

# INFORMATION SYSTEMS FOR ADAPTIVE SHARIAH COMPLIANT FINANCIAL SERVICES: DEFINING ADAPTATION CONSTRUCTS

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## *Abstract*

*Asymmetry of information in financial service creates excessive uncertainty termed gharar, which makes a financial transaction invalid (haram) in Islamic Law (Shariah). Information systems customised to shariah compliant financial service (SCFS) can make information flow more symmetric and can in turn reduce gharar. Based on information related to emergent SCFS design stakeholders i.e. financial regulators, bankers and customers make adaptation and migration decisions. However, unique nature of SCFS design requires adaptation (migration) of emergent SCFS in compliance to shariah. We discuss general service and SCFS literatures to define structural constructs of SCFS. We then discuss qiyas, which is the juridical principle of defining emergence for expansion in shariah rulings, and theory of deferred action, which is a design adaptability theory drawing in complexity. The adaptation construct for SCFS designs is defined and discussed in the joint framework of qiyas and theory of deferred action.*

**Keywords:** Emergent Context, Financial Service, Information System, Qiyas, Shariah, Theory of Deferred Action

## **1. Introduction**

Accuracy, completeness and appropriateness of information reduce excessive uncertainty related to the activities, processes and its context, which encapsulate a service. Such symmetry of information is important for the stakeholders (e.g. financial institutions, regulators, customers) to make informed decisions related to adaptation of shariah compliant financial services (SCFS) designs. SCFS designs need persistent adaptation to emergent context arising out of complex interactions among service co-creators i.e. financial institution, customer and the legal, economic and operational bonds among them. These ever changing intersections make a complex service system for SCFS.

The information system as part of SCFS design do not provide symmetric information of emergent SCFS practice, thus create excessive uncertainty in the service (called *gharar*), which is prohibited in *shariah* (ObaidUllah, 2005). In this paper we define an *adaptation construct* for SCFS systems, which could inform SCFS designers for emergence or evolution in service practice so, that they could make informed decisions related to adaptation in SCFS designs. The theoretical framework for this ‘construct building research’ is based on *theory of deferred action*, which explain adaptation of designs for emergence and *qiyas*, which is a

juridical principle of expending the rulings of *shariah* to emergent situations. The rest of this paper is organised as follows:

Section 2 discusses literature to conceptualise service design and SCFS design. The structural constructs of SCFS design are depicted in figure 1 and defined in table 1. Section 3 discusses methodology for building the adaptation construct. Section 4 define adaptation construct for SCFS design and evaluate it based on its possible implications for SCFS practices.

## 2. Literature

### 2.1. Service

In system thinking paradigm, service is viewed as set of activities and processes spread over a time line. Service itself is intangible, do not occupy any space and can only be experienced, produced, and participated in (Shostack, 1977, 1982). Service is closely related with its subject good in time and location dimension, variation in which results decrease or increase in its value. Think of the value of auto repair service at certain 'time' and 'location' when and where nobody has an 'auto'. Stressing on the importance of subject good in service concept, Levitt (1972) have rightly said:

*"There is no such thing as service industry, there are only industries whose service components are greater or less than those of other industries and everybody is in service"*  
(Levitt, 1972)

The same analogy is true for financial services as well, which are intermediation facilities and activities (Obaidullah, 2005) performed by financial Institutions for and on behalf of customers for economic consideration. Banks, Insurance companies and mutual funds are some of such financial institutions providing these services. Financial service, like any other service, can not be separated from money or goods, which work as object good for SCFS. Designing SCFS is a deep concern of financial regulators, institutions and researchers in the field since the banking emerged as business activity (Naqvi, 1993). However, process of designing adaptive SCFS has got momentum with raising voice of glocalisation, which means expending service globally with meeting requirements of every locality.

### 2.2 Service Design

Service design concept emerged in the early twentieth century when Leffingwell (1917) applied manufacturing process techniques to service organisations for improving efficiency. Important consideration in most of literature developed in twentieth century is to define the structure and elements of service concept and measure efficiency and effectiveness of service designs (e.g. Barnes, 1937; Fuchs, 1965, 1968; Chase and Tansik, 1983; Shostack, 1987, 1982, 1977). Relationships between elements in inner and outer environment got momentum in the last quarter of twentieth century. Shostack (1977, 1982) for example explained service molecule like pattern of product element, service element and the bonds in between. Interaction of service elements with external environment particularly with customer has been studied by Chase and Tansik (1983) and argued that design of service without customer consideration is incomplete. Barras (1990) importantly developed interactive model of service design where he concluded that service develops in three phases where design update itself through information it gain from the external environment. Goldstein *et. al.* (2002) linked service design with strategic objectives and customer needs of the service provider. Verma, *et. al.* (2002) concluded that service design without context cannot develop market winning services. These general service design models provide important insights for SCFS design, which we discussed in the next session.

### 2.3 Shariah Compliant Financial Service (SCFS) Design

The theory of Islamic economics starts developing in 1940, followed by Islamic banking in 1970 (Siddiqi 1982, 2006; Kuran, 1995). With increase in new regions (e.g. US, UK and other European countries) and new financial sectors (e.g. takaful, investment banking and bond market) theorists developed new concepts of services based on Islamic economic contracts like *shirkah* (partnership), *ijara* (lease), *bai* (sale) and *wikala* (agency) (e.g. Obaidullah 2005; Iqbal and Mirakhor 2008; Usmani, 2002). Financial services based on the above contracts follow a series of activities and steps to create service with freedoms from *al riba* (Interest), *al gharar* (excessive uncertainty), *al-qimar* (gambling) (ObaidUllah, 2005). The existing designs of SCFS offered by financial institutions are static and do not adapt to emergent context arising out of multidimensional growth in these services (Ullah and Patel, 2010). However, re-designing of service is common at discrete points in times. For instance, when new need of service emerge, the designers, researchers and practitioners in the field breakdown a conventional service and rebuilt it again after removing the element causing the prohibition in shariah. This approach of periodic redesigning is termed reverse engineering (e.g. Obaidullah, 1998; Iqbal, 1999; Iqbal and Mirakhor, 2008). We believe that reverse engineering of SCFS is ineffective to cover emergence, because of its discrete development in SCFS designs. This process of adaptation is also costly and time consuming process of removing the establish service, breaking it down and launching that again. Thus adaptation in SCFS designs take place in years, which lead to shariah non-compliance as the designs do not represent the practice any more for a considerably long time (Siddiqi, 2006; El-Gamal, 2008). We believe that SCFS designs can persistently be adapted for emergence in accord to *shariah*, through the adaptation construct build in this paper.

### 2.4 Basic constructs of SCFS design

Both literatures in general service design and SCFS design provide a set of static constructs of SCFS design. For example, Shostack (1977, 1982) has divided design of a service into three interdependent components of 'service element', 'product element' and the 'bonds' in between. Same concept of having tangible good as subject of service also exists in SCFS. Figure 1 illustrates SCFS design. The nature of economic, legal and commercial relationships among financial institution, deficit and surplus customers and the product element varies in different types of contracts underlying the SCFS. Bai (sale), shirkah (partnership), Ijarah (rent/lease) and wikala (agency) are the commonly use economic contracts to establish these legal, economic and operational bonds. Studies like Usmani (2002), Iqbal (1998), Iqbal and Mirakhor (2008) and ObaidUllah (2005) provide in depth detail of these contracts. As depicted in *figure 1*, service element (i.e. shariah compliant decisions, doings, processes and performances) is used to channel the product element – *the money or any other resource* from surplus customers to deficit customers. *Table 1* define each of these structural constructs of SCFS Design.

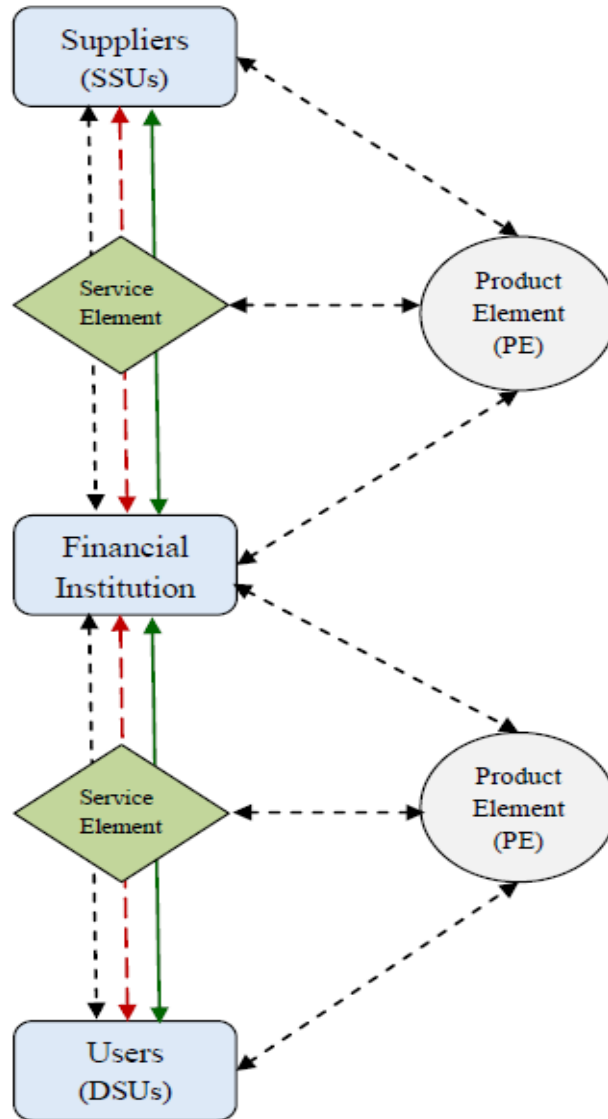


Figure 1: Shariah Compliant Financial Service (SCFS) design. Partially based on Shostack (1977, 1982), Usmani (2002), Obaidullah (2005) and Iqbal and Mirakhor (2008)

No.	Construct	Definitions
1	<b>Suppliers or Surplus Saving Units (SSUs)</b>	SSUs are the economic units i.e. governments, firms and households who are surplus in savings. SSUs supply excess resources to the Islamic financial institutions (Obaidullah, 2005). SSUs are the service co-creators because they perform activities, deeds and decisions which constitute a part of service.
2	<b>Users or Deficit Saving Units (SSUs)</b>	Like suppliers, users are also the economic units comprising governments, firms and households which are deficit in their savings and receive money and goods from the IFIs. They also create part of the service through their onstage activities, deeds and decisions.
3	<b>Islamic Financial Institution (IFI)</b>	Investopedia define financial institution as “An institution that acts as the middleman between investors and firms raising funds” IFI design the service products to channel resources from SSUs to the DSUs in compliance to <i>shariah</i> (Iqbal and Mirakhor, 2008; Obaidullah, 2005). These institutions perform specialised activities, processes and decisions through their competencies in shariah and financial matters. SCFS design explain the on stage and backstage roles of IFI.
4.	<b>Product or good element – purpose of service</b>	SCFS have mandatory product or good element which binds it with producer and user of service. For instance, musharika <b>home</b> finance, Ijarah <b>car</b> finance or murabaha <b>working capital</b> finance are the service designs targeting DSUs. In these service designs home or house, car and working capital represent the product or good elements. In service for SSUs, currency, cheques, investment certificates, bonds work as product elements (Iqbal and Mirakhor 2008; Obaidullah, 2005; Usmani, 2002).
5	<b>Service element</b>	Processes, activities and facilities co-created by IFI and customer represent a <i>service element</i> . In service design blueprinting, Shostack (1982) and Bitner <i>et. al.</i> ( 2007) have termed these as onstage service activities. Service element co-created by IFI and SSUs is also called ‘depository service’ because through service element IFI accept deposits from customers. On the other hand service element co-created by IFI and DSUs is called ‘financing service’ because through this service IFI finance customer’s funding deficiency. (Obaidullah, 2005).
6.	<b>Bonds or Relationships</b>	IFS designs specify the economic, legal and operational rights and responsibilities of SSUs, IFI, and DSUs. These relationships are documented in Islamic economic contracts such as shirkah (partnership), bai (sale), ijarah (rent) and wikalah (agency) contracts. (Usmani, 2002; Iqbal and Mirakhor, 2008; Obaidullah, 2005)

Table 1: Structural constructs of SCFS design

### 3. Methodology

This concept paper is aimed to define an adaptation construct for designing information systems compatible to shariah compliant financial services so, to avoid or reduce gharar (excessive uncertainty). For this ‘construct designing’ research we used March and Smith (1995) framework of design science. Design science is the ‘scientific method of designing solutions’ to the problem in question (Gregory, 1966; Hevner et al, 2004). Such research is prescription driven approach to research problem, which enhance the applicability and usability of research outputs in management practices (Aken, 2004).

Design science methodology is established in service design research (e.g. Shostack, 1982, 1987, 1977; Chase and Tansik, 1983; Roth, 2002; Cook *et. al.* 2002; Verma. *et. al.* 2002). We can also find the use of design science in SCFS design research (e.g. Iqbal 1999; Obaid Ullah, 2005, Iqbal and Mirakhor 2008).

March and Smith (1995) suggested four possible outputs of design science research i.e. construct, model, method and instantiation, with their respective research activities of build, evaluate, theorize and justify.

		Research Activities			
		Build	Evaluate	Theorize	Justify
Research Outputs	Constructs				
	Model				
	Method				
	Instantiation				

Figure 2: Adopted from March and Smith (1995)

We adapted the structural constructs of SCFS design depicted and defined in *figure 1* and *table 1*, respectively. These constructs are built, evaluated, theorized and justified through literature reviewed in sections 2.1, 2.2, 2.3, 2.4.

The adaptation construct for SCFS design is defined through focal theory of deferred action, and *qiyas* in sections 4. 4.1, 4.2, 5, 5.1, 5.2, 5.3. Each section provides discussion on adaptation construct with reference to its impact on the service practice.

### 4. Theoretical background of adaptation construct

Service design has its roots in design and (Han, 2010). Theory of deferred action explains planning for adaptation in complex designs in response to emergence. *Qiyas* explains shariah rulings for emergence. In the following section we discuss *qiyas* and theory of deferred action to define adaptation construct. We evaluate and justify the construct by arguing on

recently emerge financial crises and the possible use of proposed adaptation construct as SCFS strength against such crises.

#### 4.1 Qiyas

*Qiyas* is an arabic word literally means ‘measurement’ also called ‘*nazer*’, which means reflection (Hasan, 1986). Operationally *qiyas* is use as ‘analogy’ through in-depth reasoning (*ijtihad*) to extend shariah rules (*maqis’Illah*) to new situations (*far*) based on the *ratio legis* (*illah*) common in the original or known (*asl*) and emergent (*far*) situations. Thus synthesis of both *asl* and *far* brings instant rule called *maqis’ Illah* (Hassan, 1986). Some authors consider *qiyas* as a fourth source of *shariah* with three others textual sources of *quraan* (*devine book*), *sunnah* (sayings and doings of prophet muhammad *PBUH*) and *Ijmaah* (consensus of shariah scholars), However, majority of authors consider it as a juridical principle for expending the shariah rulings to emergent situations (Usmani, 2002; Hasan, 1986). Application of *qiyas* do not adapt *shariah*, but define, interpret and classify the emergence for the five prevailing rulings of shariah i.e. *frayiz* (mandatory), *sunnah* (recommended), *mubaah* (allowed), *makrooh* (disliked), *haram* (prohibited). Hasan (1986) argued on the importance of *qiyas* in emergent situation as:

*“Life is dynamic; circumstances change; situations vary; and problems alter with the social change. The textual injunctions enunciate in the Qur’an or the Sunnah, technically known as nusus (sing. Nass) and decision made on the basis of consensus of the Muslim community in the past, also an authoritative source of law parallel to nass, are not sufficient to respond to the problems and challenges that emerge in a changing society. The problems of changing life are obviously infinite while the textual laws are finite and limited in number. Hence the use of individual opinion and analogical reasoning is designed to seek answers to such questions as are not covered by the textual laws”*  
Hasan (1986, p.145)

#### 4.2 Theory of Deferred Action

Theory of deferred action (*TODA*) is an action and design theory where emergence informs design practices (Patel, 2007). *TODA* highlights the importance of deferred action in rational plan of design, as depicted in figure 3. Patel (2010) describe the insufficiency of rational planning for the emergent context as:

*“Although rational planning is necessary, in the context of emergence it is insufficient as the sole design dimension. Its scope is limited because agents modify their behaviour in the environment resulting in emergent organisation”*  
Patel (2010, p. 526)

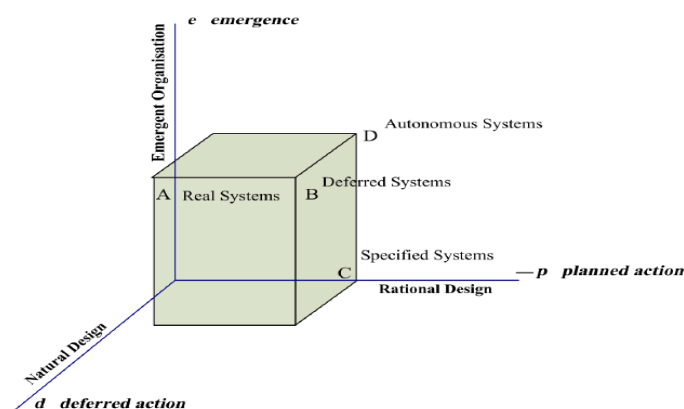


Figure 3 Theory of Deferred Action Adopted from Patel (2010)

## 5. The adaptation construct

There is considerable harmony between *qiyas* and theory of deferred action. For example recognition of complexity and emergence in *TODA* and *fars* in *qiyas*, the importance of planning for known and predictable situations called planned action in *TODA* and *nusus* in *qiyas* and finally deferred action of *TODA* and *maqis'illah* in *qiyas*. *Qiyas* further propose methodology for constructing *maqis'illah* (deferred action) as adaptation for SCFS design in response of emergence. This dual theoretical back of proposed adaptation construct can make the SCFS design adaptable in accord to system designs as well as Islamic jurisprudence which are the two source fields of SCFS systems. Sections 5.1, 5.2, 5.3 discuss each dimension of adaptation construct proposed in this study.

### 5.1 Planned Actions/ Nusus

Planning for known and predictable elements of reality is rational and necessary (Patel, 2007). For such known or planable elements of design, *shariah* provides designer of SCFS system with textual laws (*nuss*) to plan the elements. However these textual laws do not explicitly articulate all the rules related to emergent context stimulated by change in overall social context (Hasan, 1986). It is therefore, *shariah* not only allow and recommend the stakeholders to plan their investments and activities but also provide them with tools, individual and collective, to derive instant rulings for adaptation or migration in emergent context. This uncertainty in emergent context confirms *shariah* rational of interest prohibition as well. As we as discussed in 5.1.1.

#### 5.1.1 Prohibition of Interest (Riba) and planned returned/ reward

Interest is a planned fixed return on capital or money as reward or share in production. However, both the role and output of capital reside and realise in emergent context and can be negative, zero or positive. So, its reward cannot be planned with conformity (fixed as e.g. 10 percent) before undertaking the economic activity, else it can lead to unjust outcome for any stakeholder involve in the same economic activity. Depositors' money as factor of production if produce more income, than should make the depositor entitle to more return, else it will be unjust to depositor. On the other hand if the capital produce less or no income then unjust to bank. This fact has been pointed in *Quran* as:

*"Allah has permitted trade and forbidden interest ... deal not unjustly and you will not be dealt with unjustly"* (Al-Quran, 2:275-81)

The Deuteronomy prohibits interest in the following words:

*"Do not charge your brother interest, whether on money or food or anything else that may earn interest."* (Deuteronomy, 23:19)

The adaptation construct proposed in this study could be use to design SCFS with varying costs and returns profiles informed by emergence in investment portfolio, which is the object of SCFS. This construct can also enhance symmetry of information regarding emergence, which can be use by the service co-creators for informed adaptation or migration decisions regarding their stakes in emergent service. These informed decisions will in turn reduce *gharar* in SCFS practices.

### 5.2 Emergence/Far or Maqis

Emergent SCFS arise due to complex interaction among service elements and its context. Such interaction let the service design to develop itself into a more sophisticated form (Barras, 1990). Expansion in geographical locations, economic sectors and service portfolios result an emergent context which forces SCFS design to adapt in or migrate off (Ullah and Patel, 2010). In this respect, *qiyas* seems more focus on marginal change in real SCFS practice. Such marginal change both in time and location dimension is termed *far* or *maqis*



in shariah, which also means ‘new case’ for which textual laws (*nusus*) are silent. Figure 4 conceptualise change in real SCFS at a time dimension of emergent context. While standing at point T0 all other future states from T1 to TN represent emergent context. Real SCFS change with emergence of new regions, sectors and services (Ullah and Patel, 2010). Design developed for SCFS in context T0 works as planned SCFS for emergent context. However, such planned design may not fully represent emergent SCFS because of emergence or *maqis*, at any other point in time continuum (T1-TN).

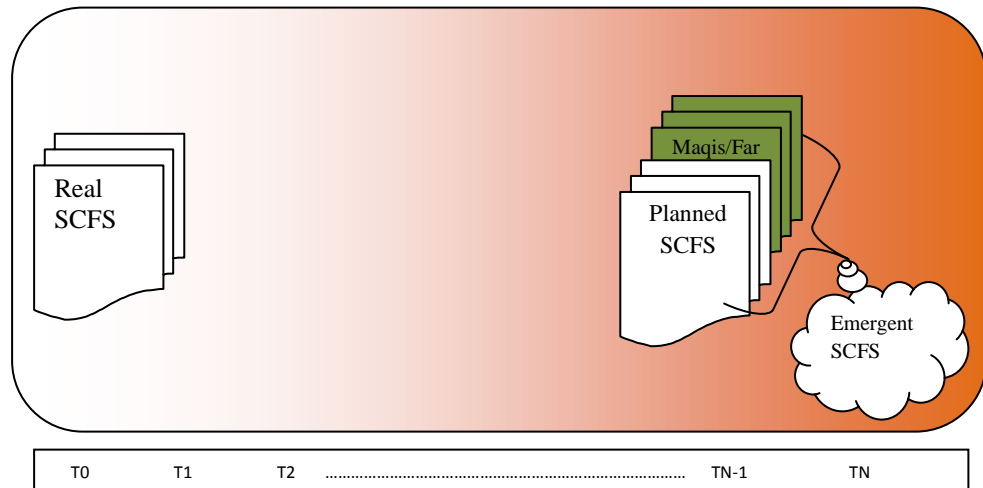


Figure 4: Real and Emergent SCFS designs. Partially based on Patel (2007) Hasan (1986) and Ullah and Patel (2010)

### 5.3 Deferred Actions/ *Maqis’ illah*

According to Patel (2010) “deferred action is the synthetic outcome of relating planned action and emergence”. This word synthetic is also the literal meaning of *qiyas* - the reflection or measurement of *asl and far* (Hasan 1986). Deferred action or *maqis’ illah* is an outcome (rule, decision, action) of this reflection of *asl* and *far* or planned and emergent SCFS. Financial institution and customers being components of SCFS design, can take ratio logis (*illah*) from the planned (*nuses*) and relate (measure or reflect) that with marginal additions (*far or maqis*). This analogy (*from asls to far*) can let the financial institutions, to instantly derive shariah rule, decision or action related to adaptation or migration off emergence or *far*. This construct can make SCFS design adaptive and evolving in emergent context.

The intrinsic value of adaptation in SCFS was one of the reasons, which strengthen SCFS to survive in subprime mortgage balloon crises 2007-10 as discussed in 5.3.1

#### 5.3.1 Survival of shariah compliant financial institutions in recent financial crises 2007-10

Shariah compliant financial institutions (SCFIs) have shown significant resistance in recent subprime mortgage balloon crises. Where giant conventional banks like Laymen brothers (in US), Northern Rock (in UK) default as their fund flow designs were not adaptive (fixed interest payable and receivable) and the respective governments have spend billions of pounds to balance the fund flow of these banks. This imbalance in the conventional financial system occurred because mortgage loans prove non-productive in emergent recessionary financial context. Fund providers (banks) claimed planned fixed return (interest) which led the borrowers to default, as they were asked to pay positive reward out of negative production in the joint economic activity. These customers’ defaults result the collapse of banks’ mortgage service portfolios and in turn default of the banks as well. This is the same end of static funds flow design – interest, as stated in *Al-quran*:

*'Allah has permitted trade (have and adaptive fund flow) and forbidden interest (static fund flow) ... deal not unjustly and you will not be dealt with unjustly.*

*(Al-quaran 2:275-9)*

Conventional mortgage loans designs were not instantly adapted to fit in the emergent financial context. This lack of adaptability in interest bearing service designs created an unjust situation for mortgage borrowers. Because the bankers, with the intension of exploiting the situation, claimed the static returns - interest out of negative output of the capital in the emergent recessionary financial context. However, unjust exploitation of one party (bank) led to their own default as well.

The proposed adaptation construct suggest planning for emergence, which could make SCFS systems capable of generating real time symmetric information to service co-creators, so that they could make informed adaptation and migration decisions related to their role in emergent service situation.

## **6. Benefits and beneficiaries**

The adaptability construct proposed and discussed in this paper can contribute to the efforts of many SCFS stakeholders seeking for adaptation or migration decisions regarding SCFS designs. For instance, regulators of SCFS such as central banks and standards setting organisations like Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) and Islamic Financial Service Board (IFSB) can use this adaptation construct to persistently adapt standards for ever-changing SCFS designs. The SCFS designers such as shariah board members and shariah compliance auditors can use this construct to inform their respective practices by having real time information regarding emergence in SCFS practices.

## **7. Conclusion**

Emergent context forces SCFS design to change. In turn stakeholders such as regulators, bankers, and shariah scholars need instant rule, decision and action of adaptation and migration. For making inform adaptation or migration decisions, these stakeholders can use the proposed adaptation construct for SCFS design so, to reduce *gharar* (excessive uncertainty). *Gharar* makes a financial service invalid or haram in Islamic law (shariah). We reviewed the literatures in general service and SCFS designs to build, evaluate, theorize and justify basic components of SCFS design i.e. surplus customer, financial institution, deficit customer, object of service or product element, service element, and the bonds among these. For defining adaptation construct, all these elements of SCFS are conceptualised in the joint framework of *qiyas* and theory of deferred action, and came up with emergence response construct (deferred decision, rule or action also called *maqis' illah*) for adaptive SCFS systems. We believe that this adaptation construct for SCFS systems can improve the information symmetry for stakeholders' i.e. central banks, standard setting organisations, shariah advisors, financial institutions and customers.

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