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Original Research Article

Human-Centered User Experience Design Frameworks for Mobile Banking Applications in Saudi Arabia under Vision 2030

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Abstract: Mobile banking has become the primary point of contact between Saudis and the financial services sector, but the fact that it is widely available doesn't necessarily mean that the apps are easy to use, inclusive or trustworthy. This integrative review looks at how human-centred user experience design can turn the aspirations of Vision 2030 into tangible qualities of the mobile banking experience. It is a structured, purposive synthesis of the peer-reviewed literature from 2020 to 2025, combining Saudi research with international evidence on usability, accessibility, trust, privacy, service recovery and continued use. The findings highlight a key difference between the factors that drive adoption and the conditions which enable users to confidently complete significant financial transactions. Poor interface design, inaccessible Arabic journeys and confusion around the authentication process are all clear examples of why satisfaction metrics are not enough. The review puts forward a six domain framework which links contextual inquiry, accessible interaction, transaction clarity, protective transparency, assisted recovery and accountable learning. Each domain is linked to specific design decisions and evaluation criteria and the relationships between design quality, perceived control, trust and equitable outcomes are presented as testable hypotheses rather than as established causal relationships. The framework provides a context sensitive research agenda and a practical basis for assessing financial interfaces without assuming that national digitalisation will automatically result in inclusive experiences.

Keywords: Mobile Banking, User Experience (UX) Design, Human-Centred Design, Digital Financial Services, Usability, Accessibility, Customer Trust, Data Privacy.

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1. INTRODUCTION

Mobile banking apps are making decisions which have immediate financial consequences (is the recipient right, is the transfer complete, has the payment failed, is that security request odd etc). The decisions are being made on small screens, often under time pressure and in environments where attention is fragmented. An app can therefore be technically 'working' and yet very hard to use. Saudi Arabia is a particularly pertinent case as part of the Vision 2030 agenda for modernisation of the financial sector is to improve digital participation as part of the wider agenda of service quality and economic opportunity. National alignment in this context is therefore about a duty to improve practical access and customer agency rather than any particular application.

Saudi evidence already points to a gap between the digital provision and the actual quality of experience. Alhejji *et al*., [1], looked at banking apps across the three dimensions of effectiveness,

efficiency and satisfaction and found deficiencies in interface, functionality and customer support. Alayed [2], then looked at three Saudi apps with blind Arabic speaking users and found a number of accessibility issues which prevent users from being able to complete tasks independently. Shafie [3], takes a security angle looking at confidentiality, authentication and device trust. Taken together these studies highlight different facets of the same service issue: users need to be able to see what they are doing, understand what they are doing and be able to recover in the event of a misstep.

Consumer research gives us some very useful (if ultimately incomplete) explanations. Abed and Alkadi [4], look at the relationship between system quality, information quality and service quality and customer satisfaction in the context of Saudi payment apps. Milhem *et al*., [5], look at the mediating role of trust and satisfaction in the adoption of digital banking. Alamir [6], looks at the relationships between usefulness, ease of use, trust and risk. Alzaidi [7], similarly incorporates compatibility and perceived risk into an adoption model. All of these studies provide us with some insight into why people will use a product, but the measured intention to use the product will not tell you whether a person can go and correct a beneficiary that's been wrongly identified or whether they can understand why a payment is still in a pending state. Human-centred design requires you to look at the transaction journey at a much more granular level, looking at the moments of hesitation, the moments of error, the moments of exclusion and the moments when people go and seek help.

Post-adoption evidence does of course sharpen the issue. Garrouch *et al*., [8], link continued use to perceived value, trust, security and privacy in the context of Saudi banking apps. Irimia-Diéguez *et al*., [9], show the importance of perceived trust in the context of Saudi Islamic payment technology. The upshot of these is that adoption is a dynamic and conditional process. The bulk of the literature on this is however based on cross-sectional questionnaires measuring the psychological constructs. Very little of it actually specifies which interface decisions lead to a particular perception, whether the effect varies with the nature of the accessibility need or indeed how one would go about validating design improvements in the context of actual financial tasks. This review addresses that very real translational gap by providing an evidence based framework in which the mechanisms, responsibilities and criteria for evaluation are all spelled out.

2. AIM, OBJECTIVES AND RESEARCH QUESTIONS

The objective is to synthesise the 2020-2025 evidence into a human-centred UX framework for Saudi mobile banking that links interaction design to trust, accessibility, financial autonomy and the service aspirations of Vision 2030. The review has five specific aims: to identify the friction points that have been documented in the core banking journeys; to critically assess the adoption and experiential explanations; to define the requirements for inclusive and culturally appropriate design; to embed security messaging and recovery into the quality of the interaction; and to develop testable propositions for future work.

Three questions underpin the analysis. Which observable design characteristics enable the accurate, confident and independent completion of Saudi mobile banking tasks? How do accessibility, privacy expectations and security interventions modify that relationship across different user groups? And what governance and evaluation practices can link the iterative design decisions to real improvements rather than just engagement metrics? The questions are deliberately drawn to separate the empirical findings from the design propositions put forward here.

3. REVIEW METHODOLOGY

A structured integrative review was chosen as the research problem spans HCI, information systems, consumer behaviour, digital inclusion and banking service management. A narrow effectiveness review would exclude the vital qualitative accessibility evidence and the conceptual work that is so important in explaining the design mechanisms. An unstructured narrative review would make it very difficult to assess the selection of sources. The approach adopted is therefore one of structured eligibility criteria and thematic comparison, acknowledging that it is not in any way a full database census.

The search strategy was built around combinations of 'mobile banking', 'banking application', 'user experience', 'usability', 'accessibility', 'trust', 'privacy', 'service quality', 'continuance', 'Saudi Arabia' and 'financial inclusion'. Relevant article records and publisher pages were found via targeted web searches of the scholarly literature with the bibliographic trails used to identify other related concepts. The time frame was 2020 to 2025 and the core set of evidence was restricted to journal articles with identifiable titles, publication details and DOIs. Saudi work was given the preference and international comparative work was included where it provided insight into an interaction mechanism not present in the local studies. Research which was purely focused on backend cryptography, monetary forecasting or non-banking commercial interfaces without a user

experience mechanism that could be applied was excluded.

Screening was carried out at title and abstract level on the basis of relevance, followed (where available) by examination of the methods and results on the publisher's pages. The dimensions extracted were: geography, sample/analytic unit, study design, central construct, user-facing implication and limitation. The synthesis looked at the claims at three levels: what the users actually said or demonstrated; what the researchers concluded about acceptance or satisfaction; and what a bank could plausibly implement and test. Contradictions were left as they were rather than being smoothed over by some form of artificial aggregation. The task-based and accessibility data were given particular weight where the research question was about actual performance and the survey data were used mainly to help with the construction of explanatory models.

This procedure has limits. There was no preregistered protocol, no reproducible export from each database, no independent duplicate screening and no quantitative risk of bias assessment. As such there are no database hit counts, no exclusions, no pooled effects and no claim of exhaustive coverage. The 30 journal sources cited constitute an analytically selected evidence corpus rather than a statistically representative sample of all the literature. The source identifiers have been checked against the records that are available for discovery but the citation metadata would still require a final audit by the publisher prior to submission. Evidence from outside of Saudi Arabia is treated as conceptual or comparative only and is not interpreted as a direct estimate of Saudi customer behaviour.

4. Thematic Synthesis

The thematic analysis treats user experience as an emergent relationship between the user, the task, the device and the institutional service. Six dimensions are evident in the literature reviewed, though the empirical basis for each varies. The sections that follow look at what each dimension explains, where the findings differ and where the design implications remain speculative.

4.1. From Acceptance Models to Situated Task Experience

Research into mobile financial services commonly looks at usefulness, convenience, quality, satisfaction and the intention to continue to use the service. Shahid *et al*., [10], find that convenience, trust and social influence are the key drivers of the consumer experience in their model, with the attributes of the application itself being of relatively less importance. Palamidovska-Sterjadovska *et al*., [11], take a more general service quality approach and their synthesis also shows that system stimuli have an effect on the user's psychological state and subsequent behaviour via a number of interrelated pathways. Chauhan *et al*., [12], identify the functional, mechanical and human aspects of the digital banking experience. These are all compatible views, just operating at different levels of explanation.

The conceptual issue arises when things like 'easy to use' become proxies for actual evidence of successful interaction. A user might rate an application highly because the familiar transfers are easy, even though they're unable to cancel a payment they've scheduled, can't find an unfamiliar fee or can't make sense of an exception state. Naeem *et al*., [13], demonstrate that for vulnerable banking users the experience of using the technology is one that involves material resources, competency and meaning as well as usability. Soyupak and Ipek [14], identify information overload, error risk and privacy as issues in their qualitative work with younger mobile banking users. So digital familiarity in no way equates to the ability to deal with the uncertainties of finance.

The review suggests a two pronged approach to measurement. On the one hand you have behavioural usability (completion, errors, time, assistance, recovery for the tasks in question) and on the other you have perceived experience (confidence, comprehension, agency and emotional cost). Neither of these replaces the other. You also need to record task difficulty as a balance check and an international transfer are not the same thing at all. This is particularly pertinent when banks will use a high level of aggregate satisfaction to justify increasingly complex workflows.

4.2. Information Architecture and Transaction Intelligibility

Mobile banking information architecture is all about whether the user can build up a coherent mental model of their accounts, their obligations and the actions they can take. Rejman Petrović *et al*., [15], link the functional and experiential quality dimensions (including design and ease of use) to user satisfaction. Zhou *et al*., [16], link interface design and system quality to service quality and loyalty intentions. These studies all point to the importance of navigational clarity, albeit neither of them offers a one size fits all screen layout which we can just copy over into the Saudi interfaces. The real challenge is to make the link between intention, action and consequence as clear as possible.

High consequence interactions need a progressive sequence: establish the task; provide only the inputs that are currently relevant; show the beneficiary, amount and charges; present a

reviewable summary; get the final authorisation; and then give a clear outcome. The sequence minimises the number of decisions that need to be made without at the same time hiding the key information. It also separates the reversible pre-submission steps from the irreversible act of submission. The alternative of a single consolidated dashboard may improve discoverability but can at the same time undermine legibility if you have multiple products, promotions and alerts all competing for the same visual space. The designer therefore needs to consider whether the frequent tasks are still readily accessible and whether the exceptional tasks still have clear pathways and sensible labelling.

For bilingual trips the translation has to be about meaning not about word order. The labels for "available balance", "pending", "scheduled" and "completed" need to preserve the same conceptual distinctions in Arabic and English (including right to left reading order, number grouping, currency formatting etc). The terminology should be tested with a range of residents with differing levels of financial literacy rather than just with professional translators. The relevant outcome is whether the user can correctly predict what the next system action will be. Interface elegance is only of value if it improves that ability to predict.

4.3. Trust, Authentication and Protective Transparency

Trust is at the heart of digital finance and its significance varies across the different stages of the service. Geebren *et al*., [17], demonstrate that trust acts as a mediator between the various quality attributes and the level of customer satisfaction. Martínez-Navalón *et al*., [18], find that privacy and ease of use are key factors in the trust that customers place in digital banking. Kruzikova *et al*., [19], go on to compare the usability and perceived security of various mobile authentication methods. All of this underlines the fallacy that any additional friction in a process is necessarily an indicator of security. A mechanism can be objectively secure and yet be confusing, hard to use or open to user workarounds.

A human-centric approach is all about the experience that the user has of the strength of authentication. Biometric sign-in may reduce the effort required on the user, but it's not a solution for everyone. There will be users whose device, ability or situation means the default option is not appropriate. If an anomalous transaction requires verification the interface should explain why that verification is required in plain language, clearly separate a genuine institutional request from a message that comes from outside the institution and of course preserve any data that has been entered where possible. A timeout with no explanation can be read by the user as either a failed payment or as an indication that their account has been compromised. You must not compromise on verifiable security, you must ensure that security is communicated to the user at the point when they need to act.

Trustworthy feedback also means honest uncertainty. A transaction that is still awaiting confirmation should not be presented as complete. If you can't say for certain what the status is then you should provide a reference number (that's accessible), an indication of the next step and a safe way of checking without just resubmitting. Security warnings need to be specific enough to inform the user of what they should do without revealing any of the underlying defensive logic. These are the sorts of patterns that take abstract notions of trust and turn them into concrete decisions about what wording to use, what status to display, when to display it and how to handle recovery.

4.4. Inclusive Interaction and Financial Independence

Accessibility is a fundamental criterion of banking quality rather than a nice to have. Alayed's [2], task based study shows that native Arabic banking apps can in fact prevent users who use screen readers from accessing the service. The study highlights a gap that would be completely invisible to a standard customer survey as these excluded users may never even complete onboarding or get into the sample at all. The design implication is not simply to add more controls, it is to ensure that the full transaction journey can be perceived, operated, understood and verified without any visual requirement.

Mobile interfaces should expose semantic names, roles and states to assistive technology; maintain a logical focus order when the content is dynamic; announce errors in proximity to the cause of the error; and support resuming a flow that has been interrupted (e.g. authentication). Confirmation screens must present the amount, destination and status to screen readers in the same order as they are presented visually. Touch target spacing, adjustable text, sufficient contrast and alternatives to gesture-only controls all help to reduce situational disability (e.g. use in bright light, use in motion, use in the event of injury).

Accessibility also comes into play with language, age, income and digital confidence. Rajaobelina *et al*., [25], demonstrate that older users follow different experiential pathways to trust and so a single 'elderly user' profile would mask these differences. Recruitment should therefore include people with different levels of financial means and different devices, people who use assistive

technologies and people who share a phone or have intermittent connectivity. Privacy preserving assisted journeys may be required but the benchmark is still independent task completion wherever possible. An interface which requires an informal helper to read the beneficiary or to reveal a one-off code has not in fact delivered equitable access.

4.5. Personalization, Privacy and Informed Control

Personalisation can reduce cognitive load but it can also mask the process by which financial recommendations are made or force users to divulge information they would otherwise not wish to. Al-Shamaileh and Sutcliffe [20], identify contextual usefulness, usability and the element of pleasurable experience as all being important in app choice. Nakamura *et al*., [21], show that app store reviews contain a range of experience signals which are not properly represented by star ratings alone. These findings all point to the need for adaptation to the real needs of the user rather than some unregulated optimisation of click-through or daily visits.

Luo *et al*., [22], look at disclosure intention via privacy concerns, empowerment and personalisation. Lu [23], looks at how benefit-risk judgements differ across digital lifestyles. In the context of Saudi banking a responsible design would make personalisation optional, transparent and reversible. Users should be able to see why data is being requested, whether a recommendation is based on their account activity and how to turn off an automated prompt without losing access to the core banking functionality. The consent screens should separate the essential processing from the optional analytics and present the options to accept and to decline with equal visual prominence when the choice is truly theirs.

Attribution is particularly important when it comes to algorithmically generated financial advice, budgeting alerts and offers. The context must make it clear whether a particular suggestion is algorithmic in origin or represents a guaranteed outcome, it must clearly state the relevant limitations and it must provide a route to human support. Banks can reduce their exposure to sensitive data through a very restrained approach to data collection and by having default settings which are user protective. The aim is not maximum personalisation but appropriate assistance under user control.

4.6. Service Reliability, Error Recovery and Human Support

Transaction failure is a design event as much as it is an operational event. Talwar *et al*., [24], make the link between initial trust and subsequent usefulness and confirmation, implying that the early experience will have a bearing on the user's continued engagement. Egala *et al*., [26], make the link between reliability, efficiency and privacy as aspects of service quality and user satisfaction and retention. Shankar [27], notes that interaction design will have an impact on engagement (though engagement should not be equated with informed financial success). Garzaro et al. [28], make the link between interactivity and social presence and the customer's experience and loyalty. Taken together these studies all point to the importance of what happens after the user has pressed that 'decisive' button.

Failure states should differentiate between validation errors, transient network issues, account restrictions and completed transactions where the receipt is simply delayed. A 'something went wrong' message is useless and will in fact lead to people re-submitting their transfer. The recovery path must be safe, must preserve the non-sensitive progress and must be able to maintain continuity across chat, call centre and branch. Where live support is required the agent must be handed the task context via a consented handoff rather than having to repeatedly ask for the full account story.

Alenizi [29], shows the value of qualitative evidence in terms of understanding the credibility and usability of a service as it is being adopted. Alsiehemy [30], looks at the link between the various service quality dimensions and customer satisfaction in the Saudi banking context. Support quality however cannot be assumed simply because a chatbot icon is present. You need separate measures of recovery performance (unresolved case duration, repeat contact, duplicate submission, understanding of status messages, successful completion after intervention etc.) to identify design flaws which transaction volume alone would not reveal.

5. Proposed Human-Centered Design Framework

The proposed framework frames the synthesis in six interdependent domains rather than a fixed set of interface screens. Contextual understanding is about who is doing what and under what circumstances. Accessible interaction ensures that the controls and information are usable across languages, abilities and devices. Transaction intelligibility makes the relationship between the input, the authorisation and the result inspectable. Protective transparency ensures that security and data practices are explained at the point of consequence. Assisted recovery provides safe ways through any exceptions that may arise. Accountable learning is the link between what we see and how we govern iteratively. Figure 1 shows these as a

continuous cycle around the customer's financial task.

The framework is deliberately non-linear. A change to the authentication can have an impact on both accessibility and recovery performance. A personalisation feature may improve task speed at the expense of increased perceived surveillance. A visual simplification may remove the very information that is needed for informed consent. The design review therefore needs to look at the interactions between domains rather than simply declaring success when one of the metrics has improved. Table 1 takes the domains and turns them into operational questions, proposed measures and failure indicators. The measures are recommendations for empirical validation rather than benchmarks which have already been established as optimal in the Saudi context.

At the heart of it is a task level causal claim: understandable and accessible interactions will lead to improved effective task completion; effective task completion and the provision of intelligible protective cues will lead to increased perceived control; perceived control and reliable recovery will in turn lead to increased trust and continued engagement. All of this is subject to potential moderation by age, language preference, visual ability, prior banking knowledge, financial vulnerability and device condition. Figure 2 sets out a testable pathway and identifies the boundaries at which a seemingly positive design change may in fact fail.

The framework also defines ownership. Product design teams own navigation, content and interaction patterns; security teams own the risk controls and safe fallbacks; accessibility people and the people who are impacted by the product own the inclusive journey; operations own the exception handling; and management own the evidence based release gates. Governance needs to have cross functional sign off on any changes to transfers, authentication, disclosure and account restrictions. The aim is to ensure that a beautifully designed interface doesn't hide the fact that there are still unresolved responsibilities in terms of customer outcomes.

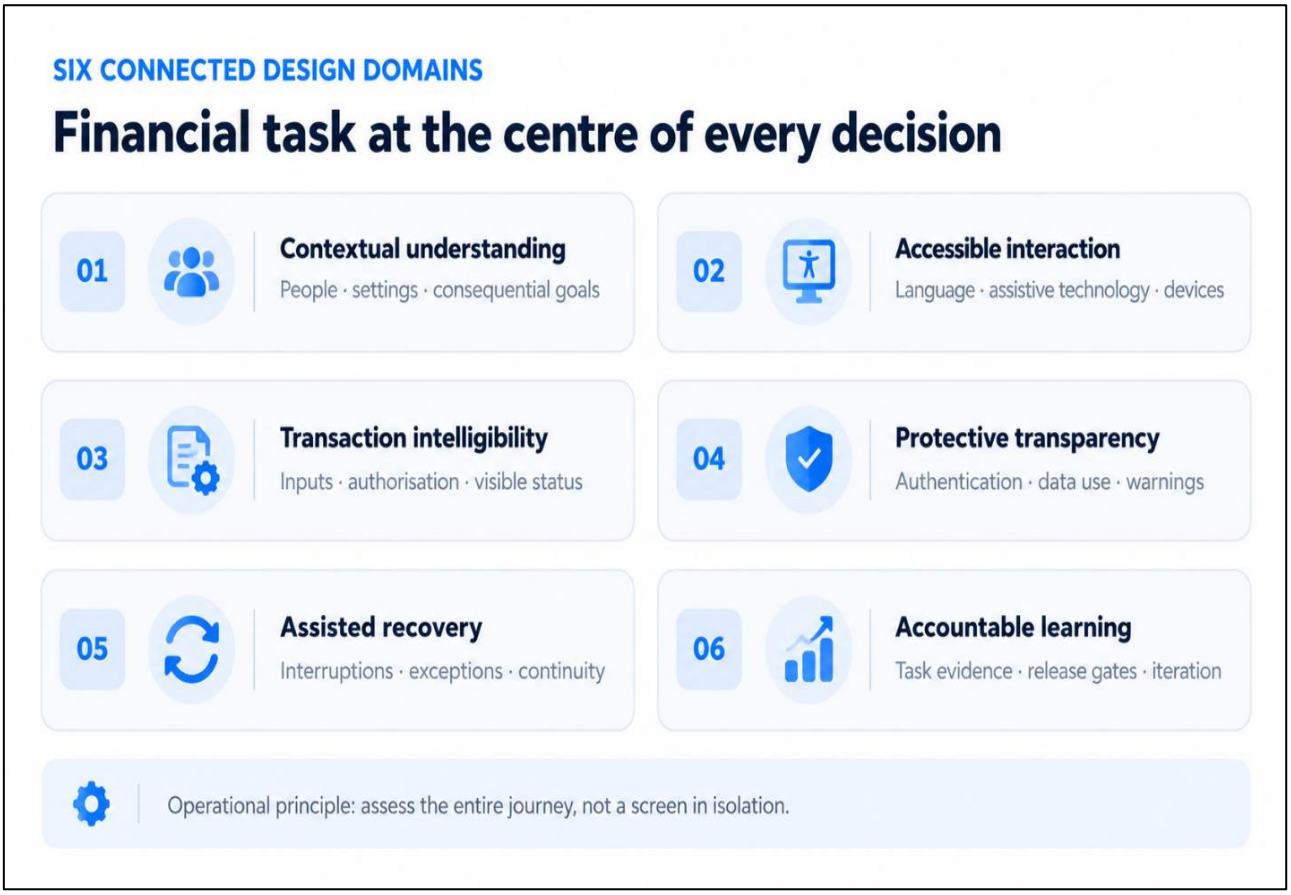


Figure 1: Six-domain human-centered mobile banking design framework

Table 1: Framework domains translated into evaluation requirements

Design domain	Minimum design requirement	Suggested observation
Contextual inquiry	Recruit across language, ability, confidence and devices	Task scenarios and participant coverage
Accessible interaction	Operable controls, semantic labels and alternative pathways	Unaided task success by accessibility need
Transaction clarity	Visible fees, review stage and unambiguous status	Recipient and outcome comprehension
Protective transparency	Explain necessary authentication and optional data use	Correct interpretation of prompts
Assisted recovery	Safe retry, reference number and continuity of support	Resolution time and duplicate submission
Accountable learning	Define release gates using diverse task evidence	Accessibility regressions and critical errors

5.1. Evaluation Strategy and Boundary Conditions

The practical value of a design framework is predicated on evidence that its decisions actually lead to improved customer outcomes. The proposed evaluation cycle therefore needs to start with agreed baseline task definitions from the researchers, the banking operations and the users who will be affected by the design. Participants would then go through carefully simulated transfer, beneficiary amendment, card control and dispute journeys without any actual funds being used. Observers would be recording the navigation decisions, the misinterpretations, the authentication interruptions and the requests for assistance. Short retrospective interviews would then be conducted to establish whether the task had in fact been understandable or just 'lucky'.

Measurement should be able to tell the difference between a first attempt and a successful completion following prompting. The primary indicators of task success are avoidable errors, recovery time and critical misinterpretation. Perceived confidence, cognitive load and trust are secondary outcomes. Rates should be reported by task and by participant subgroup (where appropriate) with confidence intervals reported where the sample design allows. Time savings alone are not evidence of improvement if the time saving is achieved by a faster workflow which leads to more incorrect transfers. A low error rate may also be misleading if the participant simply abandons the task prior to reaching a hazardous step. All outcomes must be operationally defined prior to any version comparisons.

Triangulation is better. The observational data tells you what actually happened, the interview data tells you what the participants believed happened and the privacy-protected operational data tells you how frequently this kind of friction arises in normal use. Where there are contradictory findings you don't just go and average them into some reassuring index, you go and investigate them further with additional testing. Product analytics also need to be properly governed: event logs should not contain financial secrets, should not have long retention periods and should not be used to reconstruct individual transaction histories for the sake of design.

Evaluation must include the negative cases. An interface that has been validated by confident smartphone users may well fail when the Arabic text is expanded, when mobile data drops or when a screen reader hits a modal dialog. Test scenarios should include interrupted confirmations, delayed receipts, reversed navigation and re-authentication. A release should be re-thought if users can't tell whether money has actually moved even if their average satisfaction has gone up. That way the experience evidence is actionable and the difference between what's proposed and what's actually been seen is maintained.

Ultimately interpretation must be sensitive to the institutional context. Different banks will have different approval flows, different fraud controls and different service channels. Comparing experiences therefore requires that the customer objectives are the same, that the procedural differences are transparently reported and that the failures which occur outside of the application interface are properly documented.

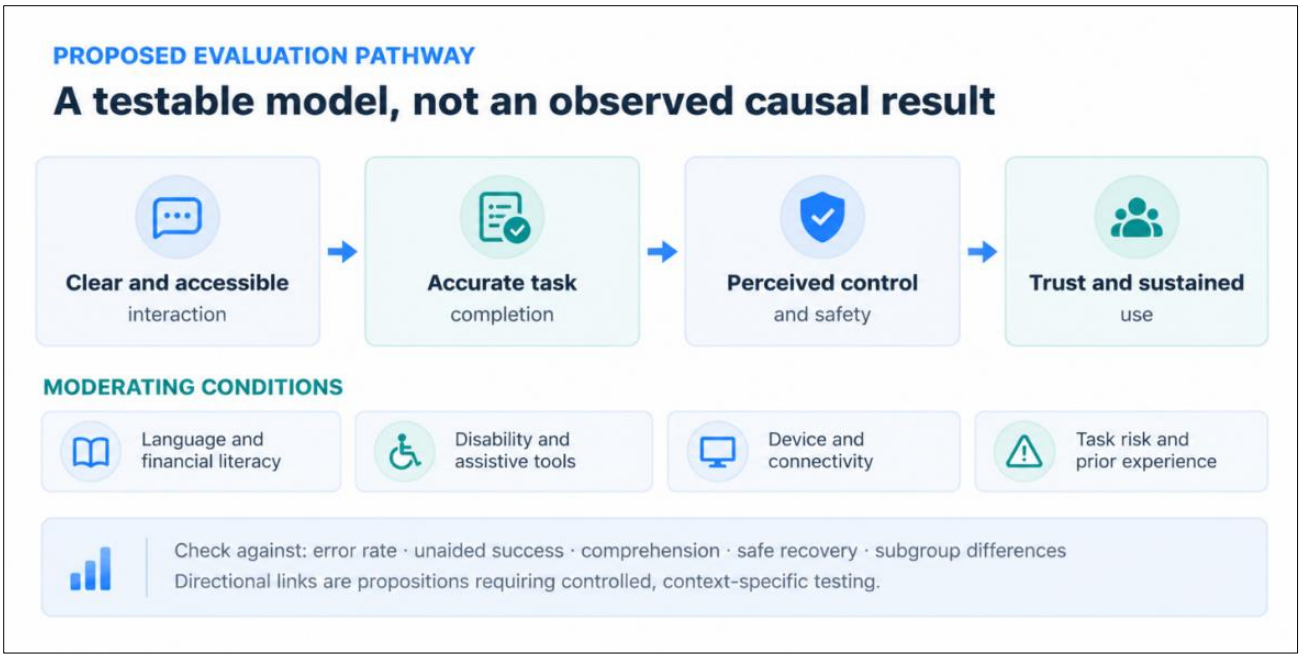


Figure 2: Proposed relationships and moderating conditions for future testing (conceptual, not empirical data)

6. CRITICAL DISCUSSION

Three tensions arise from the implications of this synthesis. First, adoption is not competence. Cross-sectional intention models will often reveal important correlates but their statistical significance does not in itself prove that a particular screen design will prevent errors. The framework therefore treats the acceptance constructs as explanations to be tested against actual behaviour. Where self reported ease and self reported task success are in conflict, the designer should look at the conflict rather than simply pick the measure which supports release.

Secondly friction isn't always a bad thing. An initial beneficiary transfer may be adequately protected by an extra confirmation, whereas the same level of protection for a low risk balance enquiry would be a massive amount of friction. The key distinction is between purposeful friction and friction without explanation. A risk aware interface should be able to explain the rationale for any protective step and provide a clear alternative. It should also be able to test whether the user actually understands what they are authorising rather than assume they do simply because they have successfully completed a biometric authentication.

Thirdly inclusion can reveal the limits of personalisation. A model trained on the behaviour of the most frequent users is going to ignore the users who use older devices, who have a preference for a different language or who use assistive technology. Those users will naturally generate less interaction data as they're effectively excluded from the interface. Behavioural analytics alone therefore need to be supplemented by purposive recruitment, some qualitative work and independent accessibility assessment. The satisfaction trends of those who do engage with the service will not reflect the experience of those who either didn't complete onboarding or simply chose not to use the digital service at all.

The real value of the framework is a shift in the unit of evaluation. Rather than assessing the application as a single entity with one overall quality score, it looks at each banking journey as a sequence of decisions that are understandable, with clearly defined security boundaries and recovery options. That is an approach which is entirely in line with the national desire for inclusive and resilient digital financial services, without in any way blurring the line between aspiration and actual user experience.

7. Implementation and Policy Implications

For the banks the implementation should start with a small set of consequential journeys: beneficiary creation, domestic transfer, bill payment, card freeze, password recovery and dispute submission. Each journey needs to be mapped from the user's intention to the final confirmation (including any interruptions, any changes to authentication and any alternative support paths). The evaluation should be a mix of moderated task observation, instrumented journey events and short comprehension probes. The reported completion rates need to split out unaided success, assisted success, false success and abandonment.

Banks should have a reusable design system that covers the patterns for Arabic and English

content, the patterns for status language, focus management, accessible validation, safe confirmation and error recovery. Reuse of components will reduce inconsistency but shouldn't be at the expense of context specific decisions. A security prompt is a good example of where you have a consistent structure but the substance of the prompt will vary dramatically according to the level of risk. The design system itself should be maintained with versioned evidence of accessibility reviews, user testing and incident trends.

For regulators and the industry bodies, the key opportunity is to promote outcome based assessment as much as technical compliance. Institutions could report on whether their representative customers are able to complete core transactions on their own, whether the key states are clear and understandable and whether the recovery pathways are able to resolve a failed journey without causing any avoidable financial loss. Of course such metrics would need appropriate privacy protections and should not be read as public rankings without a common set of tasks and sampling methodologies. Quality in the context of financial inclusion policy is best assessed against the experience of the underserved rather than simply by number of app registrations or number of transactions.

For research governance the proposed design claims should be framed as hypotheses rather than as marketing claims. A change which improves median completion time may well lead to more errors for screen reader users. A more robust security prompt may improve the sense of security but at the same time lead to increased abandonment. The release decision should therefore be based on pre-specified thresholds for material failure on task, accessibility regressions and customer harm with a qualitative investigation of any adverse patterns.

Table 2: Research and operational validation plan for representative banking journeys

Evaluation layer	Evidence source	Decision criterion
Task performance	Observed simulated transfers and account controls	Correct completion without prompting
Comprehension	Paraphrase of fees, recipient and transaction state	Accurate explanation of consequence
Accessibility	Screen-reader, large-text and bilingual testing	No material barrier for core journeys
Safety and recovery	Interrupted sessions, failed payments and unusual prompts	Safe next action without duplicate transfer
Perceived agency	Post-task interviews and brief experience measures	Confidence with correct understanding
Monitoring and equity	Privacy-preserving event trends plus purposive retesting	No serious subgroup regression

8. Research Gaps and Future Directions

Saudi mobile banking research would be enhanced by longitudinal studies which would follow people through onboarding, normal usage, the occurrence of an unusual event and service recovery. Such a design would allow the researchers to tease apart the effect of familiarity from the effect of interface improvement over time. The experiments would need to manipulate the transaction summary, the error explanation and the range of authentication options whilst keeping the actual security controls the same. The outcomes would be measured in terms of comprehension and error prevention rather than simply preference ratings.

A second priority is intersectional accessibility research. The study should recruit blind and low vision customers, older customers, customers with limited literacy, bilingual customers and customers on low-cost devices without making the assumption that any one of these groups is homogenous. A mixed methods design could combine task performance with interviews about perceived dignity, financial independence and the cost of seeking help. Data collection must be such as to not expose real account identifiers and must not in any way encourage risky transactions.

A third priority is organisational evaluation. Multi-bank case studies could look at whether shared design system rules, cross functional governance and structured post incident reviews reduce the incidence of harmful interaction failures. The proposed pathway should be tested against alternative models which allow for the direct effect of reliability and prior trust. The research should also look at whether the use of automated assistance leads to a more meaningful resolution or simply funnels the customer away from human contact. Those would be much stronger tests of the framework than further surveys asking simply whether the customer intends to continue using the application.

9. Limitations

The review is an interpretive summary of 30 selected journal articles (not a full review of the field).

Source identification was based on targeted discovery and readily available publication records rather than a full export of the search history. The evidence is very heterogeneous in terms of geography, sampling, construct definition and analysis; results from other markets cannot be assumed to be directly transferable to the Saudi context. A number of the studies use self reported intentions and cross sectional relationships which do not necessarily identify causal interface effects. The framework is not yet piloted in a bank and the measures proposed are not validated in the context of the study. The policy interpretation in the review does identify some design implications in relation to Vision 2030; it does not make any assessment of the actual performance of the official programmes or of compliance with regulation.

10. CONCLUSION

Human centred mobile banking is about so much more than speed of transaction, attractive dashboards and the kind of adoption figures that get the investors excited. The evidence we've reviewed suggests that good service is predicated on the user being able to understand the financial implications of their actions, be able to operate the interface without the need for constant supervision, be able to identify the legitimate steps that will protect them and be able to recover safely if the journey goes wrong. The Saudi accessibility findings are particularly pertinent to this and underline the need to assess real tasks in Arabic and with assistive technology. The proposed framework incorporates six design and governance domains with task intelligibility and financial agency at its heart.

Its main contribution is a set of falsifiable links between design practices and user outcomes rather than a claim that a particular framework has in fact improved banking performance. The next step in the research is to do a controlled, inclusive evaluation across a range of banking journeys and institutions. That is how the aspirations of Vision 2030 can be considered via the actual user experience: fewer serious errors, clearer choices, safer recovery and much wider independent access to the core financial functions.

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