد الرقمي المتغير باستمرار.

الكلمات المفتاحية: قانون الاتصالات، الالتزام بالخدمة العالمية للاتصالات (USO)، الوصول إلى النطاق العريض، السياسة العامة، حقوق الإنسان، استراتيجيات التنفيذ، تقييم السياسات، القانون المقارن.

1. Introduction

As society continues to evolve, the understanding of human rights is also changing. One of the most recent rights to arise is the right to communicate. It is accepted as a right derives from the Universal Declaration of Human Rights 1948. Article 19 states: 'Everyone has the right to freedom of opinion and expression: this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.' This article is strengthened by articles 27 and 28. Article 27, section 1 states: 'Everyone has the right freely to participate in the community's cultural life, enjoy the arts and share in scientific advancement and its benefits.' Telecommunications can be seen as one of these scientific advancements that should be guaranteed as human right considering its increasing importance in

modern life. Article 28 addresses this right from a different aspect as it states: ‘Everyone is entitled to a social and international order in which the rights and freedoms outlined in this Declaration can be fully realised (Universal Declaration of Human Rights, 1948).

Therefore, it can be said that communication is an essential component for maintaining a global system that protects and enforces human rights (William J. et al., 2003). The concept of a universal service obligation (USO) was introduced to ensure that citizens worldwide have this right preserved. The European Union has this obligation service and users’ rights relating to electronic communications networks and services.

The Universal Service obligation had been integrated into UK law short while after the adoption. However, it was not until four years later that the Saudi government announced that universal access and universal service policy was coming into force in 2006. This essay will discuss the differences and similarities and argue that, while the concept is the same, two different approaches are used to enforce it. Accordingly, the essay is divided into two sections. The first one considers the concept, and the second is the approach. A comparison will be made under each section between the UK and the Saudi Arabian versions.

1.1. Research Aims:

- Examine the Universal Service Obligation (USO) in the context of communication development
- Assess the implementation of the USO in different countries, with a focus on the UK and Saudi Arabia
- Investigate the variations in interpretation and implementation of the USO in the UK and Saudi Arabia
- Compare and contrast the underlying principles and emphases of the UK and Saudi USO models
- Highlight the importance of stakeholder involvement in the USO implementation process
- Analyze the potential impact of stakeholder involvement on the effectiveness and outcomes of the USO
- Emphasize the need for regular evaluation and updating of the USO to ensure its adequacy and relevance
- Contribute to the discourse on digital inclusion and bridging the digital divide

- Provide insights, best practices, and recommendations for improving the effectiveness of the USO in meeting the evolving needs of society.

1.2. Research importance:

- Addresses societal needs by examining the implementation of the USO.
- Provides comparative analysis of UK and Saudi USO models.
- Emphasizes stakeholder involvement for more effective outcomes.
- Highlights the need for regular evaluation and adaptation of the USO.
- Offers policy and practice implications for policymakers and stakeholders.

2. USO concept

This concept has been through different stages and developed over time before it reached the modern version that we see today. Therefore, it is essential to include a short introduction to give historical background.

2.1. Historical background

In its initial stage, The universal service obligation (in short USO) was introduced in the US in the late nineteenth century. There was a dual telecommunications service running by different companies, which was destructive to the new market. There were two rival camps that did not cooperate, meaning that customers to one service cannot communicate with customers using another service. The USO was then introduced to establish that telephone access should not be undermined by market competition practices and in order to promote cooperation. At this stage, the concept referred only to a unified, interconnected monopolistic network (Batura, 2016). The idea of the provision of a service at affordable prices to all citizens was evident in the later European legislation. The liberalisation of the telecommunications market was associated with USO as an essential aspect because before the government ran this telecommunication services as a public interest. Since this would change the market, safeguards were needed (Batura, n 3). Similarly, the Saudi government started to privatise the telecommunication sector in 1997, but it was not until 2006 that the USO was officially adopted.

2.2. Definitions

The European Commission in 1992 identified that its main principles are: universality, meaning affordable access; equality, meaning service for all residents; and continuity, meaning sustainable

quality¹. On the other hand, the Saudi USO policy states that ‘the universal service implies 100% of the population are reasonably able to subscribe to and use a defined ICT service at a defined quality on an individual or household basis (The Universal Access and Universal Service Policy. Citc.gov.sa, 2021).’ From these definitions, one can see one of the USO issues, is the scope of the covered services. The European definition omits the scope, which means there needs to be a discussion about whether it only covers fixed-line services or should be extended to include other types of communications. To illustrate, the UK Office of Communications in 2006 stated that ‘Universal Service ensures that basic fixed-line services are available at an affordable price to all citizen and customers across the UK’ (Ofcom, 2006). The latter was followed by the USO for broadband in 2020 after the extending decision o include broadband-based services enter into the force (Hutton, 2022).

In contrast, the Saudi government has a more futuristic view and uses the broad term as “ICT” which means broadband or any means of communication are included (The Universal Access and Universal Service Policy, n 5). Thus, when the Internet and mobile phone services were presented, they were automatically included in the USO coverage. Besides this, the concept is relatively the same. However, there are clear principles that are used to support the concept in the European version. To conclude, the EU version of the USO is implying support several values such as equality, universality and market liberation, which is fair to say that the USO represents the European legislation spirit as such. In constant, there is an absence of any reasoning to support the Saudi version’s policy, allowing one to argue that it is an attempt to imitate it, with some modifications.

3. Contrasting approaches

As discussed above, the concept appears almost identical. However, there are differences in the applications and enforcement methods. This section starts by looking at the USO’s status, its value and how it is executed.

¹ Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users’ rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws, OJ L 337, 18.12.2009, p. 11–36

3.1. USO status

What is meant by the status is how the USO is ranked in the jurisdictions under the law. The European side has integrated the policy and the obligation into the legislation as a legal right. Thence, the government is held accountable for any breaches. A good example is the USO for broadband in the UK which states that a resident has the legal right to request an affordable connection and their request must be met if it qualifies. This is, unfortunately, not the case in Saudi Arabia. The Saudi USO regulation and policy were issued by the Minister of Communication and Information Technology. This means they are not sufficient to establish a recognised legal right. This is primarily due to them not being supported by any legal rights found in the Basic Law of Governance² which functions as the Constitution. This indicates the Saudi government sees USO as an administrative matter, and a means to achieve practical goals, unlike the Europeans who actively engage citizens as rightsholders. In other words, the former focuses on organising the process of telecommunication within a relatively young nation while the latter focuses on enabling the citizen with their right.

3.2. Enforcement

The evaluation in this subsection will be in terms of readiness, interaction, transparent procedures and impact.

Ofcom has the power to regulate a wide range of communications services in the UK, including TV, radio, broadband, home phone, and mobile services. Ofcom has issued a number of related documents such as a Review of the Universal Service Obligation 2006 and Implementing the Broadband Universal Service Obligation 2018. It is noted that Ofcom also provides an insight suggestion to the parliament and legislators, but also manages some of the enforcement aspects, including supervision over USO enforcement. What is encouraging is that Ofcom appears to be active, and it releases reports and data on a regular basis. In particular, it has clear procedures to request a service covered by USO for both telephone services and broadband.

There are different arrangements to request an affordable connection under the USO for line-based service and broadband service. Every service has its organisation that supervises and ensure compliance with the USO. Overall, in terms of readiness and interaction, it seems the UK has done a decent job.

² Royal Order, 'Basic Law of Governance' [1992] Umm al-Qura Gazette 1.

Concerning impact, the percentage of the population that uses the Internet will be the chosen criterion for the purpose of comparison. In the UK, 96% now have access to the Internet compared with 26.8% of the population in 2000 (Johnson, 2020).

On the other hand, The Saudi Communications and Information Technology Commission (CITC) is the government agency that regulates the telecommunications sector. Like its British counterpart, CITC handles and supervises the industry at large. The noticeable difference is that CITC is ICT focused, which means that it deals with fixed-line, mobile phone and internet services as a whole. Therefore, it seems more harmonise and comprehensive than the UK version (The Universal Access and Universal Service Policy. n 5). CITC is active but releases data and reports to a lesser extent. Since the Saudi USO is directed towards companies and not the public, there are no exact steps to request a USO service, if applied. This again illustrates the fact that the Saudis see USO as an administration method, not a legal right. The impact seems more promising than the former, though, as 93.3% of the Saudi population have internet access in 2020. Notably, the figure was only 2.2% in 2000 (World Bank, 2020). It is to be understood that these achievements can be attributed to the USO and many additional factors. However, it is reasonable to assume that the USO has contributed a considerable amount to it.

3.3. Funding

One of the fundamental principles of the USO is that the government owes a responsibility to the public to ensure that all residents can use modes of communication. This means the government has to intervene in the communications. However, market liberation was one of the reasons for the USO being adopted in Europe. Hence, the UK funding method is considered as minimisation to government intervention. In 2018 the government appointed two several companies, as USO broadband providers. These organisations are entitled to request compensation for the cost of providing services if they could not cover it solely. It fell under the terms of The USO. Ofcom services are requested from the market regulator Ofcom. The compensation of the cost caused by providing uncommercial or costly services, under the USO, comes from an industry fund. The government has not committed any contribution to this fund (Hutton, n 8). Similarly, telephone services and Broadband service are operating in the same way but different organisations.³

³ Statement Publication, 'USO Review 2006'.

By contrast, the Saudi USO fund is entirely funded by the government. It works as a government agency by dividing the areas into different zones based on commercial profitability and the level of existent services. A plan was then developed, and it was put to tender, with the awarding of bids as a final step (Universal Service Fund Foundation Citc.gov.sa., 2021). Overall, there is a high level of government intervention in the Saudi version, while the British government only oversees the sector at a basic level.

4. Conclusion

In conclusion, the field of communications is an increasingly important aspect of modern life. The COVID-19 crisis has shown the importance of giving people a decent internet connection, no matter where they live. Therefore, the USO has been adopted by governments worldwide. It is to be expected that there will be a variation in their interpretations and implementations. As has been presented, although both definitions of the concept are similar, the approaches are entirely different. The UK USO is based on the notion of citizen rights and has socio-economic reasons, as evident from how it has been implemented. The Saudis approached USO as a method to further develop the communication field in a young nation but did not emphasise the right to have a means of communication. Instead, there was a focus on how the government can supply these services to the whole population. I believe it will have a more significant impact if people are involved in the process similar to the British method. Nonetheless, the USO's future is looking promising as long as it is evaluated and regularly updated to ensure that it is adequate and inc

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Revisiting the classical Islamic jurisprudence with the Advance in Modern Medicine and Technology (An applied study on "Inheritance by Estimation and Anticipation" in the Islamic law of inheritance)

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Abstract

Through an analytical method, this paper emphasizes the role of modern medicine and the advance in technology in reshaping the “inheritance by estimation and anticipation” in the classical Islamic law of inheritance. Main areas of concentration include: determining the sex of the hermaphrodite, the sex of the fetus/fetuses and their numbers during pregnancy. In addition to these is determining the sequence of the death of individuals in a disaster involving the same heirs, such as those killed by drowning, ship wreck, fire, and the like. These are very important factors which greatly affect the decisions on inheritance of the heirs when any of the above circumstances occurs, only that these factors were all treated based on anticipations and estimations in the classical Islamic jurisprudence of inheritance, with difficulties in achieving accurate measures to unravel these circumstances.

In order to achieve a more relevant and practical application of the classical Islamic jurisprudence of inheritance, this article works on updating the anticipations and assumptions mentioned earlier. Rulings which were based on presumptive interpretations were treated with a balance between the principles of Islamic law and the discoveries in modern medicine. However, the rulings which were based on definitive interpretations were not the area of concern.

Keywords: Classical Islamic jurisprudence, Inheritance by assessment and anticipation, Definitive evidences and/or interpretations, indefinite evidences and /or interpretations.

1. Introduction

Islam is a religion, which deals with the problems of mankind in a comprehensive and a detailed manner. It answers their unlimited problems in all perspectives of life and the hereafter. This indeed- is one of the unique characteristics of Islamic jurisprudence which attracts to it a broad research and wide academic contributions in all important fields of knowledge.

From this perspective, the Islamic jurisprudence has witnessed numerous changes in *fatwas* and *ijtihad*. This comes as a result of changes in significant elements which influence *ijtihad* and *fatwa*, like change of place, customs, and traditions, just as the popular legal maxim in the Islamic jurisprudence says: "changing of rulings should not be denied by the change of times".

In the world of findings and discoveries, there has been a tremendous advancement in the field of science and technology. This - therefore- calls for an academic revision of the classical Islamic jurisprudence, in its different specializations, which include the family law, the Islamic jurisprudence of finance and the *fiqh* of crimes and punishments. This is necessary because there are significant chapters of discussion -in the classical Islamic jurisprudence- which were widely affected by the non-existence of the modern science discoveries experienced today, in which these discoveries could have aided *ijtihad* positively, and also limit the difference in opinions - among scholars- to its lowest minimum.

In line with the above, this paper is a contribution to the study of the Islamic law of inheritance in the advent of science and technology, with a balance between the theories of Islamic inheritance and the discoveries in modern medicine.

1.1. Research Questions

The research questions are:

- What are the possible modifications to the assumptions and estimations in the classical Islamic law of inheritance with the aid of modern medicine?
- What appropriate methodology is suitable for the revisiting of the classical Islamic jurisprudence?

1.2. Research Aims and Objectives

The main aims and objectives of the research include the following:

- Bridging the gap between modern discoveries and the Islamic jurisprudence.

- Revising the classical Islamic jurisprudence with a balance in approach and methodology.

2. Literature Review

Islamic Jurisprudence (*Fiqh*) is the knowledge and understanding of the practical aspects of Islamic law, which are deduced from specific evidences such as the divine revelations in the glorious *Qur'an* and the Sunnah (Badawi, 2009). Taking aback the history lane, the history of *fiqh* can be seen as a comprehensive one as discussed by *Ibn khaldun* (1958) in his *Muqaddimah*. In a nutshell, Kizilkaya (2016) established in his review of *Ibn Khaldun's* work that Islamic Jurisprudence witnessed a classical period of traditional Islamic scholars across different schools of thought, as there is also a modern era of Islamic jurisprudence which encompasses different approaches to the interpretation of Islamic law.

Abdullah et al (2013) noted that the Islamic jurisprudence witnessed different approaches as a result of changes and developments in human life. These approaches include the traditionalism which belief that all the problems in human lives had been discussed by the classical scholars. On the other hand is the reformism and the modernism approach which believe in reconstructing Islamic tradition but mostly from the modern paradigm as detailed by Abdullah et al (2013). Meanwhile, the correct approach is to interpret the Islamic law by applying flexible approach to its practical aspects, while – at the same time - a firm attach to the basic values in the main sources of Islamic law should be considered. Kayadibi (2008) argued that this approach would strike the balance between religion values and the constant transformations in life.

Arif (2022) described the Islamic law of inheritance as one of the few rulings of Islamic law which are comprehensively explained and detailed by the basic primary source of Islamic law, the Glorious *Qur'an*. This is unlike many other aspects of Islamic jurisprudence which their fundamental theories and rulings are revealed in selected verses of the *Qur'an*, while their comprehensive understandings are detailed in other sources of Islamic law, like the sayings and actions of Prophet Muhammad - peace be upon him-. This can be exemplified by the rulings on Zakat, Fasting and Hajj (pilgrimage) rites.

Meanwhile, this detailed explanatory nature of the Islamic law of inheritance - from the primary source of *shari'ah*- was not a barrier to *ijtihad* among the Muslim scholars, starting from the companions of the prophet (Omar & Muda, 2017).

For this reason, scholars were able to give answers to contemporary issues on inheritance in their era. This was achieved by building on the established theories extracted from the *Qur'an* and the *Sunnah*, as the law of inheritance is concerned.

Although, the then contemporary issues on inheritance were not really influenced by science and technology, it remains contrary to the problematic issues in this contemporary era of advance in science and technology, which is to be showcased in this paper. Owing to this, Mahmud and Mainiyo (2015) upheld the fact that there is always a need to find solutions to contemporary issues in Islamic jurisprudence, especially in this world of modernity where technology is actively connected to the day-to-day activities of human. In addition to that, technology also influences the rationale behind some rulings and discussions in the broad Islamic law, including the Islamic family law as a whole.

If Islamic jurisprudence (*fiqh*) means the efforts to understand and interpret the Islamic law; then the understanding exercised by human intellect is prone to change and reform amidst significant developments and changes in situations. In view of this, the section of the classical Islamic jurisprudence on "inheritance by estimation and anticipation" needs to be revisited as also argued by Muhammad (2022). This is because the intellectual efforts exercised in that section were characterized by uncertainties without clear evidences from the *Qur'an* or *Sunnah*. Thus, there is still room for a revisit as contributed by Uddin (2021). This is necessary in order to update the classical understanding which could have been much better - in this particular aspect- with the advance in science and technology.

Considering the classical Islamic jurisprudence as a source of law in Islamic law

The Islamic law consists of various sources which can all be categorized into two different sources, namely the primary sources and the secondary sources. In Tallyn's (2018) overview of Islamic law, the primary sources are limited to the *Qur'an* and the *Sunnah*, while the secondary sources comprises of derivative legal reasoning, such as *Ijma'* (general consensus among authoritative Islamic scholars on a matter relating to an act of worship, after the death of the prophet Muhammad - peace be upon him-) and *Qiyas* (analogical reasoning). Taking a close look at these sources from a methodological aspect, Kamali (2006) tagged the primary sources as divine revelations, while the secondary sources are human understandings extracted from the primary sources.

This credibly means that the primary sources are agents of revelation, while the secondary sources are the results of *ijtihad* (interpretation of the legal sources of the Islamic law by a qualified expert in the field).

The sources of Islamic law – both the primary and secondary sources – are either definitive or presumptive in evidence and in authenticity. As for the *Qur'an*, all its verses are authentic in narration. This verdict about the *Qur'an* is well established and well proofed beyond reasonable doubts from both the scholars in the classical era and the contemporary academics. A detailed explanation - on this claim- can be found with the likes of Al-A'zami (2020) and Khalifa (1989). However, this established authenticity of the *Qur'an* doesn't automatically translate to mean that all rulings gained from its verses are definitive in evidence. The evidences can only be definitive if the interpretation of a particular verse or ruling has no other presumption except only one meaning. Examples of these are rulings regarding figures, like the waiting period of a wife after the death of her husband (Salleh et al, 2020).

Almighty Allah says in *Qur'an* 2 verse 234: "And those of you who die and leave wives behind them, they (the wives) shall wait (as regards their marriage) for four months and ten days".

The interpretation here is definite in evidence, as figures can only be interpreted in a single meaning without having doubts of any other possible interpretation. In other words, the "four months and ten days" mentioned in the verse is definitive in its interpretation.

Like the above discussion regarding the *Qur'an* as a source of law in Islam, the traditions of the prophet Muhammad - as a significant source of Islamic law- are mostly presumptive in evidence and interpretations, while a significant portion of it is definite in evidence and interpretation as well (Zumaro, 2022).

Similar to the above is the classical Islamic jurisprudence which can be regarded as the intellectual efforts of the classical jurists in interpreting the main sources of Islamic law. It is also made up of definitive evidences and likewise the presumptive ones. This – however -depends on the nature of the source of law which was relied upon in a particular case, and the possibility of having different reasonable opinions and interpretations to the provided evidence. Thus, the classical Islamic jurisprudence - in general- is not a final judgment in Islamic law, specifically on discussions which are greatly influenced by human discoveries and the intellect,

And not the discussions reached on definitive evidences. Razi (2014) supports this argument by stating that the classical Islamic jurisprudence can turn to a dilemma, rather than being a blessing. This is bound to happen if it is (Classical Islamic jurisprudence) regarded as a divine revelation as witnessed in some parts of the Muslim world towards the end of the 4th century of the Lunar calendar when there was a stagnation of the Muslim's knowledge due to blind-following of traditional jurists by their disciples in some parts of the Muslim world.

Focusing on the law of inheritance as part of the classical Islamic jurisprudence, the fundamental theories and rulings guarding the discipline are mostly definitive in evidence. This perception is based on the fact that the comprehensive understanding of inheritance is narrated in the *Qur'an*, while the verses themselves are nothing but definitive in their interpretations, as they mostly involve figures with their designated heirs. Meanwhile, there are significant parts of the inheritance which are firmly based on *ijtihad*, such as some discussions in the chapter of the "inheritance by estimation and anticipation" as mentioned earlier. For this reason, the concerned parts (in the inheritance by estimation and anticipation) are presumptive in evidence, regardless of them being discussed in the classical Islamic jurisprudence.

At this juncture, it is satisfactory to conclude that the classical Islamic jurisprudence might sometimes need to be updated and rechecked, but by adhering strictly to research ethics in general, and specifically to the principles guiding the Islamic jurisprudence. Thus, the "inheritance by estimation and anticipation" is open to objective criticism, reformation, and revision.

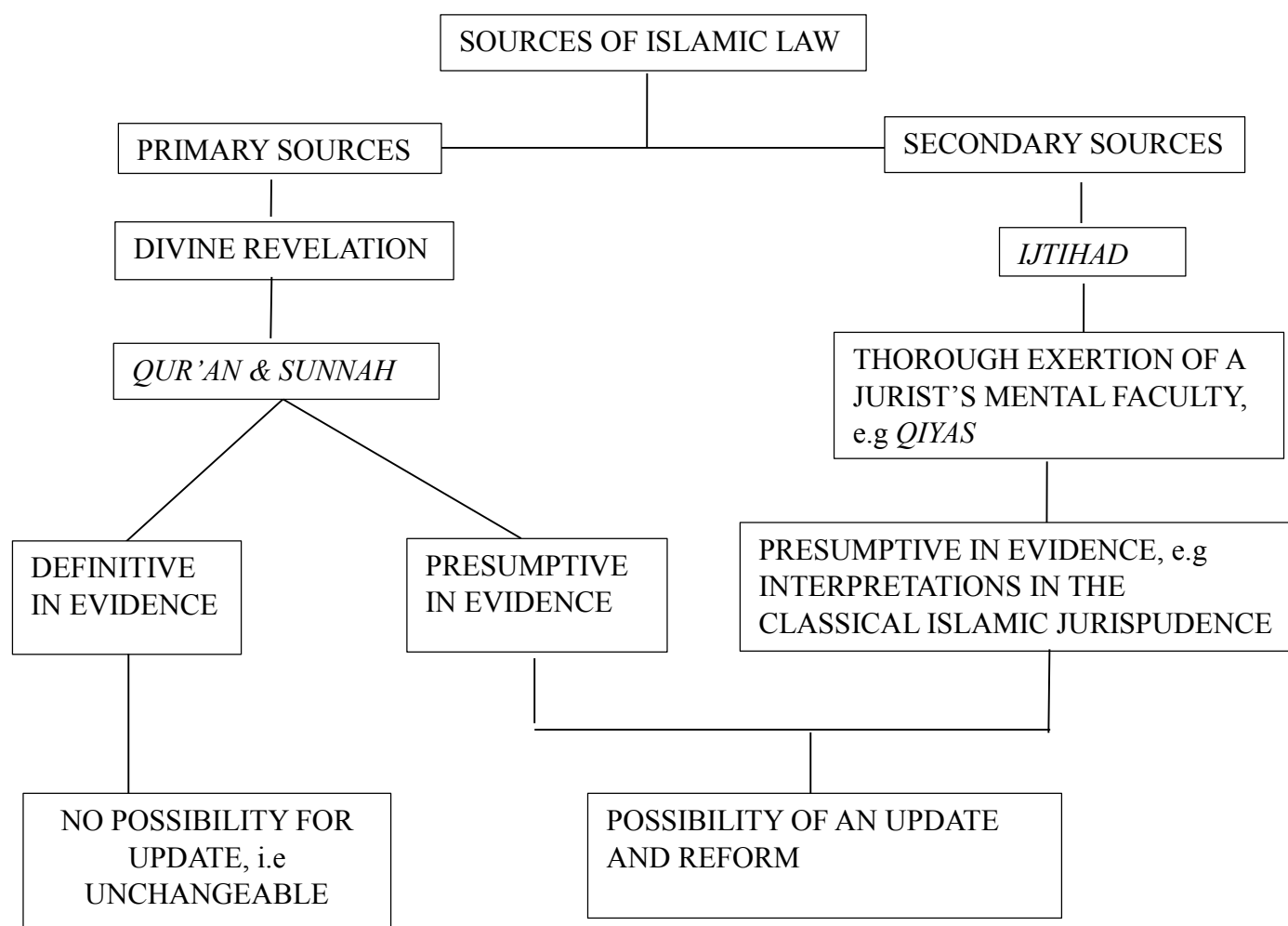


Illustration 1. The Sources of Islamic law as Definitive and Presumptive in Evidence.

Inheritance for the unborn child

As a first approach to the discussions in this section, it is important to have an understanding of the motive behind the maximum gestation in human, and the connection between this and inheritance in the Islamic law.

In the *Qur'anic* verses of inheritance, the heirs to the inheritance and their appropriate portions are duly stated. However, the order of inheritance and portions to be inherited is based on the heirs involved. In some cases, heirs might be excluded from the inheritance due to the presence of a superior heir. For example, a brother is not expected to have a portion of the inheritance when there is a son as an heir to the deceased. Also, there is a reduction in the portion of the husband's or wife's inheritance if either of them has at least a child to inherit him/her. This means that the sharing of inheritance is based on the heirs involved in the inheritance.

Meanwhile, the classical Islamic jurists were faced with the challenge of knowing the state of the unborn baby, and thus the maximum time to expect its delivery before a final decision can be made regarding the sharing of the deceased's asset.

However, this uncertainty must be cleared, as rights of the heirs to inheritance are properly guarded in Islamic law of inheritance without neglecting the unborn babies and their entitlements; since they also need wealth to face the twists and turns of life. This is the point of connection between the discussion here and the Islamic law of inheritance.

Like the discussion on the maximum gestation period, there are also some other important issues connected to pregnancy and which also affect inheritance and the shares of the heirs in Islamic jurisprudence. These include the number of fetuses in the womb, and their sex as well. Discussions on these two important factors were always mentioned in the classical Islamic jurisprudence, but without a precise answer and solution.

As for the maximum gestation, there have been wide speculations among the classical jurists in giving an answer to that. Different claims were made based on human knowledge of happenings and occurrences of the maximum gestation, as occurrences are regarded as proofs and evidences. From this perspective, Al-Sarakhsi (2016) narrated that there were claims by the Hanafi school of thought that the maximum gestation period in human is two years, likewise in the Maliki and Hanbali schools of thought, while the Shafi' school of thought pegged it at four years. These stances were merely based on claims of past occurrences of pregnancy periods and not scientific proofs.

Also, there are other claims of three years, five years, six years and seven years as well (Zayla'i, 2010), while there is also a claim of "no maximum years" due to lack of definitive and substantial evidence to ascertain any of the so-acclaimed stances. A further research regarding the differences of opinion among the classical and contemporary scholars regarding maximum gestation period can be found in Serrano-Ruano's (2022) work.

Unlike the maximum gestation period which was based on an admissible evidence of occurrences and happenings in the classical Islamic jurisprudence, that of the "numbers of the unborn babies" and their "exact sex" were not really subjected to an admissible evidence. Some scholars were of the opinion of not sharing the deceased's assets until the birth of the baby; since the possibility of knowing the sex or the exact numbers were impossible back then, while some

prefer the opinion of sharing the assets, especially when the heirs are in dire need of the inheritance (Al-Sarakhsi, 2016).

Considering the latter opinion in the above, different assumptions were made in order to determine the most appropriate way of sharing the assets while also considering the plights of the unborn and the other heirs as well. There is an opinion of assuming the unborn as two males or two females, while the larger portion between the two assumptions would be withheld for caution's sake. Likewise, there were other opinions such as: assuming the unborn to be one male or one female, while the larger portion between the two assumptions would be withheld for caution's sake as in the previous opinion (Zayla'i, 2010).

Starting from issues on maximum gestation period, the contemporary *fiqh* scholars are mostly of the opinion of submitting the pregnancy duration to evidence of modern medicine (Serrano-Ruano's, 2022). Al-Hajj (2012) buttressed this argument by stating that gestational period beyond 9 months is impossible, and this is confidently established on the grounds of conclusive scientific evidences. In that case, Al-Nur (2007) was able to give a convincing answer to the different speculations surrounding the maximum gestation period in the classical Islamic jurisprudence. Al-Nur (2007) argued that some narrations might not be authentically proved, but some still remain authentic, only that these protracted pregnancies might result from false pregnancy, miscalculation, or other possible physiological and psychological factors which leads to imagined pregnancy.

Prevailing on the research of Lindquist et al (2021), a pregnancy of about 42 weeks is a prolonged pregnancy and is associated with a sharp increase in the risk of stillbirth and perinatal mortality (death of the fetus). In a similar opinion, the National Health Service in the United Kingdom (2021) also attributes a higher risk of stillbirth to a pregnancy of 42 weeks and above. Thus, it recommends induction of labor in such situations to avert what can be described as foreseen circumstances. This means that the fetus risks non-survival with any increase in gestation period after subsequent weeks, while a possibility of lasting two years or more - as mentioned in the classical Islamic jurisprudence - is ruled out.

The sex and numbers of babies during pregnancy is not also far from the scope of modern medicine. According to Mehr et al (2021), there is a possibility of uncovering the sex of the fetus at week 13 to 14 of gestation, but a high level of accuracy is expected at the 18th week of

gestation. Going by this information, the uncertainties in the classical Islamic jurisprudence remains the same when there is zero or very low possibility of determining the fetus' sex. However, these arguments become needless with the aid of an ultrasound scan in the 18th week of gestation, when the possibility of uncovering the sex of the fetus is very high, while their numbers are also known.

Based on this, decisions and conclusions on inheritance should be taken according to results from the ultrasound scan, and the sex of the fetus or their number should no more be a matter of controversy. Although, the possibility of wrong sex identification is still not ruled out, as ascertained by Eze et al (2010), in which they claimed that the ultrasound scan is not an exact science. Nevertheless, this is still not a problem since the rulings of Islamic jurisprudence are mostly based on predominance of assumption (*ghalabat-uz-zhann*), especially when the assumption is close to certainty due to strong indications and proofs, as it is here.

Inheritance of the hermaphrodites

The term "hermaphroditism" has been used long ago to refer to disorders in sex development in humans, only that the term seems derogatory in recent developments (Lundberg et al 2018). This has paved way for a new term in medicine, in which it appears more acceptable to the real concept of hermaphroditism. The new term DSD (Disorders of Sex Development) is used to refer to congenital conditions which are characterized by abnormal development of chromosomal, gonadal (reproductive system that produces eggs or sperm) or anatomic sex (Mehmood & Rentea 2023). This definition gives a perfect overview of DSD itself and the real factors responsible for sex assignment, specifically in discussions on inheritance of the hermaphrodites between the classical Islamic jurisprudence and the modern advance in medicine.

In the classical Islamic jurisprudence, there is a serious challenge regarding the actual sex of hermaphrodites, in which some factors were regarded as the key determinants. Meanwhile, these factors are not the real determinants as they are merely agents of physical and biological features in human. Features like: growing of beards, urinating with the male or female genital, growing of the breasts, and having lust for the opposite sex, were the main factors to determine the sex of the hermaphrodite (Al-Sughdi, 1984).

However, it is a clear fact that sex assignment in DSD individuals is a more complex process compared to what was presented by the classical Islamic jurists. Sex disorder in hermaphrodites

is not limited only to the biological features and physical appearances, but it's also connected to the abnormal development of the inner reproductive system, chromosomal disorder, and the general anatomy of the body as previously explained in the definition of DSD/Hermaphroditism. In Ogilvy-Stuart & Brain's (2004) discussions on sex assignment, an overhaul of the body system must be done before sex assignment. This is because an incomplete body assessment would only bring out the traits of a gender, while other important traits which would mostly determine the exact sex are hidden. The assessment processes stated by Ogilvy-Stuart & Brain's (2004) include: examination of external genitalia, determination of internal anatomy through ultrasound or urogenital sonogram. This also includes assessment of adrenal function, DNA Analysis, and also the assessment of the complete chromosomes from the individual cell. Most of these factors were not considered in the classical Islamic jurisprudence,

In that case, uncertainties and assumptions in the inheritance of hermaphrodites/DSD patients can efficiently be solved with the advance in modern medicine (Aziz et al, 2022).

Inheritance of persons killed by drowning, fire and debris (Determining the Sequence of Death of the Heirs)

Determining the time of death of an heir is significant in the law of inheritance in Islamic jurisprudence, specifically when the nature of death involves a number of individuals whom are heirs to one another. This is because an heir is entitled to inheritance on the condition that he/she is known to be alive as at the time of death of the person who is to be inherited. Thus, the sequence of the death of the heirs is important in this sense.

In the classical Islamic jurisprudence, determining the exact time of death was a very hard task which seems impossible, likewise in the modern medicine (Shresta et al, 2020). However, there is a good level of adequacy in estimating the time of death in the modern medicine compared to the classical Islamic jurisprudence, only that the modern medicine is also not an exact science like the classical Islamic jurisprudence (Madea, 2016).

A popular opinion in the classical Islamic jurisprudence is that the heirs who died simultaneously should not inherit one another if their actual time of death cannot be ascertained. Although, there are contrary opinions to this, there was no answer to unravel the uncertainties in determining the exact time of death, regardless of the differences among the jurists as to inclusion and exclusion

of the heirs in such occurrences. This is not an unexpected challenge with the low level of discoveries in the traditional medicine compared to the modern medicine.

As for the modern medicine, Ranjan et al (2019) stated that different methods have been deployed in estimating the time of death, and these include physical, chemical, biochemical, histological and enzymatic changes which occur progressively in a body. However, it's most likely possible to arrive at an estimated time of death and not an exact one. Also, the accuracy of the estimated death time mostly depends on the level of delay in the post-mortem examination of the body. (Ranjan et al, 2019). This means that delays in the post-mortem body examination complicates the examination process and also widens the estimated time of death; instead of getting a narrow one or the exact time as conditioned and demanded in the Islamic law of inheritance.

Coming into a conclusion, modern medicine cannot fill the existing gap in the classical Islamic jurisprudence with regards to determination of the sequence of death of the heirs. This challenge remains the same as faced by the classical jurists. Also, the principle of "predominance of assumption" (*ghalabat-uz-zhann*) might not rescue the situation here, even though the principle was earlier embraced in the discussion regarding the determination of the sex of the fetus. This is because there must be "certainty" about the life of the heirs either living or dead, in order to determine who is to inherit and who is to be inherited. This is unlike the determination of the sex of the fetus where "predominance of assumption" is enough as a basis for inheritance sharing.

Thus, the ruling here (determining the Sequence of death of the heirs) in contemporary Islamic jurisprudence remains the same, and the influence of modern medicine is still not far from uncertainties just like the classical Islamic jurisprudence.

3. Suggestion

As a suggestion to better the revisiting process of Islamic jurisprudential issues, the *shari'ah* experts/jurists should – themselves - be equipped with a vast knowledge of science and modern medicine, i.e. to the level of specialization and professionalism, and not a fundamental knowledge alone. Although, the advice and expertise of specialists are sought in every matter related to their fields of specialization when the need arises in Islamic jurisprudence, but that is not the best approach. This is because Islamic jurists are in the best position to identify all possible and significant rationales which might affect the rulings in an occurrence.

Specialists in other fields are no doubts experts in their various disciplines, but their expertise does not equip them with the knowledge to know the higher objectives of the Islamic law and to also identify rationales with major priorities when finding solutions to human life through the Islamic jurisprudence.

In that case, the contemporary Islamic jurists are saddled with the responsibility of specializing in modern medicine and other spheres of science, in addition to their expertise in Islamic jurisprudence. This would go a long way in bridging the gap between Islamic jurisprudence and science.

4. Conclusion

It's never a matter of doubt that the classical Islamic jurists exerted their full efforts and mental faculty in solving jurisprudential issues from the philosophy of Islamic law. Their efforts - which were best done in their capacity and in the midst of the available resources - were more than being a commendable one. However, their *ijtihad* is never an impediment to further research and intellectual reformation, specifically in the absence of definitive evidence or a consensus of opinion.

As for the "inheritance by estimation and anticipation", most of its uncertainties in the classical Islamic jurisprudence are ascertainable with the collective intellect of Shari'ah experts and that of modern medicine. Issues like maximum pregnancy duration for inheritance distribution, number of unborn fetus and their sex, and identifying the exact sex of hermaphrodites can all be revisited, corrected, and updated. Although, the uncertainties in the inheritance of persons killed by drowning, fire, debris, and the like, still remain as it is in the classical Islamic jurisprudence; since the determination of time of death of heirs remains uncertain in modern medicine also.

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