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The Functioning of Business Incubators in the Scope of the Entrepreneurial Ecosystem Theory: Construct Framework

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Abstract:

Business incubators play a crucial role in influencing the start-up ecosystem to impact the economic output. Given the myriad number of factors affecting the functioning of the start-ups, studying the influence of the factors and the interdependence between them is ongoing. The present literature survey predominantly focuses on research gaps, cited as limitations in the research articles on various facets of the start-up ecosystem. The review identifies and consolidates the predominantly cited factors, grouped as sub-factors of major factors, start-up resources, money support, market connect, incubator resources, and government resources forming a two-tier framework. The review highlights the contradicting implications on the effect of the sub factors and the interdependent effects reported. The implication of the review is the identification of a set of factors that must be considered for the services to be provided by the business incubators.

Keyword: start-up economic impact, business incubators, research gaps, hypothesis formulation, factors, and sub-factors.

1.1 Introduction

Startups energize economic expansion by creating new sectors, jobs, and markets.Business incubators (BI) perform the crucial function of nurturing the startup ecosystem by way of advocacy, training, funding support, networking, and mentoring. BI functions as a primary node in the network of the startup ecosystem and enables nascent technologies to be identified and further develop to be competitive in the global market.

Al mubaraki et. al. (2010) explores and investigates the initiatives wherein incubators are used to stimulate the economy. Sentana et. al. (2017) discusses the objective of setting up BIs as the support of innovative firms. The results reveal the economic impact of BIs being the generation of taxes by the incubated businesses and improving the economy. This is a less obvious effect as for direct observations, BIs are only seen as recipients of funds and public investments while not generating any profit on their own.This study provides innovative ideas based on current literature concerning business incubators as an effective and innovative tool for economic development.

1.2 The role of BI in startup achievements

Ratinho (2010) studied the role of science parks and business incubators in converging economies. BI focuses on supporting small startups with value-added services like shared space, networking, venture funding and converting small startups into small industries that integrate into a Sole Proprietorship (SP). The regional entrepreneurial ecosystem developed by the BIs in terms of framework and conditions can further attract start-ups that improve the regional economy (Audretsch, 2021).Lukeš et. al. (2019) studied the sales revenue and job growth as the growth indicators for incubated start-ups and non-incubated start-ups in Italy thus observing mixed results. In converging economies, as in the context of Portugal Science Parks, Business Incubators did not contribute to the economic development.

Hence, there remain gaps in the study on the factors impacting the startup ecosystem. The study objective is to critically review the literature on the innovation and business environment, to identify the unexplored aspects and to understand the effect of these unexplored factors on the economic impact through theinfluence of BIs.

1.3: Theoretical Background

Theoretical analysis of the start-up ecosystem falls in the scope entrepreneurial ecosystem theory. As discussed by Fubah et. al. (2021), the entrepreneurial ecosystem theory is still underdeveloped and gained attention from researchers only in recent times. As stated by Ratten (2022), the entrepreneurial ecosystem theory is not a single theory but encompasses multiple theories summarisedin Table 1. Each of these theories study an aspect of the ecosystem and inturn are governed by a set of sub factors.

Table 1: Summary of the sub-theories of entrepreneurial ecosystem theory

Sl. No.	Theory	Proposition	Reference	Premise	Factors
1	Cluster	Locating industries in particular regions offers numerous benefits, such as concentrated economic activity, a concentration of labor and land resources. Clusters prove to be more effective in fostering collaboration, facilitating alliances among businesses operating at different levels within the same supply chain.	Romein et. al. (2020)	Possible contributions of incubators to the formation and growth of creative clusters.	Provision of buildings/spaces. Mediationbetween start-up and other stakeholders. Liveliness, image, buzz and social networks. A more diverse labour pool and by fostering cooperation and coordination of activities and other spillovers between firms
2.	Process theory	A conceptual framework detailing the evolution and development of an entity	Speigel et. al. (2018)	Startup ecosystems function as continual processes involving the generation, circulation, and alteration of resources.	Resource acquisition: social networks, start-up team, personal characteristics (gender, age, ethnicity, disability), training sessions with a cohort entrepreneurial knowledge, financial capital, successful mentors, and skilled workers, local culture,

					E- ecosystem technology, and institutional infrastructures
3.	Resource dependence theory	The behavior of an organization is influenced by external resources	Roundy et al (2019)	The performance and continued existence of an organization hinge, in part, on the organization's evaluation of its surroundings and its capability to exercise control over resources derived from external partners.	entrepreneurial knowledge, skilled workers, experienced mentors, early-stage investment capital, technological infrastructure, support organizations and cultural artifacts, tangible resources and intangible assets; public policies; competitive advantage, Human capital, Social networks, use of capital, Mergers and acquisitions
4.	Social capital theory	Social connections represent assets capable of fostering the development and accrual of human capital.	Bandera (2018)	The significance of social capital in the success of startups and the potential for the diffusion of social capital in densely populated ecosystems underscore the need for additional investigation into the ambiguous impact of ecosystems on firm performance.	access to knowledge and resources, novel information and tacit knowledge, physical resources, collaborations,
5.	Systems Theory	Systems theory involves the interdisciplinary examination of systems, which are cohesive collections of interconnected, interdependent components which are tangible and	Daniel et. al. (2022)	Inclusive framework encompassing dynamic and varied actors, factors, and interconnections.	policy, development, and regulatory interventions

		intangible factors of the ecosystem			
6.	Network theory	The management of network relations, including their governance, can support the initiation of entrepreneurial ventures and their subsequent expansion.	Eveleens et. al. (2017):	Leveraging network-oriented incubation enhances the performance of startups.	reputation and market access, the sharing of knowledge, innovation, and technology transfer, and access to financial investors, network heterogeneity, collaborative relationships, incubator facilities, industrial R&D contracts
7.	Stakeholder theory	Stakeholder theory says that to create value for investors, there is need to create value for all stakeholders	Mirakyan,. (2019).	Achieving balance between a skilled project team and a diverse array of external partners.	stakeholder management, founders and the members, suppliers, competitors, universities, governments, public research institutions and consultants, collaboration, PR and marketing agencies, trust and inspiring others,
8.	Knowledge Spill over theory	knowledge spillover theory of entrepreneurship highlights that knowledge serves as a fundamental opportunity source, giving rise to the creation of entrepreneurship	Qian, H. (2018).	Entrepreneurship has the potential to act as a conduit for the dissemination of knowledge spillovers, thus playing a role in fostering regional innovation, cluster formation, and overall economic development.	human capital mobility, geographical proximity, investing in R&D or knowledge creation, cluster formation, competitive advantage, spin-offs

The summary in Table 1 clearly establishes that though the stated theories propose different premises, the factors which determine the premises are similar with significant overlap between the theories and factors. For instance, the stakeholder

theory discusses stakeholder management which requires collaboration and networking which is the scope of network theory. Similarly, resource dependence theory requires a cluster set up and developing access to social capital with strategic networking. This offers the understanding that to study the influencing role of BIs on economic development, a wide set of factors need to be studied for a comprehensive picture of overlapping theories and interdependent factors.

1.4: Literature Survey methodology

The scope of the literature survey is to identify the limitations in the present literature as a set of factors which are yet to be studied comprehensively. The literature survey methodology is conducted by the method given as follows:

An extensive survey of over 250 papers ensured that each factor was adequately reviewed. The limitations or research gaps mentioned in these articles were noted. Further, the identified limitations or research gaps define a variable construct. Constructs with high frequency occurrence constitute a set of factors and sub-factors formulated.The date wise statistics is depicted in Fig. 1, from the year 2011 – 2022. The plot indicates that most of the papers are from the recent years and hence the research gaps identified are relevant for practical consideration.

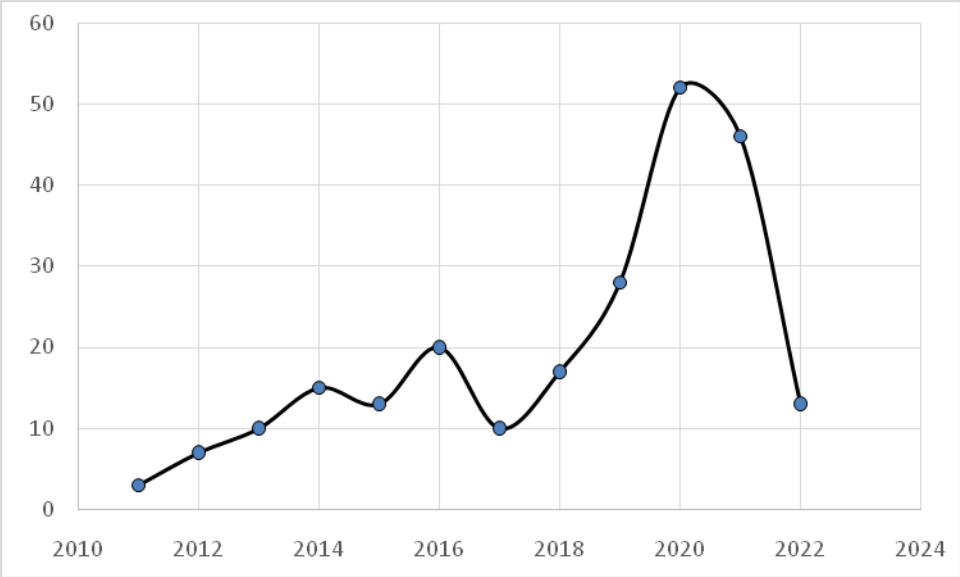

Fig.1: Publication Date wise distribution of the reviewed literature: Number of publications on the y-axis and the corresponding year in the x-axis.

2.1: The role of startups

The startup-related factors that influence incubators in impacting the economy are discussed.

2.1.1: The profile of a startup

Almansour et al (2022) stated the role of BIs in encouraging firms to align with sustainable development goals (SDGs) set by the United Nations which will build a relevant profile that can attract the attention of stakeholders. The public profile that is projected through media creates a more positive tone when the founder CEO addresses the media (Howard, 2021). The social media footprint makes an impact on the perceived image of the founder and the firm which impacts the funding possibilities.Brodzicki et. al. (2019) comments that the location influences the innovation capacity of a firm and also the subsequent patenting and licensing activities.

Hence BIs must educate and motivate startups by creating a conducive ecosystem and via providing a credible PR profile. In the scope of resource theory, process theory, and social capital theory, the role of BIs in improving the profile of startup influencing economic output is a relevant factor.

2.1.2: The role of the founder and team

Naffziger (1994) studied the personal characteristics like risk-taking ability, command, and passion of an entrepreneur in the formation of new ventures and becoming role models. As a special class of founders, the influence of female entrepreneurs (Roos, 2019) and the disabled (Kašperová, E. (2021)) require specialized guidance and mentoring to enable and encourage their participation. Another special class is family firms (Baù et. al. (2021)) which need to develop flexibility in transitioning from a local to a global market.

Knight et al. (2020) discuss the relevance of the start-up teams and stated the importance of team composition and strategy in contributing to the chances of success. A study by McAdam (2008) concludes that it is important to investigate the correlation between the usage of BI resources by a startup and its success to understand the resource-based perspective. Teams must be made aware of the importance of building trust to enable developing strategies to engage and resolve conflicts (Boone, 2020). Vanderstraetena et. al. (2020) emphasizes the importance of good communication between the incubated firms and the incubator to enable the co-development of services. Based on stakeholder theory, the effectiveness of interaction of BIs with startup team is believed to have a great impact.

2.2: The financial profile of a startup

A second crucial factor in the start-up ecosystem is financial resources. The activities of a start-up require adequate funding to enable day-to-day operations and planning for long-term development. Hence the diverse aspects of the financial profile explore the research gaps in literature.

2.2.1: Raising investments

Lanahan et. al. (2018) proposed ways to access government funds for different types of firms. Cavallo et. al. (2019) observed that Venture Capital (VC) investments is seen to be moving into investing in new ventures with breakthrough innovations. However, Angel investors are more likely to invest in the development. The effect of an accelerator is perceived as a positive indication resulting in increased investment interest in a firm (Cohen et. al. (2019)). Huang et. al. (2021) concluded based on the study that corporate venture capital is beneficial for both the corporates and the startup firms availing the funds. Further, Falato et. al. (2021) discussed the fragility of the investments made by the capital funds market in the face of the COVID epidemic. Hence, new firms must be sensitized by BIs to build robust mechanisms to override such unpredictable events in addition to seeking funds.

2.2.2: Obtaining Grants

Shinkle et. al. (2020) explores the influence of grants on the innovation made by new-age firms. The precedent of obtaining such grants complements the access to obtaining VC and Private equity (PE) funding. The innovation portfolio is a metric based on which grants are obtained. Cacciolatt et. al. (2020) indicate that the credibility of a start-up is a criterion for grants. More than previous achievements, investors study the management of a start-up as an indicator of the expected fund usage to enable fund allotment. Stevenson et. al. (2021) observed that small ventures are more likely to obtain grants as they can explore new research areas and exhibit better resourcefulness when compared to large companies.

Hence, the BIs can play a crucial part by sensitizing start-ups to focus on developing the key indicators and aligning their objectives with the policies of grant agencies for obtaining grants.

2.2.3: Debt advisory

Ukanwa et. al. (2022) discusses the scope of microfinance availing in southeast Nigeria, where socio-cultural customs prefer other alternatives. Innovation in fintech has brought about new opportunities to access financial resources (Bollaert et. al. (2021)). Subsequently, even traditional banking systems are open to adapting to such changes in servicing startup firms.The availability of debt resources and management depends on the exit strategy of the entrepreneur (DeTienne et. al., 2015). Proper debt management is important as improved credit rating enables access to more finances (Cacciolatti et. al., 2020).

Hence startups require advice on obtaining the right type of debt at the appropriate stage so that it can serve as a valuable resource to improve the startup.

2.2.4: Leveraging funds

Colombo et. al. (2016) investigates the role of VC funds in encouraging new technology-based partnerships in the context of EU-funded collaborations.Accelerator funding is more advantageous in developing the start-up in terms of the development of innovation as well as the founder's entrepreneurial skills (Cohen et. al., 2021). Equity-based funds are effective at early stages of development but impact profitability. Grants and spin-off options improve profitability.Cleantech companies can seek funding from venture capitalists from the corporate sector who are motivated by the advantage of exploring greener alternatives (Hegeman et. al. (2021)). New firms must be encouraged to work on technologies that can attract government funding based on the policy adoption.

Given the varied funding resources available, the best use of these resources by accessing the appropriate fund option and gaining advantages at the most impactful phases can be planned by the expertise and experience gained by BIs.

2.2.5: Fund utilization

Vanacker (2011) defines the scope of bootstrapping as ways in which the need for external funding is reduced. The entrepreneurs employing bootstrapping manage to obtain the same results without outside funding. Further, when obtaining external funds cannot be avoided, a choice is made to avail debt finance instead of trading in shares in equity. Jiao et al. (2021) suggest that the founder–CEO should have significant ownership rights to expect them to act in favor of the start-up interest in terms of fund handling, loss aversion, exit, and cashing out. The split up of fund utilization can serve as a measure of the startup activity. For instance, Spithoven et. al. (2015) quantifies the importance given to research and development by the amount of expenditure made in their final accounts.

Hence fund utilization is not just an internal business decision but is also seen as a key parameter to assess the viability of the startup. Nuances on fund utilization can be gained only from the observance of many case studies and hence BIs can provide crucial inputs in this regard.

2.2.6: Financial resources of a startup

Griva et. al. (2021) discusses early-stage digital startups, the approaches required in enabling VC funds, and the human capital required to harness the innovative capabilities, adaptive skills, absorptive capacity, and scale-up possibilities. The outcome of family involvement in governance is studied by Pittino et. al. (2021). Nigam (2021) studied the effect on funding availability based on the intellectual capital owned by a startup. Both positive and negative effects are observed. While some venture capitalists invest in innovative new technologies based on the start-up age and reach, others are reluctant to invest in new inventions. The economic outcome depends on the successful execution of a business idea and financial profile is one of the main pillars determining a business impacting the economy. Hence, it is hypothesized that BIs must provide resources to startups to improve their financial profile.

2.3: Networks

The different aspects of a startup ecosystem are facilitated by the interaction with the relevant stakeholders. Under the scope of resource dependence theory, there is an overlap of network theory, social capital theory, and stakeholder theory.

2.3.1: Role of Networks

Lechner et al (2006) conclude that strategic network management wherein a right mixture of market network and competitor networks can lead to co-opetition opportunities and growth. Further, the nature of networks varies with the development state of an ecosystem. Zheng et. al. (2020) differentiates between the requirements of new venture leaders at different levels of development. While novices use networks for operational benefits, experienced ventures work towards expanding the network to seek symbolic benefits. Veterans use networks for both operational and symbolic benefits. Hence the role of BIs in providing specialized networking capabilities and it is important to examine the influence of earlier networks and network development behaviorsand compare the impact of different incubators in this regard.

2.3.2: National and international collaborations

Gretzinger et. al. (2021) discusses the impact of international BIs in supporting startups entering foreign markets by enabling bridging, bonding, and protecting operations depending on the stage of development of the startup. Weiblen et. al. (2015) suggests that corporates who wish to engage in innovative technologies formulate specific models suitable to startups. For fintech start-ups, value creation was observed to occur by collaborating with financial institutions (Alaassar, 2021). Colombo et. al. (2009) view international collaborations as avenues to close the knowledge gap in the worldwide scenario.

Hardwick et. al. (2013) emphasizes the importance of trust, both technical trust and social trust, to enable a successful collaboration resulting in the transfer of knowledge. Baier-Fuentes et. al. (2021) state that market strategy to enter into foreign markets requires collaboration with the triple helix agencies for an early entry.The hypothesis proposed is that the BI national and international collaborations materialize to startup market expansions.

2.3.3: Market Strategy

De Cock et. al. (2020) report that prior market knowledge is an important parameter that is used as a boundary constraint when applying the lean startup method to determine the success rate. Rizvanović et. al. (2023) study the impact of digital marketing on start-up growth and identify growth factors as product-market fit, feature optimization, transparency, market research, sale leads, customer retention, networking, investor education, and the like. Wagner (2021) highlight the importance of the supply chain ecosystem is crucial for many start-ups.

Hence, the role of BIs in aiding startups to formulate an effective marketing strategy in terms of exposure to opportunities, global market reach, and performance evaluation in the markets is formulated as the hypothesis to be explored.

2.3.4: Stakeholder engagement

In public venture fund investments, the scope of the government stakeholder in the activity of the start-ups needs to be clarified and considered (Murtinu, S., 2021). McAdam et. al. (2016) studied the university incubation models from the viewpoint of stakeholders. With multiple stakeholders involved, the models adopted have to be tailored to the context taking the influence of stakeholders into consideration rather than following the best process.

In the case of circular economy firms, the role of stakeholders depends on the perception of the government's role (Hull, 2021). Regional stakeholders are found to influence both the incubation process and the nature of innovative products (McAdam, 2016). Hence, the incubation model should define the stakeholder position clearly. Giudici et. al. (2018) conclude that the vision of a venture enables the continued engagement of stakeholders during uncertain times. Stakeholders can act as an effective self-reinforcing mechanism by providing both positive and negative feedback. Based on these observations, it is hypothesized that Business Incubators enable access to stakeholders and monitor their engagements.

2.3.5: Development of competitive advantage

Busch (2022)concludes that training programs should not only focus on developing skills but primarily focus on developing a mindset that is flexible and capable of encountering uncertainties. Chemmanur et. al. (2021) discusses the effect of VC backing on the credibility of a startup during the IPO launching. The quality of the top management team is also found to be good in VC-backed startups. Jourdan et. al. (2017) proposes non market strategy, where activities of a firm outside the marketplace place like lobbying with regulators and engaging with activists, to enable obtaining competitive advantage.

Given the competitive environment of the startup ecosystem with a global impact, focusing on developing a competitive advantage will safeguard a start-up from competition.

2.4: Incubator resources

2.4.1: Business incubator model

Bergek (2008) differentiates incubators based on their models with the components of selection, business support, and mediation. Hence, the requirement of BIs to design their business model and service provision requires conscious revision and implementation to obtain favorable outcomes. Kolympiris et. al. (2017) discusses the university incubators as a special class of BIs that is interrelated in operation with the university.Grimaldi et. al. (2005) differentiates four different types of incubators based on their business model. Al Ayyash et. al. (2020) comment on the diversity in the nature of BIs. This clearly indicates the BI model with comprehensive influencing factors needs to be studied to understand the effect on start-ups.

2.4.2: Technology resources

Spithoven et. al. (2015) state that in spite of internal R&D capabilities and human resources, start-ups have to reach out for external R & D resources. Knowledge management provides a competitive edge which enables the firms to attract funding. Marcus Wagner et. al. (2021) state that incubators which channelize university knowledge spillover by effective methodology can enable a sustainable ecosystem at the regional level. In the context of Brazil ecosystem with an outdated industrial sector, BIs play a crucial role of enabling high technology environment and effective technology transfer to support university spin off ventures (Dalmarco et. al., 2018).

Hence, it is hypothesized that Technology Resources in terms of R&D labs, technology transfer measures provided by Business Incubators help in startup technology development under the knowledge spillover theory.

2.4.3: Scale up resources

Alvarez (2007) emphasizes a method of defining entrepreneurship models and to evaluate a business ownersaction in the context of these theories and the ecosystem in which they operate. Rubin et. al. (2015) discusses the positive contributions from a knowledge ecosystem on startup performance in the form of a university supporting as a source of new ideas and product processes. Further, Surana et. al. (2020) state that BIs should align with sustainable development goals and enable capacity building for startups. Del Sarto et. al. (2020) state that while incubators are suitable to ensure a longer lifespan for startups, accelerator programs are essential for startups which are technology based and operate in the service sector. Hence a hypothesis that acceleration programs provided by Business Incubators enable startups to scale up their operations is formulated.

2.4.4: Provision of Services

Bruneel (2012) observes a need to evolve the service portfolio based on the current tenant requirements. comprehensive framework based on six criteria namely facilities and infrastructure; clients; networking and marketing; products and services; finance; and human capital. Aerts et. al. (2007) provides insight that even in a matured well-developed landscape of business incubators, the requirement for proper screening of startups, evaluation of performance and nature of incubator is essential to improve the startup survival rate. Chan et. al. (2005) points out that as the requirements of technology startups

vary depending on the stage of development any evaluation of a BI should be made with a framework which incorporates the diversified services an incubator can provide to start ups in different stages of development. It is also stated that localized studies are required to make proper assessments.

2.4.5: Growth indicators

Madaleno et. al. (2021) observes that structural changes in economy are found to correlate with the growth of incubators and accelerators. Hechavarria et. al. (2019) discusses the social incubators where 50% of the firms are working on social innovations, the focus of the incubator is to measure social impact, encourage CSR and emphasis business ethics more than other types of incubators. However, the amount of economic output of start-ups is similar to that of startups in other incubators. Lukeš et. al. (2019) study the effect of incubators on entrepreneurial growth in the Italian contextand the gaps in the study were the incubator operations, incubator growth measures, and variations in incubator characteristics.

Hence a hypothesis to be tested is whether incubator growth indicators (incubator success, incubator sustainability, incubator awards and recognitions, performance of incubator) translate into economic benefits to the local economy through their startups.

2.5: Government resources

Governments realizing the economic benefits, can mandate support for small and medium enterprises by providing an enabling business environment which enables formation and growth of such ventures.

2.5.1: Government Benefits

Gustafsson et al (2020) comments that subsidies are provided through government programs to firms with innovative ideas,but such subsidies are impactful over a short term. Hence the need for more information to design subsidy schemes which deliver over the long term. In the special case of women entrepreneurs, apart from funding, non-economic support in the form of mentoring, and coaching should be given which will result in high success rate while requiring minimal investment (Welsh, 2021). Further, the funding must include elder care and childcare benefits to lessen the family commitments of women entrepreneurs.

Hence, it is conclusive that the Government benefits extend more than just funding assistance and varies given the specific needs of startups. Based on these facts, the hypothesis proposed is that startups effectively avail Government Benefits through Business Incubator assistance.

2.5.2: Government Policies

Acs et. al. (2016) highlights the need for government policies, emphasis on STEM education and labour reforms as the necessary steps to improve generation of new firms and entrepreneurship**.** Further, Runst et. al. (2021) conclude that SME innovation policies must include the necessity of personality education for the owner and team. The public policy for providing growth incentives to firms can be framed on the basis of the entrepreneurial ecosystem in a given region (Audretsch, 2021). Government policies must encourage and support social incubators to bring about improvements in social causes. Hottenrott et. al. (2014) opine that public policies on R & D investments can result in innovative products by enabling international collaborations. Welsh et. al. (2021) state that government policies need to ascertain the economic development level and then formulate appropriate support. Along similar lines, Autio et al (2016) discuss the focus of policies and programs on high growth enterprises that has been shown to leadtogrowth.

In summary, Government policies are framed with varied objectives of encouraging a technology sector, promoting research activities, enabling international collaboration, focusing all on support structures and the like. This conclusion leads us to hypothesis that the role of BIs to be that of keeping a tab on the government policies and assist in implementing them.

2.5.3: Leveraging Political Impact

Hiatt (2014) notes that the government's major contribution would be to maintenance political stability and an environment of safety. Business planning to include risk perception and developing contingency measures and action measures to overcome the impact of political and civil violence. Burt et. al. (2021) observe the effect of association with the government on the success of firms in the context of China. While discussing the role of government in innovative startups, Bradley et. al. (2021) suggests the need to study the interaction of a variety of factors such as legal, tax, regulatory, financial, and cultural, in determining the overall benefit to the startups.

Given the fact that the political framework is subjected to both periodic and unexpected changes, it is hypotheses that Business incubators are agile to leverage changes in Political Impact.

2.5.4: Collaboration with Government agencies

Dutt (2016) emphasis that the role of BIs in emerging markets in leveraging government agencies support to conduct training programs based on their policy framework for startups. BIs should focus on conducting such programs with collaborations with the government (Busch et. al., 2022**)**. Further, Madaleno et. al. (2021) concludes that public programs and public funding for private programs improves urban firms. Buffart et. al. (2020) advocate programs for startups must be conducted with consideration of regional requirements and with specific technology requirements. In the realm of fintech startups, Alaassar et. al. (2021) concludes that regulatory sandboxes, which can be used by these startups to test their products in a controlled environment, is very beneficial.

BIs are optimally placed in the startup ecosystem to collaborate with the government agencies and enables programs best suited for the specific startup communities which falls in the scope of stakeholder and network theory.

2.5.5: Social Startups

Ćorić et al (2020) have analyzed the sustainable market orientation of startups wherein the formative principles are based on strategic integration, societal engagement, and ethical capabilities and found a strong correlation to result in profitability. Hegeman et. al. (2021) study the venture capital propensity to invest in startups that work in clean technologies. Bendig et. al. (2022), reiterates the importance of VC funding in enabling green technologies to reach the market and state the empirical evidence of patents on green technology as a result of the VC fund. Millette et. al. (2020) makes a case for incubators to play a crucial role in encouraging circular economy ventures and soliciting the support of the government to such initiatives. Further, social startups have to balance the commercial and social goals and franchising is seen as an effective scaling of social business ventures (Giudici, 2018).

Hence encouragement and clarity must be provided to start-ups for engaging in social entrepreneurship which will impact the economy both directly and indirectly in the long term. The proposed hypothesis is that business incubators encourage startups to orient their functioning toward Societal factors.

2.6 Discussion

The framework developed based on the literature review in the context of the various sub theories of entrepreneur theory is summarized in Fig. 2.

The framework tested in the Indian context with an unbiased sampling among the different stakeholders in the startup ecosystems, BIs, startups, mentors, investors, and government sector professionals for a well-rounded understanding to determine the course of BIs role in economic impact.

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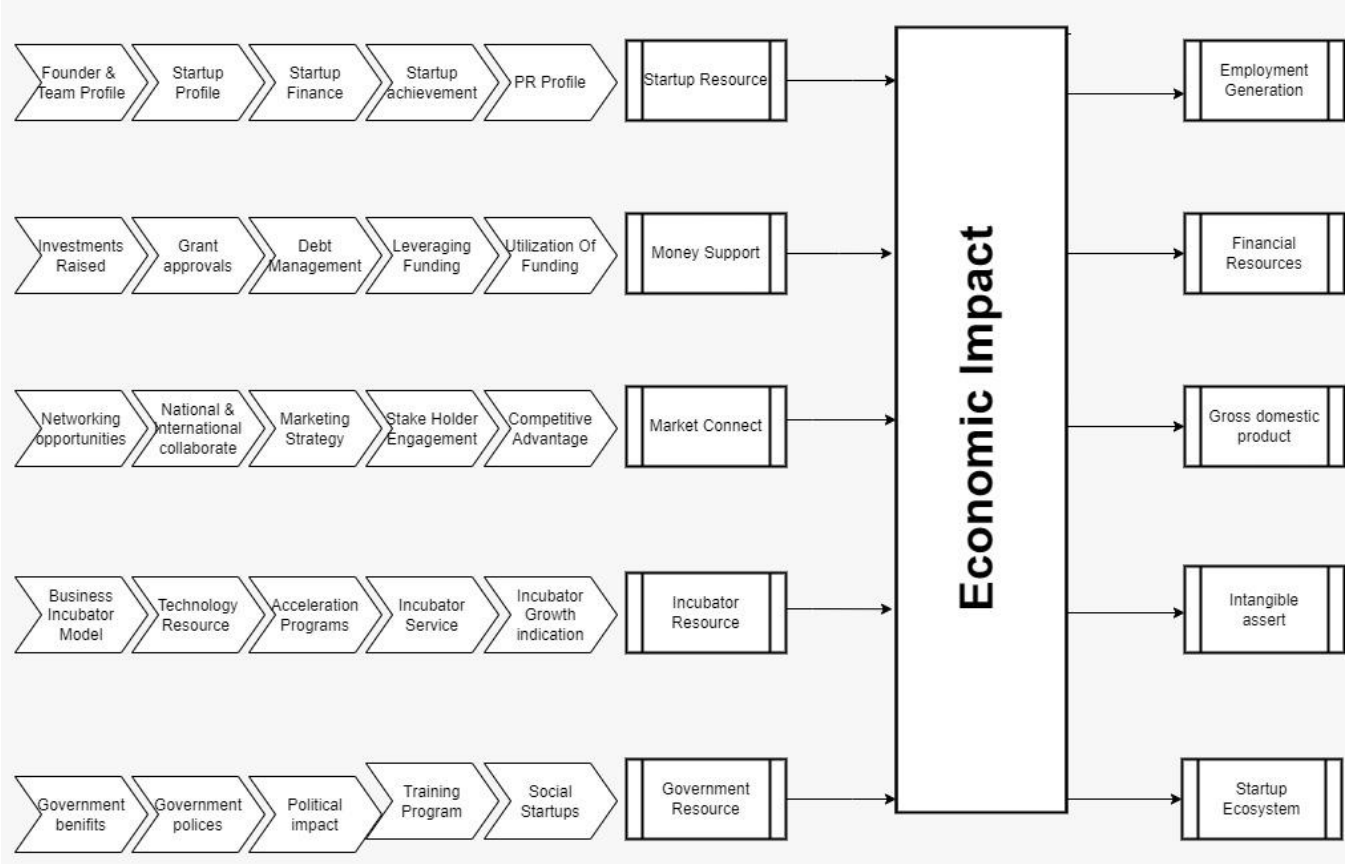

Fig. 2: The framework model of factors defined through respective set of sub-factors constituting the independent variables influencing the dependent variable economic impact defined by a set of dependent sub-factors.

2.7 Theoretical implications:

The theoretical implications of the present study imply that given the highly interconnected nature of entrepreneurial ecosystem theory, this study formulates a framework based on resource dependence theory where the resources include start up resource, financial resource, market resource, incubator resource and government resource. The scope of the resource dependence theory is expanded to include functional features of creation, maintenance, and usage of resources with a stakeholder-based classification.

This expanded scope enables the integration of process theory, stakeholder theory and system theory with the resource dependence theory. In addition, many of the functional features like training programs, debt advisory, profile alignment for grant approval,while being novel constructs, are directed to knowledge transfer to the start-ups whereby knowledge spill over theory is also incorporated.The scope of network theory and social capital theory are covered by the factors networking opportunities and collaborations.Further, by focusing on the research gaps to determine the independent factors under each resource, other novel factors have been included. For instance, financial resilience, PR profile, debt access, competitive advantage, technology resources are included as resources to be developed.

2.7.1 Implications for BIs:

The framework can be used as a set of factors which are influenced by the processes adopted by BIs. Thus the BIs role on the outcome in terms of economic development is explored through the research gap factors. By the functioning of the BIs, the

framework is applied on a cluster of start-ups whereby the principles of cluster theory are also included. Hence the framework enables the application of all aspects of the entrepreneurial ecosystem theory.

2.8 The formulated hypothesis

The set of hypotheses formulated based on the key research gaps in the current literature review are proposed to be tested in the Indian context with an unbiased sampling among the different stakeholders in the startup ecosystems. These include BIs, startups, mentors, investors, government sector professionals to obtain a well-rounded understanding to determine the effectiveness of the hypothesis statements. The formulated hypothesis is summarized below:

1. Founder and team profile are the determining factors for leveraging Business Incubator support.
2. Business Incubators support in improving the startup profile.
3. Business Incubators improve startup finances in terms of Sales Turnover, Startup Survival due to finance, Shareholding, Financial Analysis, and Mode of Sales.
4. Business Incubators play a pivotal role in the achievements of startups.
5. Business Incubators motivate start up by generating a conducive startup environment and providing good PR profile.
6. Business Incubators aid significantly in the investments raised by Startups.
7. Business Incubators help in sensitizing and improving the grant approval chances for the startups.
8. Business Incubators advise on and enable access to debt.
9. Business Incubator helps the startups in leveraging funds from different sources inclusive of Government, Angels, Venture Capital, Incubator, Accelerator.
10. Business Incubators provide advisory and regulate efficient utilization of funds by startups.
11. Business Incubators create and facilitate networking opportunities for startups (Industrial Network, Public Network, Government Network)
12. Business Incubator's national and international collaborations materialize to startups market expansions.
13. Business Incubator aid in marketing strategy (1. Orientation,2. Opportunities, 3. Global, 4. Performance)
14. Business Incubator enables access to stake holders and monitor their engagements.
15. Business Incubator helps in strategizing to develop competitive advantages.
16. Business Incubator model (monitoring framework, Business Models, Performance Metrics, Incubator Profile, Incubator Strategy) influences the growth of startups.
17. Technology Resources (R&D labs, TTO, IPR) provided by Business Incubators help in startup technology development.
18. Acceleration program provided by Business Incubator enable startups to scale up their operations.
19. The programs and services provided by Incubator (Training Programs, Infrastructure - Co-working spaces, Acceleration Services, Mentorship, expansion, satellite operations) benefit the startups.
20. Incubator Growth indicators (Incubator Success, Incubator sustainability, Incubator Awards and Recognitions, Performance of Incubator) translate into economic benefits to the local economy through their startups.
21. Startups avail Government Benefits through Business Incubator assistance (Infrastructure Grant, Recognitions, and Subsidies)
22. Business incubators keep a tab on Government Policies (Impact, Awareness, tariffs, implementation) and help in implementing them.
23. Business incubators agile to leverage changes in Political Impact
24. Business Incubators collaborate with Govt. Associations & conduct programs for startup growth
25. Business incubators encourage startups to orient their functioning towards Societal factors (Regional Focus, Economic Development, Country Culture, Social Impact)

26. Business incubators help the employment generation through their startups.
27. The incubated startups are well funded.
28. The contribution of incubated startups to GDP through revenue generation is increasing.
29. The intangible assets in the form of IPR have increased in incubated startups.
30. The number of startups and their success rates is increasing, indicating a healthy ecosystem for social and economic well being created by Business Incubators.

2.9 Data Analysis

The hypothesis formulated has been tested by conducting a survey and quantitatively analyzing the responses to ascertain the quantified effect of these factors on the economic impact of BIs. About 158 Business Incubators, 143 startups and 151 other companies were chosen. The responses to the above statements in the category of Business Incubators, Startups, and others are given by the values - "1" indicating strongly disagree to "5" indicating strongly agree.

With the above context, the overall average score calculated for Business Incubators, startups and other companies were 4.09, 3.96 and 3.99 respectively. The highly accepted score among the 3 groups (taken all the statements cumulatively) and their percentage analysis are as follows:

Table 1: Scores and Respective Percentages

Scores→ / Groups	5	4	3	2	1
Business Incubators	36.6 %	56.6%	6.6%	-	-
Startups	33.33%	63.33%	3.33%	-	-
Others	10%	86.66%	3.33%	-	-

The statements when analysed separately for all the 3 groups had an average score for each of them and is as follows:

Table 2: Average Scores for each hypothesis statement

Statements / Groups	Business Incubators *	Startups *	Others *
1	4.22	4.16	4.24
2	4.41	4.09	4.24
3	3.82	4.09	3.98
4	3.99	3.86	3.90
5	4.36	4.18	4.17
6	3.91	3.92	3.90
7	4.31	4.15	4.15
8	3.48	3.61	3.62
9	4.39	4.01	4.27
10	4.08	3.95	3.93
11	3.98	4.13	4.30
12	4.48	3.97	4.05
13	4.01	3.98	3.94
14	3.98	3.83	3.87
15	3.93	3.81	3.95
16	4.18	3.92	4.05

17	4.43	4.13	4.16
18	4.28	3.97	3.84
19	4.46	4.10	4.16
20	4.06	3.88	3.84
21	4.34	4.13	4.19
22	4.16	4.09	4.09
23	3.34	3.47	3.59
24	4.34	4.15	4.09
25	4.06	4.00	3.80
26	4.27	4.17	4.01
27	3.26	3.25	3.37
28	3.87	3.86	3.80
29	4.01	3.92	3.98
30	4.15	3.99	3.99

*- indicates the statistical significance with p-value < 0.05.

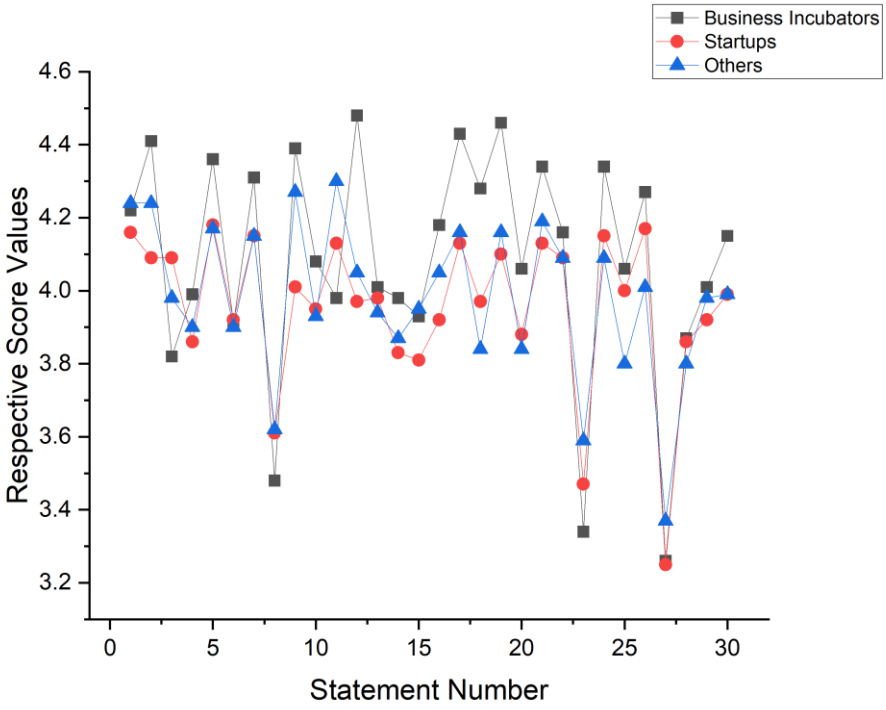

Fig 3: Graphical Representation of Statement numbers and its score values comparing the 3 groups, namely, Business Incubators, Startups and Other Companies.

The data has been analysed to be statistically significant with a p-value less than 0.05.

The above graph shows the overlap or minimal deviations of many values in such a way that the 3 different groupsagree to the hypothesis statements.Less deviations are observed in the perception of hypothesis between the 2 groups, say, Startups

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and Other Companies. This signifies that the 2 groups have the same idea of the hypothesis formed and agree together as a whole.

But a clear idea can be brought from Fig 3, wherein >= 0.1deviations are considered and is depicted below.

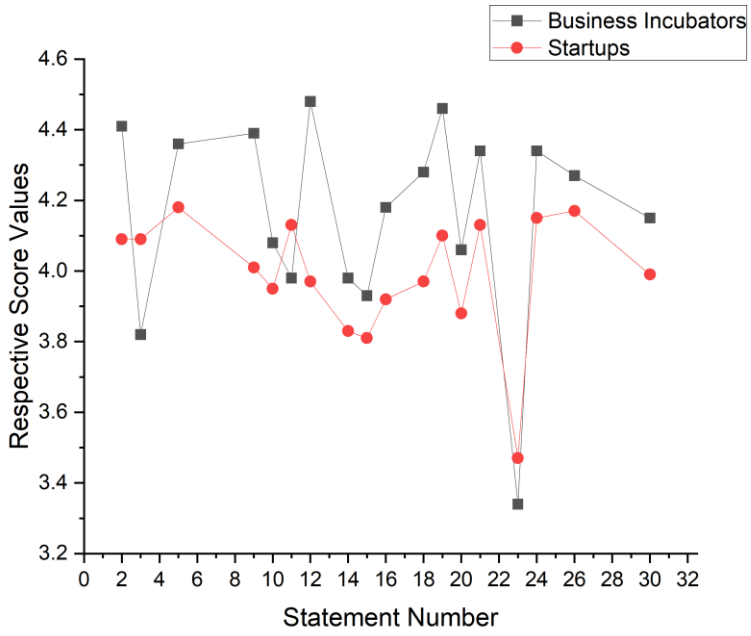

Fig 4: Graphical Representation of Statement numbers and its score values comparing the 2 groups, namely, Business Incubators and Startups, wherein difference in perception is observed.

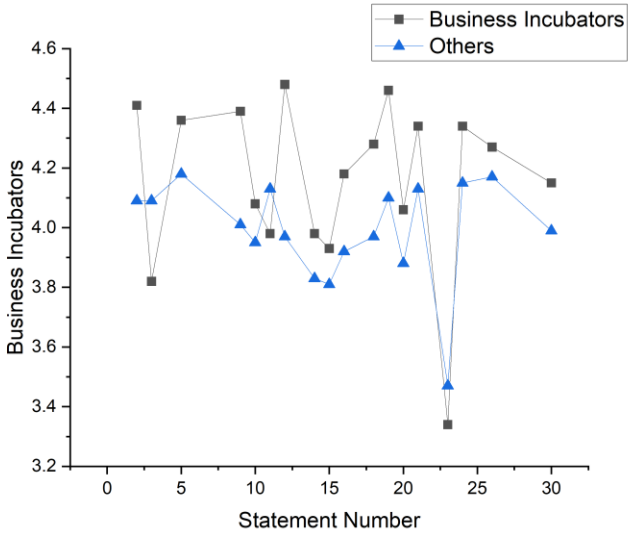

Fig 5: Graphical Representation of Statement numbers and its score values comparing the 2 groups, namely, Business Incubators and Other Companies, wherein difference in perception is observed.

In the hypothesis, where 30 statements are formed based on the limitations in the literature review conducted, at least 10 statements have differently perceived by the comparative study made. The minimal deviations are observed in the perception of statements that are formulated as follows:

The support given by BIs in improving the startup profile, startup finances, the sales Turnover, the startup turnover etc., the motivation and conducive environment given by the BIs, the leveraging funds brought out by the BIs, the role of BIs whereby they provide advisory and regulatory utilization of funds, the networking & international collaborations made by the BIs, the strategies provided by the BIs, and the programs organized by the BIs.

Even though these perceptions are different, in terms of numerical values, the overall dataset provides.

us with a value close to "5" – strongly agreeing to the formulated hypothesis i.e., with neglecting the 0.1 difference within the groups, we can say that all the 3 groups have a common perception about the formulated hypothesis.

2.10 Conclusion

Based on the extensive literature review a series of key independent variables were identified based on the research gaps observed and suitable framework was framed which can clarify the role of BIs in determining these independent variables influencing the economic outcomes. The framework signifies the gaps in the research literature regarding the determinant factors of the economic outcome of the incubation ecosystem in the scope of the entrepreneurial ecosystem theory.The conclusions derived will serve to highlight to the BIs the ways in which to optimize their functions to impact the local economy in which they are embedded.

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