INTELLECTUAL DISCOURSE, 2008
VOL 16, NO 2, 125-154

Degrees of Truthfulness in Accepted Scientific Claims

Ahmed Hassan Mabrouk*

Abstract: Sciences adopt different methodologies in deriving claims and establishing theories. As a result, two accepted claims or theories belonging to two different sciences may not necessarily carry the same degree of truthfulness. Examining the different methodologies of deriving claims in the sciences of *ʿaqīdah* (Islamic Creed), *fiqh* (Islamic Jurisprudence) and physics, the study shows that *ʿaqīdah* provides a holistic understanding of the universe. Physics falls short of interpreting physical phenomena unless these phenomena are looked at through the *ʿaqīdah* holistic view. Left to itself, error may creep into laws of physics due to the methodology of conducting the physical experiments, misinterpreting the experimental results, or accepting invalid assumptions. As for *fiqh*, it is found that apart from apparent errors, *fiqh* views cannot be falsified. It is, therefore, useful to consider *ʿaqīdah* as a *master* science which would permit all other sciences to live in harmony.

Keywords: *ʿaqīdah, fiqh,* physics, science, falsification

The findings in different sciences are usually supported by evidence of different degrees of scientific merit. As a result, the share of truthfulness of these findings might not be equal.[1] For example, it is accepted in medicine that excessive consumption of oily foods increases cholesterol or as in physics that the acceleration of a mass is proportional to the force exerted on this mass. Are these two claims absolutely true? In other words, can they be falsified? If not, what is the level of confidence we should put in each claim? To answer these questions, the methodology and the validation process used in the concerned science have to be analysed.[2] Such an analysis

*Dr. Ahmed Hassan Mabrouk is Associate Professor in the Department of Computer Science, Kulliyyah of Information and Communication Technology, International Islamic University Malaysia. E-mail: mabrouk@iiu.edu.my

would show if more validation is needed to label the claim in question as "accepted."[3] Falsification is generally used as an instrument to examine the soundness of claims and their derivation methodology.[4] Attempts at falsifying a theory would indicate the applicability or otherwise of that theory. In other words, falsification can be used as a research instrument to demark the operational domain of a theory and more generally of a science. This analysis would be valuable for exploring a unified platform for coexistence of sciences.

This paper discusses the degrees of truthfulness of the claims of three sciences: *ʿaqīdah* (Islamic Creed), *fiqh* (Islamic Jurisprudence), and physics. The first two belong to human sciences that set a binding code on humans, while the third one is an experimental science that studies the characteristics and the governing laws of the solid entities in the universe. This study analyses the methodologies of these three sciences and critical factors that have a bearing on the truthfulness of claims made in the three sciences. The study argues that notwithstanding the apparent distance of physics from *ʿaqīdah* and *fiqh*, the three sciences can be integrated in a unified platform for human understanding.

Science, in this paper, refers to a collective body of knowledge resulting from the study of a well-defined subject according to a well-defined methodology.[5] This knowledge generates theories that explain phenomena or answer queries related to the concerned subject.[6] Theory is an answer and explanation of the underlying cause of a particular phenomenon.[7] Theories generate hypotheses that are tested through observation and experiment.[8] Thus defined, science is not limited to experimental sciences in which theories can be validated through experiments conducted under controlled conditions in laboratories. Science also includes *fiqh* and *ʿaqīdah* because they have very well established methodologies that have been utilised by scholars to generate intensive knowledge that provides qualitative and quantitative answers for practical matters, in the case of *fiqh*, and for doctrinal matters, in the case of *ʿaqīdah*.

ʿAqīdah: Objective and Domain

The objective of *ʿaqīdah* is to help human beings know Allah (SWT), His beautiful attributes, His Prophets and angels, and to understand the spatial and temporal principles governing the entire cosmos.[9]

This knowledge would then naturally compel belief in Allah (SWT) and in His Prophets and Scriptures.[10] This belief, coupled with good deeds, is the key to salvation and paradise aspired to by Muslims.

ʿAqīdah is the science that links our physical world with the metaphysical world and thus enriches our understanding and appreciation of the cosmos. Contemplation over the upper worlds, i.e. the world of the heavens and angels, transfers the mind to a different platform. In the heavens, *rizq* (provision) abounds in its final consumable form. Angels possess power that far exceeds the power of worldly creatures. These lofty themes can only be appreciated with rational and imaginative faculties, not through physical and sensual experiences.[11] Study of *ʿaqīdah* thus trains the mind to escape the narrow confines of the customary and purely physical experiences built through interactions with the lower world and to peek through, using the faculty of reasoning, to a bigger world, as described in the scriptures.

Causality and Association in *ʿAqīdah*

One important concept we learn from *ʿaqīdah* is that the correlation between cause (*sabab*) and effect (*musabbab*) is not irrevocable. In other words, a cause acts as an agent to elicit an effect only through Divine Will. Thus an effect occurs on the occasion of a cause, not by it. Alternatively, these causes are not real doers/agents, but they are associated with the occurrences of particular events.[12] For example, a foetus is formed on the occasion of depositing sperm in the womb but not by the sperm. As another example, burning occurs on the occasion of contact with fire not by the fire. That is because fire does not really cause burning through its own power but the act of burning has been associated with it by the Will of Allah (SWT). The story of the trial of Prophet Ibrāhīm (AS) is an evidence that the act of burning is not really an embedded power in fire but is an act created by Allah (SWT) and associated with fire.[13] Those who think that causes have their own inherent power are no different from Darwinists who think that organisms evolve autonomously, utilising their own power.

The above belief can be fully understood if we distinguish between the necessary and indispensable association or causation (between two things) on the one hand and the customary association on the

other. Necessary associations between two events are those that can never be discarded rationally. For example, any composition of four elements cannot be imagined unless there are two pairs.[14] On the other hand, the association between something and a particular feature (of that thing) is a customary or habitual association, i.e. the association is only known through repeated observation and cannot be known until it is experienced. For example, sugar cane is sweet but for someone never used to sugar cane, it has the possibility of tasting sour or even bitter. We learn about the features of things as we examine them. However, other features could have been designated to these things with no rational contradiction.

The crisis of the secular mind is that it is confined to experiences deduced based on customary association because it is acquired only through physical experience rather than rationalisation. Thus, the secular mind denies the possibility of anything outside the customary domain. Yet, if a few hundred years ago, when horses were the fastest means of transportation, a person were to have been informed of a vehicle that flies in the air and crosses oceans in less than a day, he would have denied this possibility based on his customary experience at that time. However, if that person based his acceptance on reasoning,[15] he may have admitted the possibility of such a vehicle. Muslim scholars firmly understood the difference between the two types of associations and clearly affirmed that causal relationships cannot be established based on customary occurrences.[16] This issue will be revisited during the discussion on the temporal and spatial limitations of the laws of physics.

Sources of Evidence for *ʿAqīdah*

Since our fundamental beliefs about the essence of the universe, life and other creatures are all extracted from and founded on *ʿaqīdah*, sources of *ʿaqīdah* have to be definitive with no probability of error in them. Contrarily to *fiqh*, as will be discussed in the subsequent section, *ʿaqīdah* evidences must have the power to subdue the mind to their irresistible convincing command. The sources of *ʿaqīdah* are the *ʿaql* (reasoning) and definitive textual statements from the Qur'ān and *Sunnah* (the sayings of the Prophet, SAW). Both sources have existed since the outset of the Qur'ānic revelation. Yet, the first source, reasoning, was formulated and used

as a defensive instrument against deviant groups as of the third *hijrī* century by great theologians such as Imām al-Ashʿarī. Textual evidences from the Qur'ān and *Sunnah* were more readily discussed and presented than logical ones during the early phases of Islam due to the impeccable faith of early Muslims.

The methodology of developing *ʿaqīdah* evidences based on reasoning can be understood by studying how Muslim theologians established some of the attributes of Allah (SWT). For instance, the rational proof for the divine attribute, *qidam* (having no beginning), is presented as follows:[17]

> All creatures came into existence from non-existence; they need constant maintenance, such as nourishment for living creatures and balancing forces for celestial bodies, to continue to exist; they come to an end in the form of biological death in the case of living beings or in the form of disintegration in the case of inanimate beings. Thus all creatures are *ḥawādith* (temporary and possible), not *wājib* (necessary). As a result, these creatures need a cause to bring them to existence. This cause cannot have a beginning, otherwise it too would need a second cause to bring the first cause into existence, etc. Therefore, the First Cause, the Creator, must have existed with no beginning.

The process of proving the *qidam* of Allah (SWT) depended on definitive observations of the fundamental characteristics of the universe. Then the only valid explanation for bringing these creatures into existence was concluded.

ʿAqīdah textual evidences are based on the Qur'ān and *Sunnah* in addition to statements made by the companions who explained how they understood the Qur'ānic and Prophetic statements. Texts of the Qur'ān and *Sunnah* have two aspects: their meanings and *isnād* (the chain of narration). In order for a text to qualify as a source of *ʿaqīdah* evidence, this text has to provide a definitive (*qaṭʿī*) meaning, i.e. not an equivocal meaning, and we have to be certain that this text has been correctly attributed to either Allah (SWT) or His Prophet (SAW). The Qur'ān has reached us through recurrent narration from one generation to the next, and thus we are certain that it is the word of Allah (SWT). Some Prophetic statements have reached us through mass, recurrent narration, but the majority of

them, called *āḥād ḥadīth*, have reached us through the narrations of few individuals at one layer or more of the chain of the narrators.

These *āḥād ḥadīth* do not qualify, according to the majority of scholars, to establish fundamental beliefs since the absolute certainty of attributing them to the Prophet (SAW) is not affirmed. However, authentic *āḥād ḥadīth* can be used to establish juristic views, because *fiqh* is concerned with the permissibility or otherwise of practical acts, which can be deduced from probable, not necessarily definitive, evidences. It is suggested that subjectivity of views and the probability of different understandings of the text are unavoidable in *fiqh*. Only the Ḥanbalī scholars have accepted, in theory, *āḥād ḥadīth* for the establishment of fundamental beliefs. In practice, Ḥanbalī scholars seek other evidences to support the *āḥād ḥadīth* and elevate the level of acceptance of these *ḥadīth*.[18]

Reasoning and sacred texts complement each other in a beautiful way to provide the full picture of *ʿaqīdah*. Reasoning provides a platform and a means for those who have yet to believe in the Qur'ān and want to verify the Qur'ānic arguments through another independent path. For Muslims, reasoning is the tool for strengthening their faith by reflecting on and observing the heavens, the earth and every thing within them. Reasoning takes a special precedence in *ʿaqīdah* because, according to theologians, many of the divine attributes can only be proven through it.[19] Some of these divine attributes are *qidam*, self-sustenance (*al-ghinā bi al-dhāt*), and non-resemblance to all temporal beings (*al-mukhālafah li al-ḥawādith*), unlimited power (*qudrah*), and oneness (*waḥdāniyyah*). The Qur'ān and *Sunnah* affirmed these attributes, without giving formal proofs, and added others to them.

The divine attributes of the Hearer, the Seer and the Speaker have become known to us through the Qur'ān, and can also be proved through reasoning. The Qur'ān and *Sunnah* also provide information about issues beyond the realm of reasoning. For example, we know a great deal of descriptive information about Paradise and Hell from the Prophet's journey through the heavens (*al-miʿrāj*) that was narrated in the *Sunnah*.[20] In short, if Islamic belief is imagined as a palace, reasoning allows man to walk a few steps into this palace and then the Qur'ān and *Sunnah* walk him through all its rooms and corridors.

Variations Among Schools

Since *ʿaqīdah* presents the fundamental beliefs that represent the true essences of things and they set the objective of our life and thus motivate our efforts, it is natural to find no major differences among recognised Islamic schools of *ʿaqīdah*. The narrow range of variability among these schools is due to the high level of certainty of *ʿaqīdah* evidences. An overwhelming majority of Muslims have been following, for more than twelve centuries, the orthodox beliefs represented by the Ashʿarī and Māturīdī schools. Both schools presented a faithful formulation of the beliefs of the Prophet (SAW) and his companions and took a frontier position in defending Islamic beliefs against the attacks and the concepts of heretic groups whose views were fuelled by the heritage borrowed from non-Muslim civilisations.[21] Some scholars are of the opinion that the two schools differed on no more than ten issues and that some of these differences can be attributed to lexical or conventional usage of terms.

Falsification

Can *ʿaqīdah* beliefs be falsified? The answer to this question should be evident based on the sources of *ʿaqīdah* evidences discussed above. Those who believe in the Qur'ān and *Sunnah* and accept the sound methodology of reasoning for producing results should believe in Islamic beliefs. Reasoning provides a common platform for people to mutually convince each other based on an unquestionable approach. Yet, the point of discussion would be the validity of the premises used as inputs to the reasoning process. As discussed, these premises are based on fundamental realisations that people develop during the first few years of their lives.

Thus, divine attributes established through reasoning should be believable to everyone. Fortunately, these attributes are the backbone of the entire *ʿaqīdah*. The Qur'ān and *Sunnah* affirm these attributes through a more intuitive approach that links these attributes to our needs and to our emotions (see for example the Qur'ānic verses *Sūrah al-Naml*, 27:60-64). Once the divine attributes are established, other beliefs should naturally follow. We should believe in Prophets and sacred scriptures, which are a form of mercy from Allah (SWT); we should believe in the Last Day since on that day the promised divine justice will be fulfilled; we should believe in paradise and

hell as the means of providing this justice. Thus, it can be stated with firm conviction that *ʿaqīdah* beliefs cannot be falsified!

Fiqh: Definition, Domain and Objective

While *ʿaqīdah* targets the beliefs of the intellect, *fiqh* (Islamic jurisprudence) targets the practical aspects of life. *Fiqh* is defined as knowledge of religious practical rulings as derived from their detailed evidences.[22] According to that definition, the domain of *fiqh* is manners and acts. Regarding prayer, for example, *fiqh* describes the physical movements and the verbal recitations, but it does not directly address the issue of concentration or humility, as this is inner feeling, which is beyond the scope of *fiqh*.

In general, *fiqh* rulings fall into three classes. One, *fiqh* assigns a rank or a degree of permissibility for a particular act that specifies whether this act must be performed (*wājib*, obligatory), is better to be performed (*mandūb*, recommended), is up to the personal choice (*mubāḥ*, permissible), is better to be avoided (*makrūh*, discouraged), or must be avoided (*ḥarām*, unlawful). *Fiqh* addresses permissibility; however, it is up to the concerned person to determine the efficiency or the impact of that which he/she wants to do. For example, *fiqh* determines whether a particular financial transaction is permissible or not; however, the expected profit or the economical viability of this transaction is to be determined by the concerned person.

Two, *fiqh* describes the procedures for worships and contracts. For example, *fiqh* illustrates the sequences and methodology for *ḥajj* and how to conduct a marriage contract. Three, *fiqh* provides quantitative answers to money or time related issues. For example, *fiqh* establishes the amount of *zakāh* payable on wealth as well as the share every heir acquires from the legacy. Thus *fiqh* provides a mixture of quantitative and qualitative answers in order to enable Muslims to conduct their rites and rituals and to live the practical part of their lives in accordance with the divine Will.

What are the reasons behind the variability of *fiqh* rulings among jurists? What is *ijtihād,* the process that results in the variance of *fiqh* rulings? Can all or only one outcome of *ijtihād* be correct? What are the main factors that govern the process of *ijtihād* and lead to the variance among schools? Finally, can *fiqh* rulings be falsified?

Scope and Permissibility of *ijtihād*

Schools adopt different approaches to tackle new issues that are not covered by texts of the Qur'ān and *Sunnah* (*nuṣūṣ*). The Mālikī school, for example, is more accepting than others in applying the instrument of *maṣlaḥah mursalah* (unrestricted public interest) on new issues. The Ḥanafī school turns to *istiḥsān* (juristic preference), more liberally than others, to solve new issues. However, all schools agree that in the case of conflict of benefits (*taʿāruḍ al-maṣāliḥ*), the greater benefit takes precedence. They also agree that removing harm (*dafʿ al-ḍarar*) takes precedence when a beneficial and harmful act conflict. The application of these different approaches in responding to new issues is the process of *ijtihād*. *Qiyās* is also part of *ijtihād*, as stated by Imām al-Shāfiʿī, since it produces a new ruling and because a great deal of personal judgment is involved.[23]

Thus, *ijtihād* is a *fiqh* process to establish rulings for issues that are not directly covered by divine or prophetic texts. However, *ijtihād* must be guided by the general objectives of Islam; its outcomes have to be in harmony with other rulings, and it can only be undertaken by scholars who fulfill the conditions for being *mujtahid*. Therefore, it is important to emphasise that when the process of *ijtihād* deviates from the criterion that should be followed, then the outcome in such a case is considered to be attributing a lie to Allah (SWT). The Qur'ān is categorical: "Say (to these polytheists): 'Do you see, what provision Allah has sent down to you! And you have made some of it unlawful and (some) lawful.' Say: 'Has Allah permitted you (to do so), or do you invent a lie against Allah?'" (*Sūrah Yūnus*, 10:59). Ibn al-Qayyim said, "This is a declaration from Allah (SWT), that it is not permissible for His servants to claim that this is lawful or this is unlawful unless their claim is based on *knowledge* that Allah (SWT), made that thing in question lawful or unlawful."[24] Ibn al-Qayyim's remark has two implications. First, legislation cannot be independently performed by man; it has to have a basis in a principle extracted from the sources of revelation. Second, legislation can only be performed by those who have the knowledge that enables them to reach the truth after they exert their best effort.

Fiqh rulings can be divided into two categories: definitive rulings (*al-aḥkām al-qaṭʿīyyah*) and non-definitive rulings (*al-aḥkām al-*

dhanniyyah);[25] *ijtihād* relates to the latter. Definitive rulings include the following:

- Rulings extracted from the Qur'ānic verses or prophetic statements, which carry explicit and unequivocal orders or prohibitions, such as the verses that make prayer and fasting obligatory.
- *Fiqh* rulings based on the consensus of recognised scholars.

Fiqh scholars consider rulings of this category as absolutely correct and not open to discussion. Contradicting any definitive ruling is an obvious error that would show the ignorance of the contradictor. All scholars agree that it is permissible for those with the required qualifications to perform *ijtihād* to reach non-definitive rulings.

Scholars substantiated their position on the permissibility of *ijtihād* with two evidences. First, when the Prophet (SAW) sent Muʿādh ibn Jabal to Yemen as a judge and educator, he asked him how he would judge if he did "not find a text in the Qur'ān or my *Sunnah* related to the issue in question." Muʿādh replied, "I will resort to my *ra'y* (opinion) and exert my best effort to reach the truth." The Prophet (SAW) was pleased and endorsed what Muʿādh said.[26] Muʿādh's promise to exert his best effort is related to the fact that scholars attain different levels of the truth based on their different levels of knowledge and understanding and based on the amount of effort they exert in seeking the truth. Allah (SWT) says: "To Sulaymān We inspired the (right) understanding of the matter: to each (of them) We gave Judgment and Knowledge; it was Our power that made the hills and the birds celebrate Our praises with David: it was We Who did (these things)" (*Sūrah al-Anbiyā'*, 21:79). Allah (SWT), demonstrated in this verse that Prophet Sulaymān (AS) surpassed Prophet Dāwūd (AS) in the level of understanding, even though both had been given their shares of knowledge and wisdom.

Second, in his letter to Abū Mūsā al-Ashʿarī, ʿUmar wrote, "Then target, according to your judgment, whatever you think that Allah (SWT) likes the most and is closest to the truth."[27] In the above statement, Umar realised that arriving at the truth is not always possible, thus when a *mujtahid* strives for a ruling, even if he does not achieve the absolute truth on a matter, he should at least aim to be close to the truth. For this reason, he said "closest to the truth,"

not necessarily the truth itself. This expression is very much aligned with the fact that the truth, in non-definitive *fiqh* rulings, is hidden from us; it is known only to Allah (SWT), and no *mujtahid* can claim that his/her view is the absolute truth. Imām al-Jurjānī captured this attitude well saying: "Our *fiqh* view is correct, but it is possible that it is wrong. Opposing views are erroneous, but it is possible that they are correct."[28]

Based on this concept, the Prophet (SAW) prohibited Buraydah, the leader of his troops, to tell his enemy while negotiating with them "this is the ruling of Allah (SWT)." The Prophet (SAW) told him, "Since you do not know whether you realised the ruling of Allah or not, you should rather tell them that this is my verdict and that of my companions."[29] Ibn al-Qayyim commented on this *ḥadīth* saying, "It is prohibited to call the rulings of a *mujtahid* the ruling of Allah (SWT)."[30] Accordingly, when we mention *fiqh* positions we should attribute them to the *fiqh* schools or scholars who derived them, not to Allah (SWT) directly.

Are All *Mujtahid*s Correct?

In the case of differing opinions on one issue, the scholars have debated whether only one of those views is correct or more than one could be correct. The majority of jurists, including those of the four schools, believed that only one position can be correct.[31] They based their belief on the *hadīth*, "When a judge issues a verdict based on his *ijtihād*, if he is correct, then he receives two rewards. And when he issues a verdict based on his *ijtihād*, if he is mistaken, then he receives one reward."[32]

The word "mistaken" in the *ḥadīth* shows that the truth, or the correct ruling, is one, for if the truth lies in multiple views, then every *mujtahid* would be correct and two contradicting views would be correct, too. Accordingly, each definitive and non-definitive ruling has a single correct position. The difference between the two categories, definitive and non-definitive, is that Allah (SWT) made the signs and the evidences that would guide the *mujtahid* to the ruling less indicative and harder to pin down in the case of the non-definitive ones. In other words, Allah (SWT) did not want the entire *fiqh* corpus to be definitive; otherwise He would have indicated all *fiqh* rulings in non-ambiguous language. For this reason, many

scholars say that differences in *fiqh* positions represent the Will of Allah (SWT) and carry His mercy.

Since qualified scholars are permitted to exercise *ijtihād*, knowing that only one of them would derive the correct ruling, three important corollaries were established:

1. Scholars will not be reproached for not arriving at the correct ruling provided they exert their best effort. They will even be rewarded, out of the mercy of Allah (SWT), for attempting to arrive at a ruling. Those who exert their best and arrive at the correct ruling will, thus, be doubly rewarded, out of the bounty of Allah (SWT). Imām al-Āmidī said, "Sin is waived from the *mujtahid* in regard to juristic issues because it is adequate in these issues to approach the truth as close as possible."[33]

2. It is permissible for laymen to follow a qualified *mujtahid*, even though this *mujtahid* might not always arrive at the correct rulings. Understandably, if sin is waived from the *mujtahid*, it is also waived from laymen who follow him. For this reason, the Prophet (SAW) urged us to follow his companions though they had many differences in juristic issues. Since they were qualified to issue *fatwā*, they could be followed for guidance. Indeed, the same principle applies to the four *fiqh* schools.

3. Since all outcomes of *ijtihād* are non-definitive, no particular *ijtihād* takes precedence over another *ijtihād*. Thus, if a *mujtahid* changes his *ijtihād*, deeds that were based on the first *ijtihād* remain valid.

Inspired by the permissibility of *ijtihād* and differences of opinion, the companions sometimes rewarded those who differed with them, out of appreciation for their objectivity. Abū Bakr appointed Zayd ibn Thābit as a judge, even though Zayd disagreed with him regarding the grandfather's share of inheritance.[34] Likewise, ʿUmar admired Shurayḥ for his knowledge and honesty and appointed him an official judge despite Shurayḥ's earlier verdict against ʿUmar.[35]

Reasons for the Difference of Views among the Schools

It has been shown that in the event of different *fiqh* positions, only one position is correct while others are in error. To understand how

error may creep into the outputs of *fiqh*, it is imperative to understand the methodology of producing these outputs. The methodology of producing *fiqh* rulings is developed and illustrated in the science of *uṣūl al-fiqh* (principles of jurisprudence). The science of *uṣūl* sets the criteria and the methodology for inferring a ruling from the legal sources. Schools differ in their rulings based on differences in their *uṣūl*.

The factors that led to the differing positions among the schools can be enumerated as follows:

1. Though scholars agree on four principal legal sources,[36] they differ on additional sources on which *fiqh* rulings may be established. The Shāfiʿī school, for example, does not accept the statement of a companion as an independent evidence, whereas the Ḥanbalī school does. The Mālikī school considers *maṣlaḥah mursalah* an accepted independent instrument for establishing rulings whereas other schools do not.

2. Sometimes there is an apparent conflict between the evidences. The criteria used by scholars to prefer one evidence over another are extremely complex and is a major topic in *uṣūl* studies. Not all the elements of these criteria are agreed upon between all the schools. For example, the Ḥanafī school does not qualify general statements of the Qur'ān with *aḥādīth* whereas the Shāfiʿī school does; this resulted in many differences in rulings between the two schools. Also, when *qiyās* (analogy) is not in accordance with a *ḥadīth* narrated by a non-scholar companion, the Ḥanafī school accepts the *qiyās*, whereas the Shāfiʿī school accepts the *ḥadīth*.

3. In many *fiqh* scenarios, jurists weigh benefits against harms to decide on a ruling. The assessment of the magnitude of the benefits and harms is subjective. Based on the different assessments of the scholars, different rulings emerge.

Factors Making *Some Fiqh* Rulings Sounder than Others

Since the majority of *fiqh* rulings are non-definitive, how can we measure the soundness of a ruling? The answer to this question lies in the collective effort of the scholars in figuring out and verifying *fiqh* rulings, which is tightly coupled to the concept of a *fiqh* school.

Additionally, we can ask: what makes the position of a *fiqh* school sounder than the position of an individual *mujtahid*? The jurists join hands and continually build on each other's work to reach the authentic positions that represent their school. This can be exemplified by looking at the way the Shāfiʿī school operated and selected their most authentic books. The other three schools have the same approach, albeit their historical course may be different.

The students of Imām al-Shāfiʿī spread out in three main territories: Iraq, Khurāsān, and Egypt. Over time, the Shāfiʿī school came to have two main camps, one in Baghdad and one in Khurāsān, with some differences in the mindsets and the methodology of deduction. Imām al-Nawawī said, "Our Shāfiʿī companions from Iraq had greater mastery than our Khurāsānī ones of the statements of our Imām, his fundamentals and the views of early Shāfiʿī scholars. However, the research, the ability to branch off new *fiqh* issues, and the organisation of the writings of the Khurāsānī ones are stronger."[37]

The Shāfiʿī scholars worked together to merge the two sub-schools into one, until the time of Imām al-Qaffāl al-Marūzī (d 417 h) who almost unified the two schools. By the time of Imām al-Rāfiʿī (d 623 h) and Imām al-Nawawī (d 676 h), the two schools were completely merged into one. Imām al-Juwaynī (d 438 h) authored his famous book, *al-Nihāyah*, which captured the essence of the four books of Imām al-Shāfiʿī, in addition to the most important views of the early Shāfiʿī scholars.[38]

Imām al-Ghazālī (d 505 h) abridged *al-Nihāyah* in four successive books, each one more succinct than the previous one; *al-Wajīz* was the third of these abridgements.[39] Then Imām al-Rāfiʿī (d 623 h) wrote two commentaries on *al-Wajīz*, the bigger of which was *al-ʿAzīz*.[40] Imām al-Nawawī abridged, reviewed, edited, commented on and added to *al-ʿAzīz* in an extremely important book, *Rawḍah al-Ṭālibīn*, which has attracted a lot of attention.[41] Many scholars added more comprehensive commentaries to *al-Rawḍah* or even abridged it to more succinct books based on their purpose.

The two Imāms, al-Nawawī (d 676 h) and al-Rāfiʿī (d 623 h), are considered to be the two pillars of the Shāfiʿī school in recognition of their extensive contribution to and review of early Shāfiʿī *fiqh* works. Any view they agreed upon is considered to be the authentic

view of the Shāfiʿī school. If they disagreed, the view of Imām al-Nawawī is preferred. Imām Ibn Ḥajar al-Haytamī said, "No *fiqh* view should be directly taken from early books written before the two *imām*s, al-Nawawī and al-Rāfiʿī, without extensive investigation to ascertain that this view truly represents the authentic view of the Shāfiʿī school."[42] This important statement confirms that the authentic views of the Shāfiʿī *fiqh* were crystallised by these two *imām*s.

Another layer of detail and verification was added by *imām*s, al-Ramlī (d 1004 h) and Ibn Ḥajar al-Haytamī (d 973 h). Their views represent the authentic positions of the Shāfiʿī school after al-Ramlī and al-Nawawī. At present, *al-Nihāyah*, compiled in Egypt by al-Ramlī, and *al-Tuḥfah*, compiled in Yemen by Ibn Ḥajar al-Haytamī, are the two most authentic books of Shāfiʿī *fiqh*.[43] The two books have acquired authenticity by virtue of having been positively reviewed by hundreds of scholars over a long period. *Al-Nihāyah*, for instance, was reviewed *by* four hundred Shāfiʿī scholars who used to gather in the mosque of ʿAmr ibn al-ʿĀṣ in Cairo.

The overly simplified review of the development of the Shāfiʿī school indicates several points. First, in each generation, many distinguished *imām*s derived new rulings, analysed evidences of earlier views, and taught authentic books to the public. The books of *al-ṭabaqāt* (generations of scholars) list thousands of scholars of the four *fiqh* schools.[44] Second, scholars of later generations have examined and verified the statements and views of the founders of the schools. Third, scholars benefitted from each other's works to produce new rulings providing the basis for further development. More importantly, the *fiqh* material grew from one generation to the next to address new events. Fourth, scholars worked meticulously to filter existing views and chose the most correct ones, from among the many available, according to their *ijtihād*. In short, the existing *fiqh* corpus known as the Shāfiʿī school, has been verifiedby scholars over many generations. This collective verification is the source of authenticity and soundness of views of these schools.

Falsification

Can *fiqh* rulings be falsified? As discussed, some *fiqh* rulings are definitive and thus absolutely correct. These rulings are not subject

to discussion for those who believe in the Qur'ān and *Sunnah* as sources of legislations. Apart from definitive rulings, error may creep into *fiqh* rulings due to several reasons, the most important of which are the following: not knowing a *ḥadīth* on which a ruling can be founded, not knowing that a statement has abrogated an earlier statement, not realising that a general statement was qualified by another statement, making a wrong judgment in inferring the effective cause (*ʿillah*) for *qiyās*, and contradicting a ruling that has been agreed upon by consensus. These can be termed as obvious errors. Due to the intensive review and study of *fiqh* rulings and their sources over many generations by many jurists, as explained above, these obvious errors are not likely to exist today. The jurists, throughout history, have researched *fiqh* issues down to the last bit of detail. Actually, except for new events, it is a real challenge to find a point of contribution to *fiqh* material.

Apart from obvious errors, since Allah (SWT), did not assign concrete, explicit evidences for the majority of *fiqh* issues, the outcome of *ijtihād* would remain correct in the view of their originating *mujtahid*. What gives the outcome of *ijtihād* a higher level of authenticity is its acceptance by a greater number of scholars. Moreover, when these *ijtihād*-based rulings are practised by the masses without serious complaints over their practical difficulty, the social acceptance of these rulings adds to their scientific merits and these rulings get classified as the adopted and accepted *fatwā* of the school.

In summary, *fiqh* rulings can be classified into the following three categories with regard to their correctness:

1. Definitive rulings which are absolutely correct and not subject to discussion,
2. Rulings that may result from obvious errors, which do not exist in contemporary times due to the intensive reviews conducted by many scholars, and
3. Non-definitive rulings over which proper *ijtihād* has been exercised, whose correctness is subjective and whose authenticity should be respected by every one. These rulings are non-falsifiable, except by Allah (SWT) Who knows the absolute truth.

Physics: Objective, Subject and Domain

The domain and subject of physics can be best illustrated by describing some important laws of physics as follows:[45]

- Kepler's law of planetary motion states that the orbit of each planet is an ellipse and the sun is at one of the foci. This law characterises the orbits of planets around the sun and the spatial relationship between the sun and the orbit of each of these planets.
- Newton's second law states that **F** = **ma** where **a** is the acceleration caused by applying force **F** to an object with mass **m**. The force needed to accelerate an object according to a particular speed can be calculated by this law.
- Clausius' statement of the second law of thermodynamics is, "Heat cannot, by itself, pass from a colder to a warmer body."
- Ohm's law states that **V** = **RI** where V, R, and I are the voltage, resistance and current of a conductor. One of the three parameters can be calculated upon knowing the two others.
- Einstein's postulate of special relativity states, "The speed of light is independent of the motion of its source and of the motion of the observer." This postulate explains that irrespective of the movement of the source of light or the observer, the speed of light remains the same.

The cited examples show that laws of physics describe physical phenomena quantitatively as in the case of Newton's second law or qualitatively as in Einstein's postulate. The qualitative description of physical phenomena helps us understand the dynamics of these phenomena, while quantitative laws enable us to design devices that utilise these phenomena. Thus, the objective of physics is to reach proper understanding and quantitative formulation of physical phenomena and consequently envisage useful machines that make use of these phenomena.

The Theory of Relativity

Can theories of physics be falsified? This can be answered by examining the theory of relativity. Relativity is a special topic in physics as it addresses a non-intuitive property of the world that can

be better understood through reasoning. Unlike other topics in physics, such as the law of thermodynamics whose validity can be ascertained through some experiments, relativity does not lend itself to common sense as it does not belong to our daily experience.[46] What is interesting about relativity is that, at some points, it crosses other domains such as *ʿaqīdah*. Relativity does not subscribe to the tenets of positivism.[47] Einstein built his theory on "thought" experiments. The contribution of the human mind to this theory is highly evident, while the experimental component of this theory is very limited.

In 1905, Einstein proposed that time is not absolute, but is relative to the observer. Accordingly, the ticks of two clocks are not absolute, but they depend on the relative speed of the two clocks. If two clocks were synchronised, then one clock stayed at rest, and the other one was carried in a very fast space shuttle, which later came back, this second clock would read less time than the clock at rest. In other words, people in the space shuttle would age less than those who stayed beside the clock at rest.[48]

Laws of mechanics also embody a principle of relativity. The motion of a ball, for instance, acted on by a force depends only on the magnitude of this force whether this ball is in a car moving at constant speed or held by a stationary person. Relativity says that no mechanical experiment of any kind can reveal the absolute motion of this ball since these experiments are only impacted by the relative speed of the mechanical object to the observer. Einstein extended this sense of relativity from mechanics to all branches of physics. He said that no experiment, whatsoever, not just a mechanical one, could reveal the absolute motion of the observer. In 1888, Maxwell showed that an electromagnetic (EM) wave could be produced using an oscillating electric current in a magnetic field.[49] This EM wave can travel in space on its own, free of the magnets and wires that produced it. More importantly, this EM wave travels with the speed of light, which is 299,793 km/s. Thus, Maxwell concluded that light is an EM wave traveling with a constant speed through space.

All waves known by the nineteenth century, such as water and sound, need a material substance to travel through. When Maxwell introduced EM waves, scientists assumed that EM waves also need

a medium to travel through. Scientists hypothesised a medium, called ether, to carry EM waves. Since light, which is an EM wave, reaches us from the sun and fills the whole of space, ether must pervade through the whole of space. According to this hypothesis, ether is the medium that embodies the condition of absolute rest and absolute motion can be referenced to it.

A very important experiment in the history of physics was conducted by Michelson and Morley to determine if EM phenomena can have a state of absolute rest. This experiment showed that no such state could be found. Many physicists think that Einstein, in deriving his postulates, was greatly influenced by this experiment. In 1887, Michelson and Morley set out to determine the speed of the earth through ether by measuring the relative speed of EM waves traveling in different directions.[50] They built sensitive equipment to detect the speed of EM waves in different directions. They were expecting to see different speeds of EM waves emitting at different directions relative to the ether. But to their disappointment, they could not find any difference in the speed of the EM waves in different directions. Eighteen years later, Einstein explained the result of the Michelson and Morley experiment. He said they could not measure the speed of the earth through the ether, because the ether did not exist. He also added that light and all EM waves did not need a medium to travel through. Light can travel in a vacuum where there are no fixed points relative to which any speed can be measured.

Postulates of the Theory of Relativity

Einstein summarised his findings in the following two postulates.

- Postulate 1: All observers moving at constant speeds, even if these speeds are different from each other, will witness identical laws of physics, not only mechanics. Such observers will not be able to determine their speeds in absolute terms.
- Postulate 2: The speed of light is the same as measured by all observers, independent of their speeds and whether they are accelerating or decelerating.

The second postulate adds an important piece of data to the first one. According to the first postulate, the speed of a mechanical object

is relative to the speed of the observer. But, the second postulate negates this relativity only in the case of light. If three people are holding flashlights, two of them are moving with constant but different speeds and the third is accelerating, the speed of light emitted from the three flashlights will be exactly the same. This means that light does not follow the particle-motion model, where the particle's speed is relative to the emitter. Light follows the wave-motion model, as formulated by Maxwell's equations, but requires no medium to go through. It is important to mention that the second postulate applies to anything that approaches or reaches the speed of light, not just to phenomena involving light. This means that the law of combining speeds by simply adding them does not apply to high speeds, close to the speed of light.

The law of combining speeds is what makes sense to us because it deals with the range of speeds we experience in our daily life. However, at high speeds, this law should be replaced with a more general law, which is,

$$u = (u' + v)/(1 + u'v/c^2),$$

where u is the velocity of the object with respect to ground, u' is the velocity of the object with respect to the observer, v is the velocity of the observer with respect to ground, and c is the velocity of light. This general law does not follow from our common sense because it deals with high speeds beyond our daily experience. We only develop intuition of things that we experience. The lesson here is that we should not dismiss arguments that do not agree with our common sense, if we ever want to acquire knowledge of things beyond our limited daily experience.

Falsifying Theories of Physics

Apparently, Einstein's theory of relativity has invalidated several important misconceptions that were commonly accepted in the nineteenth century. Before Einstein, scientists used to believe in absolute rest and absolute motion. They hypothesised ether as a substance that embodies absolute rest and as a carrier of EM waves. Einstein eliminated the need for ether by invalidating the whole concept of absolute rest and motion. He demonstrated through mental experiments that only relativity impacts the outcome of the

experiments of physics. It seems that the belief in absolute rest was based on the philosophical view of Aristotle of the existence of a center of the universe that is totally at rest while other planets are moving toward this center. Aristotle's view was a mere visual image in his mind about how the universe should be, an image that was not substantiated by experiments or observations.

Relativity also falsified the concept that time and space are two independent properties. Relativity showed that time is closely related to motion and it is relative to the observer. Two observers located in two different frames of motion would sense time differently. A second as measured by one clock corresponds to less than a second if measured by another clock in motion with respect to the first clock. Independence of time and space was suggested by early scientists as an extension of their belief in absolute rest. Thus, missing the relationship between time and motion is directly caused by the same reason that led to the belief of absolute motion, as discussed in the previous paragraph.

Many contemporary authors mention Newton as one of the believers of absolute time based on his statements in his famous book, the *Principia*. Then they wonder about the contradiction between Newton's statements and the laws of mechanics introduced by him. According to these authors, Newton's laws only demonstrate the principle of relativity, so why did Newton assert the existence of absolute time and motion, which is quite contradictory to his laws? They answer this question by saying that Newton was influenced by Aristotle's view of the universe and of absolute rest.

A careful examination of Newton's statements can show that Newton was fully aware of the fact that his laws demonstrate relativity, as it can be reasonably expected. Nonetheless, Newton seemed also to be aware that his laws might not be applicable everywhere. Newton realised that absolute rest might exist somewhere else in the universe, which is not covered by his laws. Newton said in the *Principia*, "And therefore it is possible that in the remote regions of the fixed stars, or perhaps far beyond them, there may be some body absolutely at rest."[51] This statement clearly shows that Newton was fully aware that his laws carry no sense of absolute rest or motion, and accordingly he guessed that absolute rest may exist in far, fixed stars. To go deeper, Newton associated

absolute rest with God as an eternal and perfect being Who constitutes time and space. He said "The Supreme God is a Being eternal, infinite and absolutely perfect … and by existing always and everywhere, He constitutes duration and space."[52]

Moreover, relativity showed that the simple law of combining speeds can be used with acceptable accuracy only at low speeds, relative to the speed of light. The reason behind missing this fact is the unavoidable margin of error in our measurements of speed, and that the difference in results between the general law and the simplified law can be ignored at low speeds.

After discussing the arguments falsified by the theory of Relativity, we should ask ourselves if all the arguments of Relativity are fully confirmed. The two postulates of Relativity were later supported by experimental evidences and by mental demonstrations that make them believable based on our current knowledge. Also, the dismissal of the existence of ether is reasonable after proving that EM waves can travel happily in vacuum. However, some of the outcomes of the theory can still be discussed. For example, Einstein did not provide any logical justification for dismissing the existence of absolute motion, other than those physical phenomena, known to us so far, cannot determine absolute motion, and thus this motion, according to Einstein, does not exist.

As discussed earlier, Newton was more inclusive in considering less familiar conditions to us, such as those on far stars, where absolute rest may exist. Also, Einstein suggested that the speed of bodies approaching the speed of light could only be measured accurately using the general law of combining speed. However, a huge amount of energy is needed to approach the speed of light. So, was it experimentally demonstrated by pushing a body close to the speed of light, by measuring its speed, and by comparing it to the result of the general law of combining speed? Finally, did Einstein repeat the same mistake of the scientists of the nineteenth century in assuming that all types of waves do travel at the speed of light?

Before closing the discussion on falsifying theories of physics, it is instructive to mention that the way of conducting a physical experiment plays a critical role in the validity of the conclusions. Early thinkers, such as Francis Beacon (1561 – 1626), had recognised

the pitfalls of the experimental methodology and listed some good tactics to avoid misleading results.[53] Some of these tactics include: One, to diversify the experiment by changing types and quantities of the substances used. Two, to conduct the experiment under different conditions and figure out the impact. Three, to conduct the experiment under conditions that are not supposed to produce the result and confirm the contributing factors to the success of the experiment. Four, to increase the efficiency of the experiment by combining substances or conditions that may lead to a better result. Five, to reverse the flow of doing the experiment and study the consequences. It is obvious that Beacon suggested these tactics to avoid misinterpretation of the experimental results, which is a main source for introducing false theories in physics.

Harmonising Human and Experimental Sciences

As discussed above, there is a strong relationship and interaction between *ʿaqīdah, fiqh* and physics. *ʿAqīdah* provides an overall system of beliefs and shapes our views about the whole universe. Based on our belief in *ʿaqīdah* outcomes, we accept *fiqh* as knowledge that guides our practical acts in life. Physics aims at understanding physical phenomena and formulating them mathematically and then using these formulae to design useful machinery to increase the efficiency of our lives. However, physics alone cannot provide full understanding of the physical phenomena around us. *ʿAqīdah* is needed to reconcile and harmonise our interpretation of the physical phenomena that we encounter in life, and to view them through a unified platform. *Fiqh* is also needed to safeguard against the destructive potential of the endeavour of physics' research. Physics and *ʿaqīdah* could complement each other as explained below.

ʿAqīdah, it may be recapitulated, links us with the upper worlds and thus trains our mind to deal with and accept non-customary scenarios beyond our common daily experience. Developing this mindset is quite useful in addressing physical phenomena, especially those phenomena that do not really align with our common sense, such as relativity and quantum mechanics. Perhaps, that is part of the reason for both relativity and quantum mechanics to be developed later than other branches of physics, such as Newton's laws of

mechanics. We have seen the difficulty experienced by physicists in digesting the fact that some waves do not need a medium to travel through, because all waves known to them by that time did need a medium for their travel. Islamic revelation emphasises the fact that our knowledge is limited and very much inferior to the knowledge of our Creator. The Qur'ān reminds us that some people have firmer and more profound knowledge than others; "but over all those endowed with knowledge is the All-Knowing (Allah)" (*Sūrah Yūsuf,* 12:76). This attitude should make scientists more open to accepting less expected results. It is interesting to note that Einstein's challenging attitude and skepticism toward accepted claims was one of the factors that enabled his perception of relativity.

In interpreting physical phenomena, it is important to base it on a coherent system of beliefs. Thus, such phenomena should be attributed to their real doer. It is also appropriate to observe the sense of divine favour behind these phenomena. In many verses, the Qur'ān combines the description of a physical scenario with the reminder of the divine bounty on us as in the following verse: "See they not that We have made the night for them to rest in and the day to give them light? Verily in this are signs for any people that believe!" (*Sūrah al-Naml*, 27:86). In order to attribute physical phenomena to their real doer, the distinction between causality and customary association has to be made clear. No non-Muslim philosopher, perhaps, has come closer to the Islamic view of causality than David Hume (1711-1776). Observing the scenario of a ball hitting another ball at rest and consequently the second ball starting to move, Hume commented that there is nothing inherent in the motions of the two balls that require them to be causally connected.[54] He added that it is only because we observe such events frequently that we assume they are causally connected. He said:

> Nor is it reasonable to conclude, merely because one event, in one instance, precedes another that therefore the one is the cause and the other is the effect, …. All inferences from experience, therefore, are effects of *custom*, not of reasoning.[55]

This last statement of Hume is indeed amazing! Hume said that repetition of acts, preceded by particular events, does not establish a causal relationship between the act and the event, but we just become accustomed to the association between the pair of the act

and the event.[56] All that Hume needed to add in order to elaborate a full Islamic theory of causality was that the Divine Will decrees the act to happen when the event takes place and the same Divine Will may decide to break this association in some instances.

In addition to recognising the real doer of physical events, the spatial and temporal limitations of these laws have to be recognised as well. Physical laws come into effect in particular environments that provide the operable conditions of these laws. Many of the laws of physics may be inoperable in far stars enduring excessive pressure or temperature. Also, these laws are operable during our life on the earth. Upon commencement of the hereafter, all these laws will come to a halt and be replaced with different ones. Actually, even during this life, these laws may be temporarily suppressed at the times of miracles to show support to a Prophet or to pious people. Only through *ʿaqīdah*, can we have a unified view of different stages of life, starting with this life and followed with the hereafter.

ʿAqīdah can draw the big picture around some facts of physics that cannot be fully comprehended otherwise. A good example is the speed of light, the fundamental constant of the whole cosmos. Only EM radiation and pure energy can travel at 299,793 km/s. The speed of light is different from other physical constants such as the boiling point of water that can be increased or decreased by adding some solvents to the water. Different types of radiation travel exactly at the speed of light. Moreover, this speed is the upper limit that cannot be exceeded. Why is this number in particular chosen? Why not, 299,794 or 299,792? The answer lies in the divine choice of this constant. There is no physical or mathematical justification for this constant that the present level of knowledger is aware of. *ʿAqīdah* helps us to see how God made a choice that controlled many physical phenomena.

Conclusion

ʿAqīdah is the science that provides a holistic understanding of the universe and of its Creator. The field of research of other sciences and the outcomes of these sciences can be determined and accepted respectively in the light of *ʿaqīdah* views. It has been shown that physics falls short of interpreting physical phenomena unless these phenomena are looked at through the *ʿaqīdah* holistic view. Study

of *ʿaqīdah* enhances the rational sense of our thinking and releases us from being overwhelmed with customary experience. This in turn helps scientists to be more receptive to conclusions that do not lend themselves to common sense such as those conclusions from relativity and quantum mechanics.

The level of truthfulness of a science's outcomes is tightly coupled with the objective and research methodology of that science. *ʿAqīdah* forms the system of belief and thus obviously, its outcomes have to be certain. *ʿAqīdah* enjoys the highest level of certainty among other sciences because it is based on texts conveyed through recurrent transmission and on reasoning. Reasoning represents the neutral part of the evidences that should be believable to everyone and through which the fundamental divine attributes can be derived.

In *fiqh*, subjectivity of views and the probability of different understandings of the texts are unavoidable. Accordingly, the variance of views in *fiqh* is broader than that of *ʿaqīdah*. Apart from apparent errors, *fiqh* views cannot be falsified. These views gain a higher level of authenticity through the collective mode of deriving and validating them. For this reason, the four Islamic schools of law represent the most endorsed body for developing *fiqh* views.

Concerning physics, error may creep into laws of physics due to the methodology of conducting the physical experiments, misinterpreting the experimental results, or accepting invalid assumptions. The theory of special relativity, as discussed, has shown how it invalidated and rectified some of the concepts about motion and time measurements. Credibility of physical experiments should be limited to the conditions and setup under which the experiments were conducted.

This paper shows that it is beneficial to consider *ʿaqīdah* as a *master* science under which experimental sciences, such as physics, are guided.[57] Only through this hierarchical view, can sciences coexist on a unified platform of human understanding.

Notes

1. The term "truthfulness" has been used to refer to the degree of closeness between a certain claim and the reality. Therefore, a claim is true if it is an

accurate representation of some phenomenon and thus corresponds to the facts as they are in the real world.

2. The methodology is defined as a body of rules and postulates employed in a discipline in order to direct the path of our research toward positive outcomes. See A. Janet Kourany, *Scientific Knowledge* (Belmont: Wadsworth Publishing Company, 1987), 191. Validation is to support or corroborate a claim based on sound basis. Theories gain more credibility as they are successfully validated using different testing approaches, by different scholars, and over an extended period of time. See Peter Kosso, *Readings in the Book of Nature: An Introduction to the Philosophy of Science* (Cambridge: Cambridge University Press, 1991), 15.

3. In this context, acceptance means it is generally recommended to use this claim to build other theories based on it.

4. Falsification is a way of testing a theory by deducing from its consequences regarding observable states of affairs that are then compared with the results of observation and experiment. If the comparison process results in a match, the theory is probably true otherwise the theory is false. See Kourany, *Scientific knowledge,* 121.

5. See Alparslan Acikgenc, *Islamic Science: Towards a Definition* (Kuala Lumpur: ISTAC, 1996), 35.

6. See Kourany, *Scientific Knowledge,* 77.

7. See Kosso, *Readings in the Book of Nature: An Introduction to the Philosophy of Science,* 15.

8. See Kourany, *Scientific Knowledge,* 112.

9. Among these principles are that the universe is limited in space, even though it may be expanding, and that this life will be followed by another permanent life where people will be rewarded according to their deeds.

10. Belief in scriptures entails belief in their teachings and contents such as the events of the Last Day and descriptions of paradise and hell.

11. See Osman Bakar, *The Theory and Philosophy of Islamic Science* (Cambridge: Islamic Texts Society, 1999), 19-26.

12. ʿAbd al-Karīm al-Tattān and Muḥammad Adīb al-Kīlānī, *ʿAwn al-Murīd li Sharḥ Jawharah al-Tawḥīd fī ʿAqīdah Ahl al-Sunnah wa al-Jamāʿah* (Damascus: Dār al-Bashā'ir, 1999), 1:161.

13. Many writers quote this example and others from the writing of imam al-Ghazālī, which may give the impression that al-Ghazālī is an originator of the belief of association. It should be understood that imam al-Ghazālī shares this

belief with the overwhelming majority of Muslim scholars and that this belief was documented in many references of *aqīdah* far before al-Ghazālī.

14. Muṣtafā Ṣabrī, *Al-Qawl al-Faṣl* (Cairo: Dār al-Salām, 1986), 33.

15. The term "reasoning" is used to include all forms of rational thinking, not only to the formal patterns of deduction used in logic as a science.

16. See al-Tattān and al-Kīlānī, *ʿAwn al-Murīd li Sharḥ Jawharah al-Tawḥīd fī ʿAqīdah Ahl al-Sunnah wa al-Jamāʿah,* 1:160-168.

17. Imām al-Laqqāni concisely formulated this proof in verses number: 17, 23, 24 of his poem. See al-Tattān and al-Kīlānī, *ʿAwn al-Murīd li Sharḥ Jawharah al-Tawḥīd fī ʿAqīdah Ahl al-Sunnah wa al-Jamāʿah,* 1:40.

18. ʿAbd Allah Al-Turkī, *Usūl Madhab al-Imām Aḥmad* (Beirut: Mu'assasah al-Risālah, 1996), 315.

19. Al-Tattān and al-Kīlānī, *ʿAwn al-Murīd li Sharḥ Jawharah al-Tawḥīd fī ʿAqīdah Ahl al-Sunnah wa al-Jamāʿah,* 160.

20. Osman Bakar, "Cosmology," in *The Oxford Encyclopedia of the Modern Islamic World*, ed. John Esposito (New York: Oxford University Press, 1995), 322-328.

21. ʿAlī ibn al-Ḥasan ibn ʿAsākir, *Tabyīn Kadhib al-Muftarī fī mā Nusiba ilā Abī al-Ḥasan al-Ashʿarī* (Damascus: Dār al-Fikr, 1978), 57.

22. Muḥammad Abū Nūr Zuhayr, *Uṣūl al-Fiqh* (Cairo: Dār al-Tabāʿa, al-Muḥammadīyyah, n.d.), 1:18

23. Muḥammad ibn Idrīs al-Shāfiʿī, *Al-Risālah*, ed. Aḥmad Muḥammad Shākir (n.p.: Dār al-Fikr, 1309 h.), 477.

24. Muḥammad ibn Abī Bakr Ibn Al-Qayyim Al-Jawzīyyah, *Iʿlām al-Muwaqiʿīn ʿan Rabb al-ʿĀlamīn* (Beirut: Dār al-Fikr, 1977), 1:38.

25. The term "speculative" is avoided here since these non-definitive rulings are based on well-defined deductive process performed by qualified scholars.

26. Muḥammad Shams al-Ḥaqq Al-ʿAẓīm Ābādi, *ʿAwn al-Maʿbūd Sharḥ Sunan Abī Dāūd,* Vol 5 (Beirut: Dār al-Kutub al-ʿIlmīyyah, 1990), 9:368.

27. Ibn Al-Qayyim Al-Jawzīyyah, *Iʿlām al-Muwaqiʿīn ʿan Rabb al-ʿĀlamīn,* 1:85-86.

28. ʿAli ibn Muḥammad ibn ʿAli al-Jurjānī, *Kitāb al-Taʿrīfāt*, ed. Ibrāhīm al-Abyārī (Cairo: Dār al-Rayyān li al-Turāth, 1993), 177.

29. Yaḥya ibn Sharaf Al-Nawawī, *Ṣaḥīḥ Muslim bi Sharḥ al-Nawawī,* vol 6 (Beirut: Dār al-Fikr, 1995), 12:31-33.

30. Ibn Al-Qayyim Al-Jawzīyyah, *Iʿlām al-Muwaqiʿīn ʿan Rabb al-ʿĀlamīn,* 1:39.

31. Zuhayr, *Uṣūl al-Fiqh,* 4:237.

32. Aḥmad ibn ʿAlī ibn Muḥammad Ibn Ḥajar al-ʿAsqalānī, *Fatḥ al-Bārī bi Sharḥ Ṣaḥīḥ al-Bukhārī*, ed. ʿAbd al-ʿAzīz ibn ʿAbd Allah Ibn Bāz (Beirut: Dār al-Fikr, 1996), 15:257; Al-Nawawī, *Ṣaḥīḥ Muslim bi Sharḥ al-Nawawī*, vol 6, 12:12.

33. Al-Āmidī, ʿAlī ibn Abī ʿAlī ibn Muḥammad, *Al-Iḥkām fi Uṣūl al-Ahkām*, ed. Ibrahim al Ajuz (Beirut: Dār al-Kutub al-ʿIlmīyyah, 1985), 4:409.

34. Abū Bakr Aḥmad ibn ʿAlī al-Jaṣṣāṣ, *Uṣūl al-Jaṣṣāṣ*, ed. Muḥammad Muḥammad Tāmir (Beirut: Dār al-Kutub al-ʿIlmīyyah, 2000), 2:388.

35. Ibid.

36. These four sources are the Qur'ān, the *Sunnah*, *qiyās* (analogy), and *ijmāʿ* (scholarly consensus).

37. Yaḥyā ibn Sharaf Al-Nawawī, *Al-Majmūʿ Sharḥ al-Muhadhdhab*, ed. Maḥmūd Maṭrajī (Beirut: Dār al-Fikr, 1996), 1:54.

38. Imām al-Ḥaramayn Abdul Mālik ibn ʿAbd Allāh Al-Juwaynī, *Nihāyah al-Maṭlab fī Dirāyah al-Madhhab,* ed. ʿAbd al-ʿAẓīm Maḥmūd al-Dīb (Jiddah: Dār al-Minhāj li al-Nashr wa al-Tawzīʿ, 2007).

39. Abū Ḥamīd Muḥammad ibn Muḥammad Al-Ghazālī, *Al-Wajīz fī Fiqh Madhhab al-Imām al-Shāfiʿī* (Cairo: Dār al-Risālah, 2004).

40. ʿAbd al-Karīm ibn Muḥammad Al-Rāfiʿī, *Fatḥ al-ʿazīz sharḥ al-wajīz* (Beirut: Dār al-Kutub al-ʿIlmīyyah, 1997).

41. Abū Zakarīyyā Yaḥyā ibn Sharaf Al-Nawawī, *Rawḍah al-Ṭālibīn,* ed. ʿĀdil Aḥmad ʿAbd al-Wujūd, ʿAlī Muḥammad Muʿawwaḍ (Beirut: Dār ʿĀlam al-Kutub, 2003).

42. Ibid., 1:13.

43. Al-Ramlī, Muḥammad ibn Aḥmad ibn Ḥamzah ibn Shihāb al-Dīn, *Nihāyah al-muḥtāj ilā sharḥ al-minhāj* (Beirut: Dār al-Fikr, 1984); Al-Haytamī, Aḥmad ibn Muḥammad ibn ʿAlī ibn Ḥajar, *Tuḥfah al-muḥtāj bi sharḥ al-minhāj* (Beirut: Dār al-Kutub al-ʿIlmīyyah, 2001).

44. These books discuss the lives of significant scholars, their scientific merits and accomplishments. See, for example, Al-Dhahabī, Muḥammad ibn Aḥmad, *Siyar Aʿlām al-Nubalā'* (Beirut: Mu'assasah Risālah, 1992).

45. R. Edwin Jones and L. Richard Childers, *Contemporary College Physics* (Reading: Addison-Wesley Publishing Company, 1990).

46. Alan Lightman, *Great Ideas in Physics* (New York: McGraw-Hill, 2000), 120.

47. Cemil Akdogan, *Science in Islam and the West* (Kuala Lumpur: ISTAC, 2008), 12. According to positivism, observation, based on sense-data, and experimentation play a fundamental role in establishing any theory which is not the case in relativity.

48. Lightman, *Great Ideas in Physics,* 122.

49. Max Born, *Einstein's Theory of Relativity* (New York: Dover Publications, Inc., 1965), 179.

50. Lightman, *Great Ideas in Physics,* 130.

51. Ibid., 168.

52. Note that Newton did not present the highest level of transcendence in his usage of the term 'everywhere,' which is a property that can only be associated with bodies, while God is dissimilar to all creatures. God can only be described as being everywhere, if His knowledge is referred. However, the context of Newton's statements does not enable this favourable interpretation.

53. Yusuf Karam, *Tarīkh al-Falsafah al-Ḥadīthah* (Cairo: Dār al-Maʿārif, 1986), 49.

54. Lightman, *Great Ideas in Physics,* 173.

55. Ibid.

56. Hume may have been driven by the sense of skepticism upon making this statement, but nonetheless the outcome of his research comes close to the Islamic view.

57. The hierarchical view of sciences is an acceptable view by many Muslim thinkers. See S.M.N. al-Attas, *Islām and Secularism* (Kuala Lumpur: ISTAC, 1993), 148; and Osman Bakar, *Classification of Knowledge in Islam* (Kuala Lumpur: ISTAC, 2006), 263.