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Research Paper

Systematic Structuring of the Business Domain of Local Mobile Apps Stores Using Soft Systems Methodology (SSM)

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Abstract

Abstract. Due to the global competitive environment in the mobile app market, traditional problem-solving methods in examining the problem of accepting stores offering these digital products have ignored the important role of human factors and therefore this weakness necessitates research on relevant policies by governing bodies from another perspective based on a soft systems thinking approach. This problem has structural complexities, and many stakeholders have different views on it. Therefore, using the methodological approach of soft systems can be a solution for this purpose. This research was applied, exploratory, and qualitative, and the statistical population consisted of 10 experts in the telecom industry, whose selection was made by purposeful judgment. Data collection tools were conducted in in-depth semi-structured interviews. The research findings lead to a conceptual and structured model for improving change, learning and helping to improve macro policies in this area.

Keywords *App Store; Unstructured Problems; Soft Systems Methodology (SSM); Policy-Making, Learning*

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1. Introduction

In recent decades, new methods have been developed to deal with confusing, complex, and unstructured problems that seem difficult to solve. These methods are structured and precise, but unsatisfactory, known as soft operational research, soft systems, or problem structuring methods (PSM) (Mingers, 2011). With the launch of the Apple app store in 2008, the mobile service ecosystem has undergone many changes (Karhu, Tang and Hämäläinen, 2014). It's difficult to accept the app's native markets, with the presence of Play Store, who has a major leadership and market share in the Android app industry. Therefore, examining the problem of macro policy-making in structuring the acceptance of these stores at the community level is an important problem, and the question arises that "the optimal policy-making model of governing institutions on the store industry what should the apps look like?" The existing knowledge gap (lack of benefit from the views of key stakeholders, lack of identification of factors influencing market acceptance and lack of structured attitude), led to the definition of this research to look holistically, systematically and integrated, provide a conceptual model; Because each stakeholder, by its very nature, seeks to increase the value of the network. Given that the problem of this research has not yet been considered as a systemic whole, so it has a thematic innovation. In order to respond to the problematic situation, the researchers are trying to structure the problem so that they can explain it.

2. Literature Review

Since mobile application marketplaces are complex and different actors work together to produce and distribute these products and digital services, the literature in this field has included a variety of studies from the perspective of the network's main actor. It has started and has progressed to the point of

view of the mobile service ecosystem. If we consider problems structurally, at the two ends of a spectrum, at one end, there are hard and structured problems that can be formulated and found a suitable solution for them; and on the other hand, there are soft problems that are not easily formulated because they are vague or unstructured. Admittedly, many problems are of this kind; So that even the most sophisticated mathematical knowledge and the most professional operations research experts are not able to formulate their mathematical statements due to the uncertainty of the structure and the combination of interests and motivations of stakeholders involved in the situation (Azar, Khosravani, Jalali, 1395). In general, soft operation research methods, unlike hard operation research methods (which only seek to solve the problem), structure problems. Problem structuring approaches are participatory modeling methods that aim to help reduce the complexity of the problematic situation. Complex situations are characterized by multiple actors, multiple perspectives, different interests, intangible sensitivities, and uncertainty (Mingers, 2011). Prior to the 1970s, conventional methodologies for solving human and managerial problems were rigid methodologies based on the paradigm of positivism. While to solve human and managerial problems, soft methodologies were needed that were holistic, interpretive, systemic and problem-oriented, and their goal was to face the problematic situation formed on the basis of the world. Conflicting noses. One of the most successful methodologies is the Soft Systems Methodology (SSM), developed by Peter Checkland and colleagues at the University of Lancaster and is currently the most widely used systemic thinking approach. In this methodology, stakeholders intervene in the position of the problem and try to take actions that lead to the improvement of the problem position (Hanafizadeh and Mehrabioun, 2019). The use of this approach as a framework for solving unstructured problems that seem appropriate to solve

complex situations is on the rise among analysts (Shahabi et al., 2019). According to the study, no research was conducted that addressed the problem of mobile services using a research approach in soft operations. Thus, this problem has remained almost untouched in domestic studies, and since marketplaces are an emerging business model in the digital economy, few studies have examined the dynamic behavior of mobile services in marketplaces (Pagani and Otto, 2012: Pagani and Fine, 2008). Most of the research on mobile services has focused on business model analysis, key success factors, and user engagement behaviors. Complex situations are characterized by multiple actors, multiple perspectives, conflicting interests, intangible sensitivities, and uncertainty (Mingers and Rosenhead, 2004). According to Table 1, the position described can be considered a "bad structure."

Table 1.
Investigating the Poor Structure of the Research Problematic Situation

Characteristic of unstructured Problems	**The situation of the problematic situation**
Multiple stakeholders	• Key stakeholders, each defining the problem from their own perspective (operators, marketplaces, developers, and users), and the competitive interests of some of them, have added to the complexity of the problem.
Not well made	• The system under study is not based solely on a single criterion; Rather, a complex system consists of internal dependencies and includes a set of different criteria in different dimensions. • Many of the important metrics for market acceptance are subjective.
Multiple views and dimensions	• The existence of multiple and sometimes conflicting views between operators and private companies has added to the complexity of the problematic situation.

Characteristic of unstructured Problems	The situation of the problematic situation
	• Given that the mobile value-added service system is intertwined with humans, both in design and implementation, it is essential to look at it as a system of human activity. . • How to add value-added mobile services requires the participation of open minds from different areas.
Intangible and uncertain factors	• To examine the system under study, several methods can be considered, some of which have a quantitative approach and some of which have a qualitative approach. The ideal method for this purpose is not available. • Systems recognition methods are methodologically different.

Therefore, the use of "soft systems methodology" has been selected as the desired approach to structuring this complex problem.

3. Method

This research is applied in terms of purpose and exploratory in terms of research implementation strategy. The data collection method was field (using a semi-structured interview). The statistical population of the study (experts) were the managers of the telecom industry, in the selection of which, five criteria (key, identified by others, theoretical understanding of the subject, diversity and agreement with participation) were considered. Sampling was judged purposefully and by snowballing until theoretical saturation was achieved, and thus 3 more people were identified in addition to the previous 7 (a total of 10 people were present in the interview process). Narrative through Collaborative Survey, Research Participation, and Pluralism; and reliability was achieved by controlling reliability by audit during the research process. The soft systems methodology (SSM), based on a seven-step process in both real and abstract (or systemic) spaces, works as follows: 1- Identifying the

position of the problem; 2- Provide a clear picture of the problem; 3- Provide a fundamental definition of the problem; 4-Presenting a conceptual model of the problem; 5- Comparing the conceptual model with the real world; 6- Determining changes; And 7- providing a practical plan for implementing changes (Azar, Khosravani, Jalali, 1395).

4. Findings

The ineffectiveness of the policies used in the mobile service ecosystem (for app stores) leads to the failure to achieve the goals of Iran's 20-year vision document on the horizon of 1404. The beneficiaries of this ecosystem can be represented in Figure 1.

Fig. 1. Stakeholders Identified in the Application's Mobile Ecosystem in Iran

After reviewing the documents and analyzing the qualitative data obtained from the semi-structured interviews, three perspectives on mobile services have been identified:

- **Perspective of marketers.** The Communications Regulatory Authority (CRA) of Iran (as the regulator of relations and marketing and the representative of the government in the mobile ecosystem) should play a more active and effective role in this field with an active approach. Measuring the performance of Iranian markets using quality criteria and knowing the preferences of key players can help relevant officials in mobile service policy under the current conditions of the country (the existence of international sanctions).
- **Perspective of professional developers.** Professional developers put their programs up for sale to users through the market platform.
- **Perspective of End-Users.** Marketplaces allow users to search, buy and download the applications they need while visiting their platform environment.

The rich picture of the problem position are presented in Figure 2.

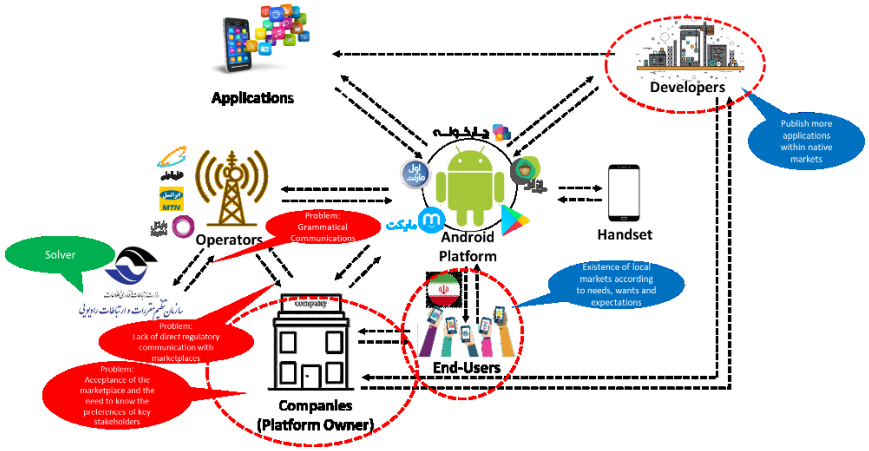

Fig. 2. Rich Picture of the Problematic Situation

Root Definition (RD) is a statement that, while describing an ideal and desirable system, identifies the goals, persons, and actors involved in the

situation, the people affected and affected by the system situation (Azar, Khosravani, Jalali, 1395). There is a well-known method called CATWOE to create a root definition based on illustrated images situation (Azar, Khosravani, Jalali, 1395; Hanafizadeh and Mehrabioun, 2019). Each root definition must include the six main components of CATWOE analysis for each perspective. In Table 2, information about CATWOE components is shown separately for each view.

Table 2.
CATWOE Analysis

Components	RD (1)	RD (2)	RD (3)
Customers	• Subscribers (real and legal) operators (potential) • Application market users (actual) • Professional developers	•Application market users	• People
Actors	• Professional application developers • End users •MNOs and MVNOs	• Private companies •MNOs and MVNOs	• Private companies • Professional application developers •MNOs and MVNOs
Transformation	• Providing a variety of mobile value-added services for the evolution of the mobile ecosystem according to the knowledge and understanding of the preferences of users and developers • Efforts to gain the maximum satisfaction of developers and users by awarding various points and incentives in order to eliminate competitors • Identifying problems and prioritizing concerns (this requires the formation of a think tank with the maximum presence of actors to monitor trends and uncertainties). To improve the efficiency of this think tank, large-scale considerations and frameworks must be obtained from regulatory bodies, and reports on uncertainties must be regularly addressed.		

Components	RD (1)	RD (2)	RD (3)
	• Research on the defined problem and select the intended approach (for this it is necessary to form an expert team. To do this, negotiate with government agencies (including regulators), emulate the experiences of other successful global markets. It is necessary to negotiate with key actors and identify their preferences, gather information from the required resources, review past policies, and analyze multiple information and scenarios. • Pre-action review (in order to extract the extracted scenarios, using simulation techniques, analysis and its effects to finally select the best scenario. • Get the maximum participation of actors to implement policies and help them to implement programs; For this purpose, one of the measures is to determine and define the list of requirements and the model of readiness to implement and determine the required resources. Other measures include systematic sensitization of managers and innovation in digital products and processes to facilitate the implementation and enforcement of policies. • Post-action controls (meaning that in performance measures, reports are obtained from actors about policy implementation, knowledge management, and learning to measure deviations from programs). • Adapting the situation of local markets to the world and having a task to eliminate the existing backwardness		
World View	• Improving the level of welfare and digital life of the Iranian people by providing a variety of value-added (non-content) services - such as app markets • In this view, the operator is viewed only as a member of the value chain. • Reduce world backwardness and homework • Proper response to the needs, demands, expectations and general concerns of Iranian users despite international sanctions and limiting the tastes of global	• Profitability • Customer orientation • Responding appropriately to the needs, demands, expectations and concerns of Iranian users despite international sanctions and restricting the tastes of those in charge of global markets to Iranian users.	• Support domestic production and easy access to local markets by receiving free apps or making Rial payments per purchase. • Use of exclusive services available from local markets

Components	RD (1)	RD (2)	RD (3)
	market authorities on Iranian users.		
Owner	•Governance (High Council of Cyberspace) •Ministry of Communications and Information Technology (Regulatory)		
Environmental Factors (Uncertaintity)	• Low reputation and social credibility of real operators in the country • Weakness in the technical infrastructure of the operator to perform multilateral cooperation with others • Political problems and sanctions • Rapid growth of technology • Existing lobbying • Differences in cultural and knowledge levels of society	• Existence of ambiguity and lack of transparency of invoices problemd by real operators for subscribers • Multiple influential institutions in relevant macro-decisions •Multiple regulations set by the regulator	• Existence of some opportunistic behaviors and abuse of user credibility • Inability to closely monitor the operation of marketplaces • Lack of a codified system for evaluating the performance of mobile value-added services (local application markets) to identify and regulate the market •Data security and the problem of cyber attack prevention

In general, soft systems consist of stakeholders who have different and defensible perceptions of a single problem. Meanwhile, people with close and similar perceptions get closer to each other and an intellectual faction is formed (Hanafizadeh and ValiZadeh, 2014). Each of the different perspectives on the problem creates a unique system of human activity that results from the social system of the relevant intellectual faction. The process of consensus

turns unique human activities into a system of acceptable human activity by different factions during limited repetitions. This process takes place through the collection of concepts in a mental structure. Types of consensus of different attitudes are shown in Figure 3.

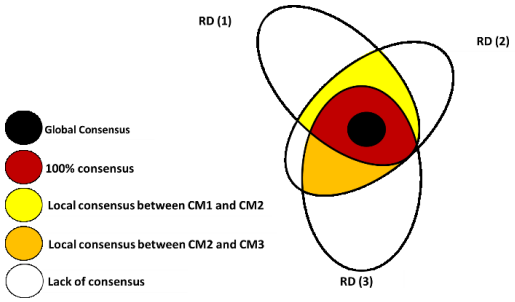

Fig. 3. Different Types of Consensus (Wilson, 2001)

The desired combined model resulting from the mental models of the actors of the mobile value-added service ecosystem in Iran, in the figure 4 Presented, which includes five main steps.The first step is to create a "problem definition subsystem" to identify problems and prioritize concerns. To do this, it is necessary to form a think tank with the maximum presence of actors to monitor trends and uncertainties. To improve the efficiency of this think tank, large considerations and frameworks must be received from regulatory bodies, and reports on uncertainties must be regularly addressed. The second step is to create a "scenario-making subsystem" for researching the problem defined in the previous step and selecting the intended approach by forming an expert team. To do this, negotiate with government agencies (including regulatory), emulate the experiences of other successful global markets, negotiate with key players and identify their preferences, gather information from required sources, review past policies and analyze information, and more. The third step is to create a "pre-action review subsystem" to examine the extracted

scenarios, using simulation techniques, analysis, and its effects to ultimately select the best scenario. The fourth step is to create a "sub-system for selecting scenarios" in which to involve the actors as much as possible in implementing policies and helping them to implement programs. For this purpose, one of the measures is to determine and define the list of requirements and the model of readiness to implement and determine the required resources. Other measures include systematic sensitization of managers and innovation in digital products and processes to facilitate the implementation and enforcement of policies. The fifth step is to create a "post-action control subsystem" (meaning that in performance measures, actors' reports on policy implementation are taken to measure deviations from the program. Learning is also done in this step. The conceptual model presented is a kind of two-way model, and to complete it, it is necessary to take other measures, which are: designing a mechanism to ensure the participation of all actors; A platform for continuous identification of uncertainties and its inclusion in the problem definition subsystem; designing a mechanism to ensure methodological fit with the problem and, finally, analyzing the activity of other markets to provide value-added services. Mobile and related global trends. This conceptual model has been developed for favorable conditions and to better implement and use it properly, there are requirements that are: the existence of specialized trade unions in the field of value-added services. Mobile with the presence and constructive participation of operators, markets and companies providing mobile value-added services; Having a think tank for active and constructive participation of key actors; Existence of an institution or part in the regulatory body in order to continuously monitor and monitor weak signals and anticipate uncertainties ahead; The readiness of the legislature (Islamic Consultative Assembly) and the regulatory body to formulate policies related to the provision of M-VAS.

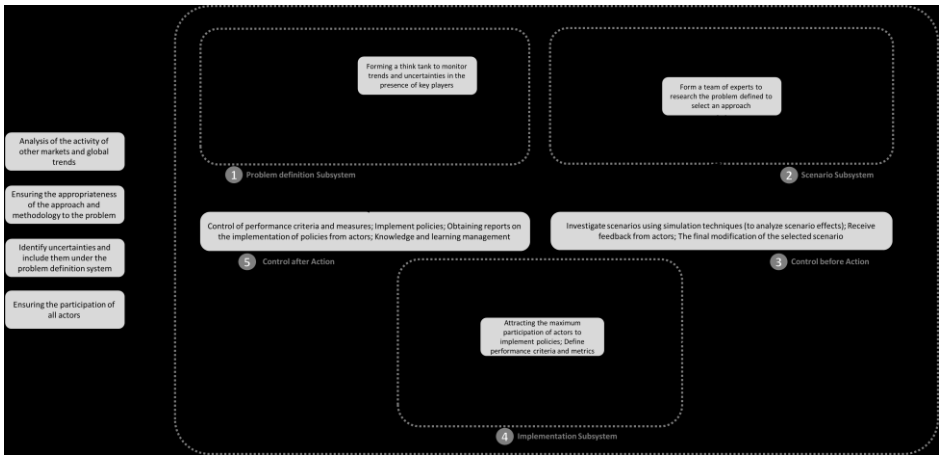

Fig. 4. The Optimal Model Resulting from the Conceptual Models of the Actors

With the implementation of the developed model in this research in the form of problem-solving, scenario-making and current sub-systems, many of the current problems and current policy situation of accepting local markets in Iran will be solved. Lack of participation of actors in decision-making and monopoly policy-making of regulatory, implementation and implementation of policies in a reactive and linear manner, the existence of numerous and sometimes contradictory directives, lack of necessary mechanisms to monitor programs and Controlling the results is one of the things that operational solutions have to offer. At this stage, the methodology of soft systems returns to the real world from the world of systems. This step is designed to structure the discussion of improving the current situation, and the analyst (researcher) should examine how the events unfold. Conceptual models, based on root definitions, express what should be done by the system (the optimal world extracted from the combination of mental models of actors). In order to compare and apply the desired world (conceptual model) and the real world (rich picture), we can use Chekland's proposal to extract changes by

comparing the two with each other. . In other words, is it possible to implement what seems necessary in the mental model in the real world? And to what extent can these two be brought closer together? For example, in the subsystem of problem definition that is mentioned in the mental model, parts can be implemented in the real world, parts of it cannot be implemented, and parts can be improved. As in the figure 2 (rich picture) showed that the relationship between regulators and marketplaces is defined indirectly (by operators) and by grammatical type; But in the mental model of the actors, this has to be done in a participatory way. Therefore, the problem can be defined in the form of an improvement project. In other words, there is a kind of stylization between the real world and the desired world. The table 3 shows all the necessary actions and measures for each of the existing subsystems in case of uncertainty.

Table 3.
Action Plans

Subsystem	Action (Imaginative Actions)	Existence in the real world	How to do it	Desirable	Possibility	Comments
Define the problem	Obtaining macro views and considerations and frameworks from governing institutions	has it	Often grammatical	No	Yes	Turn into a participatory mode
	Obtaining reports of uncertainties	does not have	Passive	No	Yes	Define the relevant structure and process

Subsystem	Action (Imaginative Actions)	Existence in the real world	How to do it	Desirable	Possibility	Comments
	Identify problems and prioritize concerns and determine problem levels	To some extent	Passive (by event)	No	Yes	Define the optimal process
	Forming a think tank to monitor trends and uncertainties	Very limited	All at once randomly and selectively	No	Yes	Defining the appropriate structure; Promote appropriate thinking and attitudes and ensure the presence of the main actors
Scenario making	Form a team of experts to research the problem	has it	Focused ring	No	Yes	Use all available capacities to conduct a research
	Benchmarking	has it	Customize	No	Yes	Systematically
	Negotiate with key actors	To some extent	All at once randomly and selectively	No	Yes	Defining the appropriate structure; Promote appropriate thinking and attitudes
	Gather information from required sources	has it	Passive	To some extent	Yes	Systematically
	Examine past policies and their consequences	has it	Occasionally (by accident)	No	Yes	Define the relevant structure and process

Subsystem	Action (Imaginative Actions)	Existence in the real world	How to do it	Desirable	Possibility	Comments
	Analyze information and provide multiple scenarios	Rarely	By accident	No	Yes	Creating the necessary infrastructure in terms of attitude, knowledge and relevant procedures
	Negotiate with legal, cultural and governmental institutions	has it	Depending on the case or occurrence	To some extent	Yes	Forming a center (s) and a room for common thoughts and discussions
Control before Action	Provide the final scenario (s) using simulation techniques	No	Does not exist	No	Yes	Form an expert group to simulate and evaluate the impact of scenarios
Implementation	Determining and defining the list of requirements and implementation readiness model	To some extent	Passive (depending on the case or occurrence)	No	Yes	Change attitudes and improve skills
	Get the most out of actors to implement policies (s)	has it	Often grammatical	No	Yes	Changing attitudes and creating participatory and interactive procedures
	Implement policy (s) by innovating in digital products or processes	has it	Often ordered or copied from foreign models	No	Yes	Attitude change; Creating participatory and interactive procedures; Pay attention to uncertainties

Subsystem	Action (Imaginative Actions)	Existence in the real world	How to do it	Desirable	Possibility	Comments
	Systematic sensitization of managers to implement policies (s)	has it	Often grammatical and passive	No	Yes	Strengthen the spirit of interaction and participation
Control after Action	Control key performance metrics and performance measurement policies (s)	Very incompl ete	It often stops after ensuring policy implementat ion (s)	No	Yes	Create mechanisms and define relevant procedures

The results of the fifth step lead to suggestions for changes and related actions (Table 3). Software methodology is divided into two types, SSMc and SSMp. The SSMc type only defines and suggests desirable and possible actions to make changes. In the SSMp type, the proposed changes are implemented (Checkland and Poulter, 2006). This stage (action and implementation of relevant changes) is a time-consuming and lengthy process and is outside the scope of the researcher's authority in the practice environment; Therefore, their implementation is recommended to the problem owner.

5. Conclusions

The results suggest that the use of a suitable mechanism for policy making in the mobile value-added service system requires subsystems that serve as the main steps of the policy cycle. Put into action and ensure its success. Which act as the main steps of the policy cycle and ensure its success. The problem definition subsystem, the scenario subsystem, and the current

subsystem are among the main steps in this cycle. In the subsystem of problem definition, attracting maximum participation and using the capable think tank to consider the views and macro-considerations of governing institutions, trends and future uncertainties, it is necessary to have a desirable model. The reason for defining such a subsystem at the beginning of this cycle is to pay special attention to unknowns and uncertainties. In other words, in the current system, the problems of the past are in the spotlight, and only one actor (regulator) plays a key role in policy-making; while in favorable conditions, it seeks to benefit from the opinions of all actors and also considers environmental uncertainties and uncertainties. In the scenario subsystem, all expert capacity must be used to investigate the problem; Conducted systematic case studies; He negotiated with key actors as part of a participatory culture and promoted an interactive approach, and ultimately provided the infrastructure needed to analyze information and provide different scenarios to be an effective model for market acceptance policy. Achieved. One of the major concerns in the current situation is facing unknown phenomena about which there is not enough awareness and subsequently appropriate decisions and policies are not made. In the desired model, an attempt has been made to examine and pay attention to this defect from different aspects and from different angles, and this section will become a strong point for decision-making in accepting markets. In the current subsystem, it is necessary to change the basic attitude in defining the requirements and creating readiness to accept the changes; Existence of participatory and interactive procedures for creating innovation in digital products and processes will also solve many problems in the implementation process.

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