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PAPER

Mobile Technology and Institutional Readiness as Drivers of Corporate Governance: The Mediating Role of Risk Management in Infrastructure Projects

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ABSTRACT

This study investigated the enhancement of corporate governance in large-scale infrastructure projects through mobile technologies by evaluating the effects of mobile technology use and institutional readiness on corporate governance, with risk management serving as a mediating factor. The study used a quantitative, cross-sectional design and gathered data from 225 people working on large infrastructure projects. Researchers analyzed the data with partial least squares structural equation modeling (PLS-SEM). Results showed that both mobile technology use and institutional readiness had strong positive impacts on risk management, which in turn led to better corporate governance. Mediation analysis confirmed that risk management facilitated the transfer of the benefits of mobile technology and institutional readiness to governance performance. The findings suggest that governance improvements in infrastructure projects depend not only on digital tools but also on organizational readiness and systematic risk oversight. The study concludes that stronger corporate governance results when mobile technology adoption and institutional preparedness are effectively translated into risk management capabilities within complex infrastructure environments.

KEYWORDS

mobile technology, institutional readiness, corporate governance, large-scale infrastructure, governance law

1 INTRODUCTION

Large infrastructure projects drive economic growth, connect communities, and create public value. However, they are also complex, involve many stakeholders, take a long time to complete, and face significant uncertainty [1]. Governance has become a strategic concern rather than just an administrative task. Research shows that governance in major projects affects decision-making, accountability,

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stakeholder management, and the ability to handle uncertainty. Weak governance can lead to unclear roles, poor oversight, and low performance in public infrastructure programs [2], [3] demonstrated that big infrastructure projects are risk-prone by nature and that governance arrangements have an impact on the way risks are detected and controlled. In this way, governance in large-scale infrastructure contexts should be perceived as a dynamic ability to manage projects by volatility, interdependence, and strategic complexity instead of just exercising control to adhere to plans. Mobile and digital technologies have started to transform the monitoring, coordination, and governance of infrastructure projects in this changing context [4].

Recent research indicated that digital technologies enhance infrastructure performance through the ability to collect data in real-time, enhance the speed of data processing, provide more transparent reporting, and enable better-informed decision-making [5]. Other studies on project governance in infrastructure have discovered that digital technology can improve decision-making and engage stakeholders through up-to-date, visual, and integrated information provided at the governance level to enhance project environment coordination and transparency [6]. On the operational level, IoT-based smart monitoring systems, cloud platforms, point-cloud data, and location technologies have become possible to enable managers to monitor safety, quality, environmental conditions, and site activities in real time [7]. These advancements imply that mobile technologies are not mere means of communication; they are being more and more integrated into the governing system of complex infrastructure.

Nonetheless, the advantages of mobile technologies are not self-evident. Literature on technology use has always stressed that adoption is based on the ways the users weigh the benefits as well as the dangers of a technology [8]. Practically, perceived usefulness and perceived risk have recurrently been found to be key determinants of mobile technology acceptance in any setting. Extended studies on mobile services have also demonstrated that perceived usefulness facilitates intention and successful use, but perceived risk may limit adoption by generating concerns that pertain to privacy, security, and uncertainty [9]. These issues are particularly significant in the infrastructure sector, where project decisions often involve high-value assets, safety considerations, and complex contractual and multi-party responsibilities. Therefore, understanding the application of mobile technology in infrastructure governance requires attention not only to technological functionality but also to the perceived value and risk profile from the users' perspective.

Readiness encompasses both organizational change motivation and organizational change [10] implementation capacity, supporting the perspective that successful change requires both willingness and capability [11]. Risk assessment frameworks assist management to prioritize and deal with various types of risk, and governance structures influence the way risks are managed in mega-infrastructure projects. Combined, these insights imply that risk management can become the functional interface between digital capacity and governance capacity [12].

Although interest in digital transformation in infrastructure is increasing, there is still a gap in the literature. Previous studies have looked at how digital technologies can improve decision-making, stakeholder involvement, sustainability, and ESG performance in infrastructure projects [13]. However, recent research also points out that there are insufficient empirical studies on digital technologies and governance performance, especially at the project governance level, which warrants further exploration [14]. To address this, the present study examines how mobile technology use and readiness among institutions affect corporate governance, with risk management acting as a mediator in large-scale infrastructure projects.

2 LITERATURE REVIEW

2.1 Use of mobile technology and institutional readiness

The use of mobile technology in literature has always demonstrated that mobile-enabled systems enhance real-time accessibility to information, effectiveness of communication, and responsiveness in the decision environment, making them particularly applicable in complex organizational circumstances [15]. In this stream, technology acceptance studies have focused on how actual and sustained use is also influenced by the functional value of a technology and how users assess the potential risks. A mobile technology acceptance scale was found to have two key scales of mobile technology usage: perceived usefulness and perceived risk [16]. According to their work, there is a higher likelihood of the users adopting the mobile-based systems when it is perceived that the technologies can help them in terms of efficiency, convenience, and task performance, and the issue of uncertainty, privacy, or potential adverse effects can undermine the adoption [17]. This also means that the utilization of mobile technology is not just a technical problem but a perceptual and behavioral problem that is influenced by the expected value and perceived vulnerability ratio. In this light, the adoption of mobile technology can be a valuable organizational skill, which can assist in coordination, monitoring, and oversight when usefulness surpasses perceived risk [18].

Together with the use of technology, the literature has also found institutional readiness as a key requirement to successful organizational change. Organizational readiness is a common psychological state that indicates the joint commitment of the members to effect change and the belief that they could affect the change [19]. Expanding on this wider perspective of readiness, this view is extremely applicable to digital transformation since companies can have access to mobile technology and, nevertheless, they cannot produce significant results when they are not driven to change or do not have the capacity to implement changes. In this spirit, institutional preparedness extends the organizational space upon which mobile technologies may be assimilated into protocols and reporting procedures and governance. According to the literature, the use of mobile technologies and institutional readiness are conceptually antithetical: the former is an indicator of the technological component of change, and the latter is an indicator of the organizational desire and capacity to turn the technological possibility into successful institutional practice [20].

2.2 Risk management and corporate governance

Risk management has been widely accepted in the literature as a key organizational mechanism of identifying, evaluating, prioritizing, and responding to risks that can affect performance and strategic goals [21]. The conceptualization of risk as a multidimensional phenomenon is that organizational exposure can be quantitatively represented in the form of categories, namely, demand-side risk, logistics-side risk, information risk, and environment risk [22].

This multidimensional perspective is especially relevant in large-scale infrastructure environments, where project delivery depends on interdependent actors, extended supply and reporting chains, uncertain conditions, and continuous information flow. In such contexts, risk management extends beyond operational control and becomes a strategic capability that enables organizations to anticipate vulnerabilities, assign responsibilities, and address disruptions in a coordinated manner. Consistent with this view, the structure of project governance influences how risks are identified, allocated, and managed, demonstrating that risk management is embedded within governance frameworks rather than functioning as an isolated technical process [23]. Corporate governance literature, especially in the context of organizations and projects, has shifted away from the board-centric concept of governance and has focused on governance as a general ability to provide direction, coordination, accountability, analysis, and adaptation [24].

Governance capacity: Recent literature has emphasized that successful governance is based on the capacity of actors to marshal resources and efforts towards a shared objective, as well as retaining analytical and collaborative capacities [25]. Similarly, in an empirical contribution, the organizational governance capacity in terms of responsibility capacity, coordination and cooperation capacity, analytical capacity, and self-organizing capacity has much in common with how organizations govern in the face of complexity and uncertainty [26].

Figure 1 presents the research model, which illustrates the relationships among four key constructs: use of mobile technology, risk management, corporate governance, and institutional readiness. The model proposes that these latent variables have direct or indirect effects within the context of organizational or technological adoption.

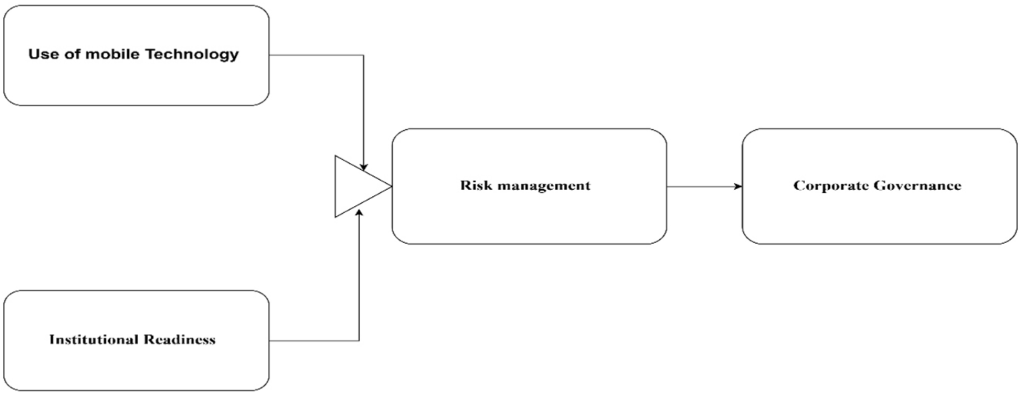

Fig. 1. Research model

3 METHODOLOGY

3.1 Research design

In this study, a cross-sectional survey design was used in a quantitative approach to explore the use of mobile technologies in promoting corporate governance in large-scale infrastructural settings via the mediating concept of risk management.

3.2 Population, sampling, and sample size

The audience consisted of the professionals engaged in the planning, monitoring, coordination, and governance of the large-scale infrastructure projects.

These respondents were project managers, site engineers, operations managers, risk officers, compliance personnel, and other decision-makers in organizations charged with the responsibility of developing major infrastructure. The selection of these people was because they had firsthand experience in the use of mobile technology, institutional preparedness, project risk management experiences, and governance capability in their respective organizations. The research employed a purposive approach of sampling respondents who met the inclusion criteria. The participants in the survey were only those with direct experience in the execution, monitoring, governance, or risk-related functions of infrastructure projects. This methodology helped to ensure that the data that was collected was informed and respondents were able to meaningfully analyze the study constructs.

The final sample consisted of 225 usable responses. This sample size was sufficient for partial least squares structural equation modelling (PLS-SEM), as it exceeded the minimum threshold typically required for estimating complex structural models with multiple paths and higher-order constructs. Additionally, the sample size was adequate for assessing the measurement model, testing the direct relationships hypothesized, and evaluating the mediating effect of risk management.

3.3 Instrument development and measurement of constructs

Data were collected using a structured questionnaire developed from previously validated scales. The questionnaire was designed in English and consisted of two sections. The first section captured respondents' demographic and professional information, while the second section measured the latent constructs included in the research model. All measurement items were adapted to fit the context of large-scale infrastructure governance and mobile technology use. The construct Use of Mobile Technology was treated as an independent variable and was adapted from Khare and Sarkar [27]. It was operationalized through two dimensions: perceived risk and perceived usefulness, with five items for each dimension. The perceived risk items assessed respondents' concerns regarding uncertainty, security, and possible negative consequences associated with mobile technology use, whereas the perceived usefulness items evaluated the extent to which mobile technologies were perceived to improve work effectiveness, monitoring, coordination, and decision-making. The construct "Institutional Readiness" was also treated as an independent variable and was adapted from [28]. It comprised two dimensions: organizational motivation with seven items and organizational implementation readiness with five items.

The mediating construct, risk management, was adapted from [29]. It was measured using four dimensions: demand-side risk (6 items), logistic-side risk (6 items), information risk (4 items), and environmental risk (6 items). These dimensions captured the organization's ability to identify, monitor, and respond to various categories of risks affecting infrastructure projects.

The dependent variable, corporate governance, was adapted from Turker [30]. It was measured through four dimensions: responsible governance (10 items), coordination and cooperation governance (7 items), analytical governance (12 items), and self-organizing governance (7 items). These dimensions reflected the organization's governance capability in terms of accountability, coordination across stakeholders, analytical decision-making, and adaptive self-regulation in project environments. In total, the questionnaire contained 80 measurement items. All items were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The use of a Likert-type scale was appropriate because it enabled respondents to express the degree of their agreement with each statement and facilitated subsequent latent variable analysis using PLS-SEM.

3.4 Data collection

The information was obtained using a self-administered questionnaire that was sent to the respondents who satisfied the criteria of the study in organizations engaged in large-scale infrastructure development. The respondents were contacted by using professional contacts, organizational contacts in projects, and sector communication channels. All the participants were well informed of the study purpose, and only the ones possessing pertinent professional experience were asked to fill out the questionnaire. The questionnaires were filled during a specified time of data collection and reviewed to be complete and useful. Responses that contained significant missing data or had obvious inconsistencies in responses were purged. Upon screening, only 225 valid questionnaires were left and kept being analyzed.

3.5 Ethical considerations

This research adhered to the ethical principles of social science research. It was all voluntary, and prior to filling out the questionnaire, the respondents were informed of the academic intent of the research. They were assured that their answers would remain confidential and would not be used to make any judgment. The analysis did not include any personal identifying information, and anonymity was ensured during the study. It was also explained to the respondents that they could refuse to participate or pull out of the survey at any point without any repercussions. These processes were useful to ensure informed consent, reduce response pressure, and enhance the accuracy of the data collection process.

3.6 Common method bias and data screening

Since the research was based on self-reported survey data gathered in a single group of respondents, some procedural and statistical measures were undertaken to minimize the chances of the common method bias. In the protocol, clear and concise wording of items, anonymity, and logical separation of construct sections ensured that the questionnaire was not associated with evaluation apprehension and response pattern bias. The aim of these steps was to promote truthful responses and minimize the chances of respondents making presumptions about anticipated relationships between variables. Following data collection, model estimation was done after data screening. The screening process looked at the missing values, outliers, and consistency of responses. Distribution of responses and item-level statistics were also checked to determine problematic patterns. Besides, common method bias was tested statistically by collinearity measures and checking the variance accounted for by a single factor. The findings revealed that common method bias was not a significant threat to the study findings.

3.7 Data analysis technique

The data was analyzed using PLS-SEM with SmartPLS software. The analysis proceeded in two stages: assessment of the measurement model and assessment of the structural model. This sequence ensured that the reliability and validity of the constructs were established before testing the hypothesized relationships among them. In the first stage, the reflective measurement properties of the lower-order constructs were evaluated through indicator loadings, Cronbach's alpha, composite reliability, rho_A, and average variance extracted (AVE). Indicator loadings of .70 or above were considered desirable, although items with slightly lower loadings were retained if they contributed to content validity and did not reduce overall construct quality. Internal consistency reliability was considered acceptable when alpha, composite reliability, and rho_A values exceeded recommended thresholds. Convergent validity was established when AVE values were greater than .50. Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT) and cross-loadings. HTMT values below the recommended cut-off indicated that the constructs were empirically distinct from one another. In the second stage, the structural model was assessed by examining path coefficients, t-values, p-values, confidence intervals, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). Collinearity among predictor constructs was also assessed using VIF values before interpreting the path estimates. The significance of the relationships was tested using a bootstrapping procedure with 5,000 resamples, which generated robust standard errors and confidence intervals for hypothesis testing.

4 RESULT AND DISCUSSION

Table 1 demonstrated that mean values of all four constructs were above the middle of the five-point scale, which means that the participants were mostly responding favorably. The mean score of the constructs was the highest in corporate governance (M = 3.85, SD = 0.51) and then institutional preparedness (M = 3.83, SD = 0.57), implying that the participants felt that their organizations were relatively well-equipped concerning their governance and were ready to change their institutions. The positive mean was also reported in the use of mobile technology (M = 3.76, SD = 0.59), and a slightly lesser and yet acceptable mean was reported in the risk management (M = 3.69, SD = 0.54). Also, skewness and kurtosis were within acceptable limits, meaning that the data were more or less normally distributed and could be subjected to more statistical operations.

Table 1. Descriptive statistics

Construct	Items	N	Mean	SD	Skewness	Kurtosis
Use of Mobile Technology	10	225	3.76	0.59	–0.41	0.18
Institutional Readiness	12	225	3.83	0.57	–0.47	0.26
Risk Management	22	225	3.69	0.54	–0.22	–0.08
Corporate Governance	36	225	3.85	0.51	–0.51	0.29

4.1 Measurement model assessment

Table 2 indicated that all the indicator loadings were above the minimum acceptable level of 0.70, which demonstrated satisfactory item reliability. Cronbach alpha, rho A, and composite reliability values of all constructs were more than 0.70, which is sufficient to ascertain internal consistency reliability. Besides, the values of the AVE were between 0.651 and 0.706, all of which were above the recommended value of 0.50. These findings showed that the constructs explained more than fifty percent of the variance of their indicators, and thus, convergent validity was established. In general, the results indicated that the reflective measures of the study were reliable and valid.

Table 2. Measurement model assessment

Construct	Loading Range	Cronbach's Alpha	rho_A	Composite Reliability (CR)	AVE
Use of Mobile Technology	0.742–0.861	0.901	0.905	0.918	0.69
Institutional Readiness	0.756–0.873	0.914	0.918	0.929	0.706
Risk Management	0.719–0.852	0.928	0.931	0.939	0.651
Corporate Governance	0.731–0.876	0.944	0.946	0.951	0.681

Figure 2 shows a measurement model depicting latent constructs PRISK, PU, and OM with their observed indicators. PRISK loads on four items (PRISK1–PRISK4), PU on three (PU1–PU3), OM on five (OM1–OM5), and OCIR1 to OCIR601 represent additional observed variables.

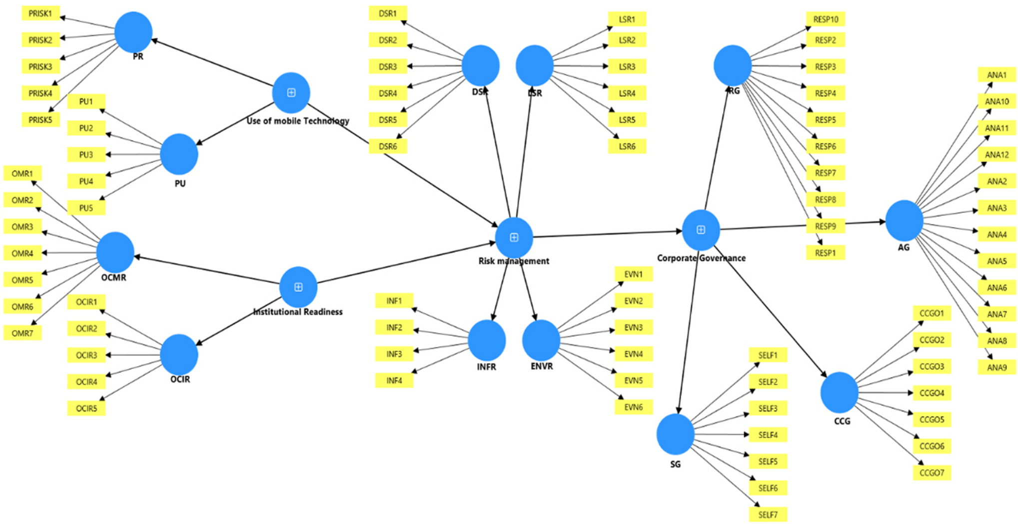

Fig. 2. Measurement model

Table 3. HTMT results for discriminant validity

Construct	1	2	3	4
1. Use of Mobile Technology	—			
2. Institutional Readiness	0.612	—		
3. Risk Management	0.587	0.671	—	
4. Corporate Governance	0.644	0.703	0.728	—

Table 3 was all below the recommended cut-off level, with the highest value observed between risk management and corporate governance (HTMT = 0.728). Since none of the pairwise comparisons exceeded the threshold, the results confirmed that each construct captured a conceptually distinct phenomenon. Therefore, the measurement model demonstrated satisfactory discriminant validity, and the study proceeded to the assessment of the structural model.

4.2 Structural model assessment

After establishing the adequacy of the measurement model, the structural model was assessed to examine the hypothesized relationships among the constructs. The assessment focused on the significance of the path coefficients, the explanatory power of the endogenous constructs through R^2, the effect size of each direct relationship through f^2, and the predictive relevance of the model through Q^2. In addition, the mediating role of risk management was tested using bootstrapping procedures. The results indicated that all direct and indirect hypotheses were statistically significant, thereby providing support for the proposed structural model.

Table 4. Structural model assessment and mediation results

Hypothesis	Relationship	Path Coefficient (β)	t-Value	p-Value	f^2	R^2 (Endogenous Construct)	Q^2	Decision
H1	Use of Mobile Technology → Risk Management	0.312	4.684	<0.001	0.126	0.523	0.314	Supported
H2	Institutional Readiness → Risk Management	0.491	7.238	<0.001	0.337	0.523	0.314	Supported
H3	Risk Management → Corporate Governance	0.624	10.417	<0.001	0.64	0.389	0.257	Supported
H4	Use of Mobile Technology → Risk Management → Corporate Governance	0.195	3.972	<0.001	—	0.389	0.257	Supported
H5	Institutional Readiness → Risk Management → Corporate Governance	0.306	5.684	<0.001	—	0.389	0.257	Supported

Table 4 showed that all direct paths were positive and statistically significant. Specifically, use of mobile technology had a significant positive effect on risk management ($\beta = 0.312$, $t = 4.684$, $p < 0.001$), thereby supporting H1. Likewise, institutional readiness exerted a significant positive effect on risk management ($\beta = 0.491$, $t = 7.238$, $p < 0.001$), supporting H2. The effect of risk management on corporate governance was also positive and highly significant ($\beta = 0.624$, $t = 10.417$, $p < 0.001$), thus supporting H3. In terms of explanatory power, the model explained 52.3% of the variance in risk management and 38.9% of the variance in corporate governance, indicating moderate explanatory strength. The Q^2 values for both endogenous constructs were above zero, confirming the predictive relevance of the structural model.

The mediation analysis further showed that risk management significantly mediated the relationship between use of mobile technology and corporate governance ($\beta = 0.195$, $t = 3.972$, $p < 0.001$), thereby supporting H4. Similarly, risk management significantly mediated the relationship between institutional readiness and corporate governance ($\beta = 0.306$, $t = 5.684$, $p < 0.001$), supporting H5. These findings suggested that both use of mobile technology and institutional readiness enhanced corporate governance indirectly through stronger risk management practices.

5 DISCUSSION

The results of this study were very useful in supporting the thesis that mobile technologies and institutional readiness were significant factors in enhancing governance in large-scale infrastructure projects by enhancing risk management. The positive association between use of mobile technology and risk management implied that mobile-enabled systems were helpful in timely identifying, monitoring, and communicating risks associated with projects. Mobile technologies emerged to better provide real-time visibility in large infrastructure environments, which tend to be complex, dispersed, and highly dynamic, and to minimize delays in the transmission of operational information. This finding meant that mobile technology adoption was not just a technical enhancement but a governance-enabling solution that helped to create more structured and responsive management control.

The result also indicated that risk management was more influenced by institutional readiness when compared to the use of mobile technology. This finding meant that technological tools would not be enough unless organizations themselves were motivated to change and could effectively implement the change. That is, the presence of governance improvements seemed to be a matter not only of the availability of mobile technologies but also of the internal preparedness of the organization to incorporate the technologies into its daily activities, decision-making, and coordination mechanisms. This observation supported the perception that digital transformation of infrastructure governance was both technological and organizational in nature. It also postulated that the institutional conditions under which the technological potential was converted into actual risk governance could be found in the change, motivation, and implementation capacity.

Most importantly, the findings validated that risk management played a significant role in improving corporate governance and mediating the impact of both the use of mobile technology and institutional readiness on the outcome of governance. This result implied that risk management was the most important transmission pathway between organizational and technological capabilities and greater governance capacity. When applied in the context of large-scale infrastructure, this implied that the quality of governance was enhanced in the case when organizations could predict disruptions, handle information uncertainty, coordinate responses, and expose themselves to environmental and operational vulnerabilities. The mediating findings thus expanded the knowledge on governance by revealing that mobile technology and institutional preparedness did not directly and independently affect governance, but their effects were achieved via the improved risk management practices.

6 CONCLUSION

This paper examined how mobile technologies can improve governance in large infrastructure projects. It examined how using mobile technology and institutional preparedness affect corporate governance, with risk management acting as a moderator. Using a quantitative approach and PLS-SEM analysis, the study found that both mobile technology use and institutional readiness positively influence risk management. In turn, better risk management has a positive effect on corporate governance.

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