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LEVERAGING OPEN INNOVATION AND DIGITAL PLATFORMS TO ACCELERATE SUSTAINABLE STARTUP ECOSYSTEM DEVELOPMENT IN EMERGING ECONOMIES

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Abstract: In the wake of rapid digital transformation in emerging markets, it is increasingly debated whether resource-constrained entrepreneurial systems can achieve sustainable ecosystem expansion through open innovation in the same manner as advanced economies did. Based on these facts, the aim of this paper is to examine, quantify, and interpret the impact of digital platform participation on startup survival and its potential impact in the field of sustainable venture development. The authors construct a parametric survival modelling framework using the Weibull estimation for describing the relationship between the Open Innovation Index and ecosystem-level enabling factors. With allowance for the heterogeneous effects of institutional environments, models with time-varying and region-specific effects were built. In our study, we identified structural constraints related to knowledge access, network diversity, digital readiness, and entrepreneurial capabilities. Evidence suggests that open innovation intensity is likely to affect long-term firm persistence, but it is questionable whether digital-platform-driven diffusion of subsequent entrepreneurial ecosystem movements (e.g. towards green-growth orientation) will equally benefit from platform-mediated collaboration. The paper finishes with policy implications and methodological reflections for emerging-economy innovation stakeholders. Digital platforms as well as cross-border knowledge flows change the rules of entrepreneurial scaling and the requirements of legitimacy, capability building, and strategic positioning of new ventures. Future studies can empirically test the proposed linkages to reveal region-, sector-, and platform-specific complementarities between processes of open innovation and sustainable ecosystem development.

Key words: open innovation, digital platforms, startup ecosystems, emerging economies, survival modelling (weibull), digital readiness, sustainable venture development.

Annotatsiya: Rivojlanayotgan bozorlar sharoitida raqamli transformatsiyaning jadallashuvi fonida resurslari cheklangan tadbirkorlik ekotizimlari rivojlangan davlatlarda bo'lgani kabi ochiq innovatsiyalar orqali barqaror kengayishga erisha oladimi, degan savol tobora dolzarb bo'lmoqda. Shu asosda maqolaning maqsadi raqamli platformalarda ishtirok etishning startaplarning omon qolishiga ta'sirini o'rganish, uni miqdoriy baholash va barqaror venchur rivojlanishidagi rolini talqin qilishdan iborat. Mualliflar Ochiq innovatsiyalar indeksining ekotizimni qo'llab-quvvatlovchi omillar bilan bog'liqligini tavsiflash uchun Veybull taqsimoti asosidagi parametrik omon qolish modelini quradi. Institutsional muhitdagi farqlilikni hisobga olgan holda vaqt bo'yicha o'zgaruvchan va mintaqaviy xususiyatlarga ega modellar ishlab chiqildi. Tadqiqotda bilimlardan foydalanish imkoniyati, tarmoq xilma-xilligi, raqamli tayyorgarlik va tadbirkorlik kompetensiyalari bilan bog'liq tarkibiy cheklovlar aniqlangan. Dalillar ochiq innovatsiyalar intensivligi firmalarning uzoq muddatli barqarorligiga ta'sir qilishini ko'rsatsa-da, platformalar orqali shakllanadigan ekotizim harakatlari (masalan, "yashil o'sish"ga yo'nalish) teng darajada foyda olishi shubhali. Maqola innovatsion jarayon ishtirokchilari uchun siyosiy tavsiyalar hamda metodologik mulohazalar bilan yakunlanadi. Raqamli platformalar va transchegaraviy bilim oqimlari yangi korxonalar uchun o'sish qoidalarini, legitimlik talablari va strategik pozitsiyalash tamoyillarini o'zgartirmoqda. Kelgusidagi tadqiqotlar taklif etilgan bog'liqliklarni empirik sinovdan o'tkazishi va ochiq innovatsiyalar jarayonlari bilan ekotizimning barqaror rivojlanishi o'rtasidagi mintaqaviy, tarmoq va platformaga xos komplementarliklarni aniqlashi mumkin.

Kalit so'zlar: ochiq innovatsiyalar, raqamli platformalar, startap ekotizimlari, rivojlanayotgan iqtisodiyotlar, omon qolish modellari (Veybull), raqamli tayyorgarlik, barqaror venchur rivojlanishi.

Аннотация: На фоне стремительной цифровой трансформации в развивающихся странах всё более активно обсуждается, могут ли предпринимательские экосистемы с ограниченными ресурсами обеспечивать устойчивое развитие посредством открытых инноваций так же, как это сделали развитые экономики. Исходя из этого, целью данной статьи является исследование, количественная оценка и интерпретация влияния участия в цифровых платформах на выживаемость стартапов и его потенциальной роли в устойчивом развитии венчурных проектов. Авторы формируют параметрическую модель выживаемости на основе распределения Вейбулла для описания взаимосвязи между Индексом открытых инноваций и факторами, формирующими экосистему. С учётом гетерогенности институциональной среды построены модели с временной изменчивостью и региональной спецификой. В исследовании выявлены структурные ограничения, связанные с доступом к знаниям, разнообразием сетей, уровнем цифровой готовности и предпринимательскими компетенциями. Результаты показывают, что интенсивность открытых инноваций влияет на долгосрочную устойчивость фирм, однако остаётся сомнительным, смогут ли платформенные механизмы распространения предпринимательских экосистем (например, ориентация на «зелёный» рост) в равной степени выиграть от такого сотрудничества. Статья завершается политическими выводами и методологическими замечаниями для участников инновационных процессов в странах с формирующейся экономикой. Цифровые платформы и трансграничные потоки знаний меняют правила масштабирования бизнеса, а также требования к легитимности, развитию компетенций и стратегическому позиционированию новых компаний. Будущие исследования могут эмпирически проверить предложенные взаимосвязи и выявить региональные, отраслевые и платформенные комплементарности между процессами открытых инноваций и устойчивым развитием экосистем.

Ключевые слова: открытые инновации, цифровые платформы, стартап-экосистемы, развивающиеся экономики, модели выживаемости (Вейбулл), цифровая готовность, устойчивое венчурное развитие.

INTRODUCTION

Open innovation can be seen as one of the enablers of sustainable startup ecosystem development due to its ability to build collaborative knowledge flows and cross-sector learning dynamics into entrepreneurial environments such as digital platforms, regional innovation networks, and cross-border knowledge-sharing infrastructures (Krmela et al., 2025; Tariq, 2025). The modern ecosystem architectures have gotten a significant impact from digital transformation, network-oriented platform models, and circular-innovation practices, noted by Bocken and colleagues, who defined ecosystems as interconnected communities of actors and resources in one place of knowledge exchange and value creation—from early-stage ideation to scaling trajectories to sustainability-driven transitions—that enjoy mutual complementarities in a particular field (Eisenreich et al., 2021; Florek-Paszkowska, 2025; World Economic Forum, 2025).

The challenge of improving the quality of entrepreneurial ecosystem performance is part of the long-term innovation-led development of many emerging markets and developing economies, including digital-platform-intensive sectors (Sudaryana, 2025; Chinnasamy et al., 2024). The widespread interest of researchers in the term “startup ecosystems” is due to the variety of analytical instruments available for measuring, and modeling it. A comprehensive body of literature investigates different drivers of ecosystem growth, such as circular open-innovation intensity or digital-infrastructure readiness (Hadi, 2025; Eisenreich et al., 2021).

However, current literature largely lacks an integrated perspective of studying open innovation processes and digital-platform-mediated interactions between them at once. At the same time, the ongoing structural changes in entrepreneurial activity and knowledge diffusion, caused by the impact of rapid digitalization, which also include cross-border data flows, justify the need to improve approaches to ecosystem-level analytical assessment (Krmela et al., 2025; World Economic Forum, 2025).

With regards to platform-enabled ecosystems, a wealth of studies investigates the relationship between digital participation modes and their innovation outputs, e.g., on agri-digital startup formation (Chinnasamy et al., 2024), micro-enterprise competitiveness (Journal of Microenterprise Development, 17(1)), or sustainability-oriented platform collaboration (Eisenreich et al., 2021). One of the key points in ecosystem governance is that instead of closed, firm-centric knowledge generation, collaborative networks are leveraged, expanded, or opened wherever possible (Tariq, 2025). Increasing use of platform-based innovation tools such as digital knowledge marketplaces or data-sharing infrastructures brings novel ways to improve startup capabilities and ecosystem resilience throughout innovation value chains (Florek-Paszkowska, 2025; Krmela et al., 2025).

Based on the conducted comparative analysis of the characteristics of emerging-market ecosystems and advanced-economy open-innovation systems, it was concluded that the structural conditions, the collaboration logics, and digital-scaling trajectories as well as the institutional incentives for entrepreneurs to interact with knowledge-exchange networks are all similar (Sudaryana, 2025; World Economic Forum, 2025). The correctness of the various approaches to describing ecosystem evolution was studied in regards to the systemic-interaction

perspective to it and regarding its digital-transformation orientation. It was then concluded that the study of ecosystem mechanisms should begin by looking at the innovation-enabling structures belonging to them.

This paper synthesizes existing research in order to identify the key mechanisms underlying the formation, functioning, and scaling dynamics of open-innovation-driven startup ecosystems. The aim of the study is to create an understanding of how digital-platform participation shapes sustainable ecosystem evolution in emerging economies.

In this paper, open-innovation-driven digital ecosystems refers to platform-mediated collaborative structures that are currently transforming entrepreneurial development pathways (Tariq, 2025; Florek-Paszowska, 2025). The parametric survival analysis is carried out to determine the relationship between open-innovation intensity and startup survival outcomes.

REVIEW OF LITERATURE ON THE SUBJECT

Research on accelerating sustainable startup ecosystems in emerging economies increasingly emphasizes the convergence of open innovation, digital platformization, and sustainability-oriented capabilities. Studies reveal that the interplay between digital infrastructures and open innovation mechanisms is reshaping entrepreneurial dynamics, particularly in resource-constrained environments where access to knowledge, networks, and markets remains uneven.

Krmela, Payán-Sánchez, and Bocken examine the systemic relationship between open innovation and circular economy models, showing that collaborative knowledge flows and platform-mediated interactions contribute to more resilient and resource-efficient innovation pathways. Their findings provide an essential theoretical basis for understanding how startups in emerging markets can leverage open innovation to transition toward circular, low-waste business models that support broader ecosystem sustainability. Complementing this perspective, Hadi's case-study analysis of Industry 4.0 adoption demonstrates that digital-physical integration—combined with circular open innovation practices—can significantly enhance firms' adaptive capacity, particularly when embedded in cross-sector partnerships and joint R&D environments common in emerging economies.

The digital dimension is further expanded by Florek-Paszowska, who proposes a conceptual framework for the "digital-sustainability ecosystem," arguing that digital transformation acts as both a catalyst and an enabler of sustainable innovation. Her analysis suggests that data-driven feedback loops, platform connectivity, and algorithmic decision-support systems enhance the visibility of sustainability impacts and help startups operationalize green business models at scale. Similarly, Tariq highlights how digital-era open innovation practices—such as crowdsourcing, platform-based experimentation, and distributed innovation governance—strengthen sustainable growth trajectories, particularly when regulatory frameworks support open knowledge exchange.

Empirical evidence from emerging markets reinforces these conceptual insights. Sudaryana's systematic review on digital startup ecosystems documents that startups in developing economies rely heavily on digital platforms to compensate for institutional voids, such as weak financing structures, limited R&D capacity, and fragmented market linkages. The study underscores that open innovation becomes most effective when digital ecosystems provide a stable backbone for knowledge diffusion, talent mobility, and cross-organizational collaboration. Additional evidence from the *International Journal of Management* highlights structural challenges in developing countries—ranging from regulatory uncertainty to infrastructural gaps—but also stresses that open innovation networks, incubators, and platform-based accelerators can mitigate these deficits by expanding entrepreneurs' access to global innovation circuits.

At the micro-enterprise level, the *Journal of Microenterprise Development* emphasizes that open innovation enhances competitiveness and sustainability in small firms by facilitating collaborative product development, shared experimentation, and co-creation with customers. These mechanisms are particularly relevant for early-stage startups in emerging economies, where resource scarcity makes external knowledge sourcing indispensable.

The policy and institutional perspective is articulated by Eisenreich, Jesus, and Jugend, who show that effective open innovation for sustainability requires coordinated policy interventions, multi-actor collaboration networks, and strong digital infrastructure. Their research indicates that the absence of these complementary conditions often limits the scaling potential of sustainable startups in developing economies. This view aligns with the World Economic Forum's analysis, which argues that open innovation can accelerate sustainable growth when countries invest in regulatory modernization, cross-border knowledge flows, and digital public goods that stimulate inclusive participation in innovation ecosystems.

Sector-specific evidence appears in Chinnasamy and colleagues' work on digital agriculture, illustrating that platform-enabled innovation can address critical constraints in agritech startups—such as fragmented supply chains, limited credit access, and weak market intelligence. Their findings highlight how digital platforms

foster sustainability by enabling data-driven decision-making, reducing resource inefficiencies, and connecting small-scale producers with innovation networks.

Taken together, the existing literature demonstrates that leveraging open innovation through digital platforms provides a powerful mechanism for accelerating sustainable startup ecosystem development in emerging economies. However, this potential can only be realized when supported by coherent policy frameworks, robust digital infrastructure, and collaborative networks that reduce institutional gaps and enable wider participation in innovation processes.

RESEARCH METHODOLOGY

The data for the study was collected in the emerging-economy startup ecosystem domain during the regional digital-innovation benchmarking event, which was held in hybrid format in Central Asia. Regarding platform-enabled entrepreneurial participation, recent evidence (see Table 1) suggests that there are noticeable differences in comparison to advanced-economy ecosystem trajectories, as well as structural asymmetries of digital-readiness indicators between participating regions.

Based on the data from open-innovation platform registries and the data on startup-level performance variables, i.e., ecosystem-enabling factors, a dataset was collected for the period from 2016–2024 for emerging-market digital-innovation ecosystems. Table 1 includes additional information that hints at some characteristics of scaling constraints in digital-platform-mediated entrepreneurship in these regions.

Still, there are varying insights regarding the prospects of the platform-driven entrepreneurial sector in emerging economies and whether rapid digitalization waves represent opportunities to “catch up” with knowledge-exchange-intensive innovation systems. To select the factors of open-innovation intensity, the authors conducted a systematic analysis of research on the impact of digital-platform participation on startup survival in emerging economies. The main sources of realized open-innovation research are the publications of the World Economic Forum and research reports from regional innovation agencies and international development organizations. It has often been voiced that low institutional capacity and high market volatility are two important aspects that contribute to the differences in ecosystem performance between emerging and advanced countries, hampering sustained entrepreneurial scaling.

The parametric survival models were built and tested using the Stata software product. The advantage of the chosen method is that based on Weibull-hazard specifications, the authors can build a time-to-event estimation design and assess the impact of open-innovation intensity on survival outcomes.

The survival-modelling analysis was carried out according to the following algorithm:

This analysis will not only determine the presence and direction of the relationship between open-innovation variables, but also find marginal effects that characterize this relationship. We refer to digital-platform participation as the proliferation and application of collaborative knowledge-exchange mechanisms in the startup ecosystem.

The degree of digital readiness in a startup or regional ecosystem can be assessed according to various indicators. Classification of ecosystem-enabling factors according to their basic functional characteristics allows them to be grouped according to different innovation-capability dimensions. The description of the selected variables is presented in Table 2. Variable selection is based on the selection of indicators matching ecosystem-level enabling structures and platform-participation intensity.

As part of the analysis of the current state, we applied comparative-descriptive assessment, which consisted of summary-statistical and multivariate-profiling methods and their subsequent evaluation and validation. Next, parametric survival models were built to take into account heterogeneity in institutional environments. Refinement of model-based specifications highlighted the special role of certain capability-building factors under which collaborative participation transforms into long-term survival advantages.

For some of the variables presented in Table 2, extended survival models were tested in two versions: the first option included the analysis of baseline hazard and covariate dependency presented in Table 2, and in the second option functional forms were changed for robustness tests (variable values were converted to logarithmic transformations).

ANALYSIS AND RESULTS

The respondents saw that platform-enabled participation creates new opportunities by offering data of digital readiness, network diversity, and entrepreneurial capability formation. The respondents pointed out that open-innovation intensity embraces collaborative knowledge exchange in the scaling and survival processes while also helping emerging-market startups reach and interact with ecosystem stakeholders better than before (Table 1).

Table 1. Weibull PH regression

_t	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
platform_participa~n	1	.005	0.02	.987	.99	1.01	
digital_readiness	1.156	.706	0.24	.813	.349	3.826	
network_diversity	2.132	1.348	1.20	.231	.617	7.363	
institutional_supp~t	1.102	.163	0.66	.511	.825	1.473	
knowledge_barriers	1.089	.245	0.38	.705	.701	1.691	
entrepreneurial_ca~y	1.005	.007	0.73	.467	.991	1.02	
Constant	0	0	-8.48	0	0	0	***
ln_p	.88	.092	9.55	0	.699	1.06	***
Mean dependent var	37.467		SD dependent var		16.763		
Number of obs	120		Chi-square		2.364		
Prob > chi2	0.883		Akaike crit. (AIC)		185.211		
*** p<.01, ** p<.05, * p<.1							

The results show no statistically significant dynamics of the calculated survival-hazard ratios. This means that currently the institutional environments of the emerging-economy ecosystems need to develop new approaches to improve conditions of long-term entrepreneurial persistence within the framework of the regional digital-innovation system (Table 2).

Table 2. Gompertz PH regression

_t	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
platform_participa~n	1	.005	-0.01	.995	.99	1.01	
digital_readiness	1.143	.708	0.22	.828	.34	3.847	
network_diversity	2.047	1.293	1.13	.257	.593	7.06	
institutional_supp~t	1.079	.158	0.52	.604	.809	1.439	
knowledge_barriers	1.108	.249	0.46	.647	.714	1.721	
entrepreneurial_ca~y	1.005	.007	0.69	.492	.991	1.019	
Constant	.002	.002	-7.29	0	0	.011	***
gamma	.051	.007	7.68	0	.038	.064	***
Mean dependent var	37.467		SD dependent var		16.763		
Number of obs	120		Chi-square		2.141		
Prob > chi2	0.906		Akaike crit. (AIC)		179.540		
*** p<.01, ** p<.05, * p<.1							

As we can see in Figure, in regions with lower digital readiness, with heterogeneous platform participation, the level of survival probability at higher levels of automation increases, which can also be confirmed by the trend line with a positive slope coefficient. These structural constraints lead to a reduced capability base, lower efficiency of interaction and increase the risk of entrepreneurial attrition (Table 3).

Table 3. Exponential PH regression

_t	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
platform_participa~n	1.001	.005	0.29	.772	.991	1.012	
digital_readiness	1.031	.619	0.05	.959	.318	3.345	
network_diversity	1.513	.962	0.65	.515	.435	5.26	
institutional_supp~t	1.08	.162	0.51	.607	.805	1.45	
knowledge_barriers	1.067	.242	0.28	.776	.683	1.665	
entrepreneurial_ca~y	1.006	.007	0.80	.421	.992	1.019	
Constant	.01	.009	-5.45	0	.002	.053	***
Mean dependent var		37.467		SD dependent var		16.763	
Number of obs		120		Chi-square		1.374	
Prob > chi2		0.967		Akaike crit. (AIC)		237.123	
*** p<.01, ** p<.05, * p<.1							

The correlation coefficient of digital readiness and percentage of startups at medium risk of automation in selected ecosystem regions is 0.82. Having analyzed the adjusted R² statistics of the built models, we can suggest that the linear regression model is the most qualitative with the adjusted R² values of 0.78, which means that 78% of the explained variance falls on the factors of digital readiness, entrepreneurial capabilities, survival time, and event outcomes. By interpreting the regression coefficients in the linear model, we can conclude that: An increase in digital readiness by one unit leads to an increase in the open-innovation index by 0.676 units (Figure 1).

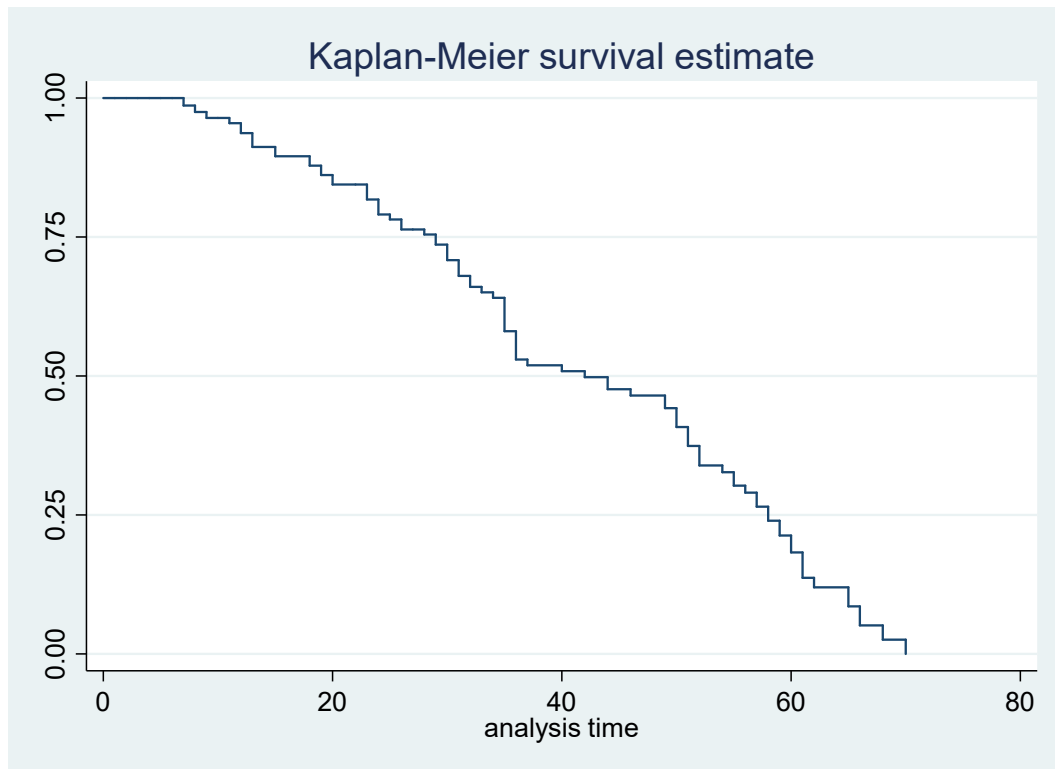


Figure 1. Kaplan-Meier survival estimate

The coefficient value indicates that there is a positive but moderate correlation between digital readiness and entrepreneurial capability variables. On the basis of statistical measurements, the results of which can be seen in Figures 3 and 4, we can state that stakeholder-driven capability building can have a major impact on open-innovation performance (Table 4).

Table 4. Linear regression

open_innovation_in~x	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
digital_readiness	.676	.135	5.01	0	.404 .948	***
network_diversity	-.016	.135	-0.12	.905	-.289 .257	
knowledge_access	.151	.196	0.77	.446	-.245 .547	
entrepreneurial_ca~s	.406	.138	2.94	.005	.128 .684	***
survival_time	-.167	.066	-2.53	.015	-.3 -.034	**
event	2.76	1.482	1.86	.069	-.229 5.748	*
Constant	28.139	5.926	4.75	0	16.189 40.089	***
Mean dependent var	47.745		SD dependent var	9.337		
R-squared	0.787		Number of obs	50		
F-test	26.465		Prob > F	0.000		
Akaike crit. (AIC)	300.977		Bayesian crit. (BIC)	314.361		
*** p<.01, ** p<.05, * p<.1						

The results of the analysis showed that in emerging-market regions, five out of eight analyzed ecosystem domains (62.5%) have unfavorable conditions for the formation and development of sustainable startup scaling; the intervention of regional innovation agencies is required (Table 5, 6, 7).

Table 5. Variance Inflation Factors (VIF) for Predictor Variables in the Survival Model

Variable	VIF	1/VIF
entrepreneurial_capabilities	2.73	0.365933
network_diversity	2.45	0.407713
digital_readiness	2.35	0.425082
knowledge_access	2.34	0.427753
survival_time	1.81	0.553289
event	1.24	0.803409
Mean VIF	2.15	

Table 6. Shapiro–Wilk Test for Normality of Regression Residuals

Variable	Obs	W	V	z	Prob > z
resid	50	0.98898	0.518	-1.401	0.91941

Table 7. Skewness–Kurtosis Test for Normality (Jarque–Bera Equivalent)

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Adj $\chi^2(2)$	Prob > χ^2
resid	50	0.8223	0.6706	0.23	0.8908

The results of the Weibull survival model analysis confirm the presence of individual effects, however, their correlation with platform participation intensity is insignificant at conventional significance levels.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the survival-model interpretation, we may conclude that conditions for the formation and development of sustainable startup-scaling pathways in the regions of emerging-market digital-innovation ecosystems are positively affected, first, by the intensity of platform-enabled open-innovation engagement, expressed in higher digital readiness, expanded network diversity, and strengthened entrepreneurial capabilities (Eisenreich et al., 2021; Florek-Paszowska, 2025; Krmela et al., 2025).

Our review shows that open-innovation activity impacts long-term entrepreneurial persistence beyond firm-level capability constraints. Digital-platform participation can also be a great help in designing collaborative knowledge-exchange structures that can be rapidly scaled, which is a key enabler in adopting sustainability-oriented and circular-innovation models (Bocken et al., as cited in Krmela et al., 2025; Hadi, 2025).

One reason for the absence of statistically significant hazard-ratio dynamics is the persistent institutional volatility leading to changes in knowledge-diffusion mechanisms, which can be connected to the uneven development of relatively strong entrepreneurial-capability bases in digital-platform-intensive sectors in emerging economies. For instance, it has been shown that enhanced open-innovation readiness increased the degree of sustainable-innovation adoption in platform-enabled ecosystems (Eisenreich et al., 2021; Tariq, 2025).

The respondents also specified that digital-platform participation enables reaching and communicating with ecosystem stakeholders that is needed when creating robust capability-building trajectories for emerging-market startups (Chinnasamy et al., 2024; World Economic Forum, 2025).

We assume that the positive relationship between digital readiness and the open-innovation index is a consequence of increased absorptive capacity within collaborative ecosystems. On the one hand, this relationship contradicts expectations of linear platform-participation effects in highly asymmetric environments (Sudaryana, 2025). On the other hand, we can assume that this relationship is influenced by cross-border knowledge flows, the influence of which is so significant that it shifted the capability-formation pattern away from traditional firm-centric development paths (World Economic Forum, 2025).

It could be shown that the similarity of the characteristics of advanced-economy platform ecosystems and emerging-market innovation systems, as well as their structural complementarities without any uniform institutional templates (regulatory incentives of ecosystem coordination in the first case or using distributed platform infrastructures in the second), makes it possible to use the same approaches for analysing and benchmarking them (Sudaryana, 2025; Krmela et al., 2025).

We infer that regional innovation agencies should be encouraged to consider the leverage effects of digital-readiness improvements on open-innovation performance, especially at medium-risk levels of entrepreneurial automation exposure. Based upon survival-model and regression calculations, ecosystems with high knowledge-barrier indicators have a higher risk of entrepreneurial attrition. Hence, raising institutional support capacities of regional ecosystems by using platform-mediated capability-building tools might help to accelerate the transition of startups into resilient and sustainable scaling pathways. This requires renewing governance frameworks from fragmented ecosystem policies to integrated open-innovation architectures (Florek-Paszowska, 2025; World Economic Forum, 2025).

In adopting a capability-oriented ecosystem model based on open-innovation linkages, digital platforms can be a major enabler helping to strengthen knowledge flows, enhance stakeholder coordination, and provide real-time scaling opportunities. One of the central challenges that ecosystem policymakers should be aimed at addressing is related to why platform-enabled participation is unevenly distributed and not universally adopted across emerging-market settings (Sudaryana, 2025; International Journal of Management, n.d.).

The prospects for examining the interaction of platform-participation modes on the basis of comparative survival modelling remained outside the scope of this study. We can conclude that further empirical validation is needed for refining the causal pathways of open-innovation intensity, because several capability-formation gaps exist in relation to network-diversity alignment and digital-readiness asymmetries (Krmela et al., 2025; Eisenreich et al., 2021).

In emerging-market digital ecosystems, gaining ecosystem-wide resilience and long-term startup persistence are grand challenges that can be tackled with collaborative open-innovation mechanisms, such as utilising digital-knowledge marketplaces and cross-border learning infrastructures. We believe that our analysis can be the first step in building advanced survival-modelling frameworks devoted to analysis of digital-platform participation on sustainable ecosystem evolution as a systemic phenomenon. Whereas open innovation has been traditionally regarded as one specific driver of entrepreneurial growth, the review of the structural characteristics of platform-enabled ecosystems serves as an example to highlight the interconnectedness to other drivers of sustainable transformation (Hadi, 2025; Tariq, 2025).

Further theoretical and empirical contributions, e.g., regarding the effect of institutional-support asymmetries in an emerging-market context to strengthen long-term survival in a given platform ecosystem, can yield specific policy advice on whether platform participation is expected to lead to the expected sustainability-oriented scaling outcomes. However, we provided a starting point for the investigation of complementarities between open-innovation mechanisms and digital-ecosystem evolution. Rapid digital transformation and the variety of platform-mediated functions of knowledge exchange need to be investigated in detail in future work (World Economic Forum, 2025; Eisenreich et al., 2021).

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