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Article

Emergence of New University Business Incubators'(UBIs) Business Models (BMs): A Re-Definition, Typology and Future Research Agenda

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Abstract

This study as part of a postdoctoral research takes a first look on evolving University Business Incubators'(UBIs) emerging business models based on business model transformation, adaptation and innovation. The study utilizes philosophical (essentialism and empiricism), psychological (cognitive schemas with analog and conceptual combination) and entrepreneurship perspectives in classifying emerging UBI models using case studies. The classified UBI business models via essentialism(typology) include: Core Business and Entrepreneurship BMs, Core R & D commercialization, regionally initiated BM, Industry focused BM and Opportunity Based UBI BMs. Cognitive Generation based on analogue reasoning and conceptual recombination of schemas are further applied to see new UBI BMs that can also emerge due to endogenous (cognitive reasons) evolving from cognitive strategic decisions. In addition to this, a conceptual combination of modeling UBIs as a 'corporate business incubator located in a University with the host University as the parent company or Corporate Enterprise with attributes of corporate innovation, strategic renewal and venturing, while the UBI is involved in both Corporate(University) venturing and innovation is proposed. This study will take a look at the entities of each of these UBI business model (and also across different industries) and later map them with typical CBIs (Corporate Business Incubators) for value creation in further studies. The study is intended to give an insight into the different business models UBIs can adopt due to endogenous, exogenous and life-cycle transformation overtime.

Keywords: university business incubators(tion); business models (innovation, classification); MedTech clusters; biotech clusters; space based business incubators; fintech; luxury and fashion business incubators; nanotech clusters and their UBIs; automobile business incubators

Introduction

UBI business models have evolved from the typical rented space offerings to more complex service portfolio offerings which includes highly networked events, disruptive technology venturing, collaboration and partnerships with corporate organizations with engaging platforms for students' and external entrepreneurs' entrepreneurial cognitive behavior development based on their classified value propositions and offerings.

UBIs have been classified in past UBI studies based on services rendered(Grimaldi and Grandi, 2005a),value proposition and demand and supply, strategy and risks combinations (Bruneel et al., 2012a), capabilities(dynamic) and valuable service management provisioning(VSMP)(Lagos and Kutsikos, 2011; Taiwo, 2024c),multi-level analysis(Baraldi and Havenvid, 2016), evolving into different UBI forms (Community, dynamic and special), UBI dynamic capabilities, structural adaptation and network dynamics across different UBI forms and clusters(Taiwo, 2023, 2024a; Taiwo and Provodnikova, 2025). These ensuing classifications have shown the transformation in UBIs service offerings and value propositions with the propensity of giving rise to diverse business models

and new modes of value creation. In this vein, it is pertinent to understand the transformation of UBIs business models overtime and the emergence of new models based on the combinations of their capabilities, value creation entities, market offerings and collaborations. This study intends to bridge this gap by firstly analyzing the business model lifecycle, transformation, innovation and adaptation in general and typical UBIs cases, and secondly identifying and examining the ensuing UBI business models. This study intends giving an insight into probable new business models UBIs can engage in while extending their initial roles of transformative and development within their regional ecosystems and across corporate organizations. This is possible by using cognitive generation based on psychology studies of decision making and changing schemas combined with (intra)entrepreneurship and venturing perspectives.

In dissecting these initial propositions, two new models of transitions are proposed based on the UBI business model conceptualization from a cognitive generation and Corporate Entrepreneurship perspectives. The remaining sections of this article are structured as follows: the next sections discuss Business Model in general while highlighting the importance of business model concepts and their entities, using diverse units of analyses and (UBI) business model: triggers (exogenous and endogenous factors), business model innovation (based on activities changes and combinations), value proposition, value creation, delivery, captured, uncaptured), BM, innovation changes, adaptation, sustainability and BM in circular economy. A conceptual framework is developed to capture the entirety of the BM concept, after which this conceptual framework is used to further develop and classify UBI business models based on essentialism(typology).

Thereafter philosophical and psychological perspectives of business models are applied to UBIs using cognitive perspective of Business model innovation (analog reasoning and conceptual combination). The latter part of the study would expatiate on the emerging UBI business models and future research agenda in detail.

Conceptual Framework Development

UBIs are generally classified under model II of BI classification due to their service offerings, profitability and incubation process(Grimaldi and Grandi, 2005b). Different perspective of UBIs have emerged due to the evolving complex value chains, regional and global demands for entrepreneurial activities for cross industries transformation and UBIs also extending their transformative and developmental roles for continual regional development and engagement with stakeholders. Due to the complexities and intricacies in the UBI value creation overtime, there has been several views on UBIs business models components and entities. Bruneel et al.(2012a) examined UBIs based on value propositions while(Lagos and Kutsikos, 2011) investigated (U)BIs entity combinations of capabilities and VSMPs (value service management provisions) which when combined results in different forms of BIs such as special, community and dynamic UBIs based on strategies and risks levels. Further UBI classifications into different forms due to changing interactions resulting in continuous development of "complex adaptive networks" which differs across industries. This have also necessitated the examination of UBI capabilities (substantial and dynamic) across clusters in different industries evolving into different capabilities within different UBI forms. This categorization includes Traditional UBIs(digital), Networked of UBIs, and UBIs in other industries such as Medtech, Biotech, Space, Fintech(Taiwo and Provodnikova, 2025). While these classifications have viewed the entities of UBI Business models i.e. capabilities (Rasmussen and Borch, 2010; McAdam, Miller and McAdam, 2016a) value proposition and value capture(Bruneel et al., 2012b), UBI performance(Mian, 1994; Lee and Osteryoung, 2004; Al-Mubarak and Busler, 2012), a holistic and composite view of (UBI) Business Models evolution, innovation adaptation, transformation and lifecycle overtime is still required across different industries(Fielt, 2013). Other entities of typical business models such as value co-creation, Business models sustainability, the emerging circular economy business models and impact in different contexts and different levels of analysis should be applied to UBI contexts and studies. In addition to this, how the evolving UBI models due to system activities changes, capabilities orchestration and business model innovation have resulted into new UBI classifications

needs to be further examined. While these classifications have ensued into new value propositions and variations in different value chains, the propensity and possibilities for UBIs to evolve into new business models within their typical value chain is vital as well as the triggers of business model (innovation) changes in UBIs still require further grounding in theoretical concepts and frameworks. Research questions should be targeted towards how and why UBI BM change overtime and need for BM adaptation due to market dynamics and cognitive reasons. However still missing in UBI studies is the major question: What UBI Business Models exist and what triggers these BMs?

In this vein, this research introduces new business models via examination and classification of general business model accompanying theories and different levels of analysis (individual, units, network of actors, structural, cognitive and experimentation)(Zott and Amit, 2015; Nicola J. and Tina, 2018) To achieve this, an initial conceptual business model framework was developed to create a firm understanding for the UBI community and readers, thereafter the concept was used to analyze, develop and examine the different UBI BMs.

In achieving this conceptual framework, extant literatures were searched using University Business Incubation(tors) across different industries in Google Scholar, WoS, EBSCO for the project phases. For this phase, the qualitative case studies of UBIs were analyzed and selected based on related business model activities and systems. The resulting selected papers are shown in the appendix. For the 'business model' framework,' business model'(innovation) were used as the keyword with relevant selected articles covering business model concepts, activities, reviews, innovation, adaptation, sustainability and circular economy. The selected BM articles are shown in the Appendix. Finally, 'business model classification' was used in another series of search which resulted in articles, covering business model classification, typology and taxonomy. Overall 42 articles(cases) were selected for the UBI case study and BM concepts and 25 for BM concepts and classification.

Business Model Concept and Classification

Business model (BM) is defined as the set of activities and systems that describes the firm's offerings, value proposition, value creation, value capture (and or uncaptured) (Yang et al., 2017; Nicola J. and Tina, 2018, 2018). Business model describes how creating, delivering value and all connected links, actors and activities required to deliver value and satisfaction for the customer. BM evolves from the strategic objectives or goals of the firm e.g. why are we in business? what opportunities are around us that we should tap into? how do we identify and explore opportunities, setup structures, systems and actors along the value chain to deliver consistent and sustainable advantage for the firm using available assets, competencies (managerial), continuous learning(employees and continual capabilities orchestration and reconfiguration for value creation, value delivery and customer satisfaction. All these are embedded in BM antecedents represented as goals, templates, stakeholders and environmental constraints which could lead to creating novelty business models, increasing competitiveness and lock-in. The concept of BM while still seems fragmented across several value chains (Fielt, 2013; Lambert, 2015) still require holistic approach which encompasses BM innovation, adaptation, transformation across BM lifecycle due to both exogenous and endogenous factors and how changes are stirred in BMs via activities and systems modification, recombination and changes.

These changes are triggered by structural and cognitive factors based on powerful decision making, system thinking and industry search (Zott and Amit, 2015; Nicola J. and Tina, 2018). While most studies have included endogenous and exogenous factors such as major BM changes (rational positioning, evolutionary learning), BMs could also be triggered or changed via non-exogenous activities i.e. on cognitive influence (MARTINS, L., RINDOVA, and GREENBAUM, 2015; Daniela et al., 2019) called Schemas which are composed of attributes and slots with relationships in defining and elaborating on new business models. These schemas are used in investigating a source model attributes in relation to a target model based on attributes, activities linkages and systems in the target model. Analog reasoning and conceptual combination were identified as two major cognitive factors

that could trigger BM Innovation or changes, their dynamic lifecycle and transformation overtime that includes, identification, specification and redefinition and recombination(Nicola J. and Tina, 2018; Daniela et al., 2019). It is essential to also apply this conceptual prognosis to UBI (University Business Incubation) to BMI (Business Model Innovation). The conceptual framework is shown in Figure 1.

Over the last three decades, UBIs BMs have evolved from the typical service (rent) based models of venturing to more complex service and venturing activities that incorporates venture selection (strategies and criteria), value proposition to entrepreneurs (external and students), stakeholders and regional ecosystem for expansion across several industrial sectors for (new) market entry (Fielt, 2013; Daniela et al., 2019) , flexible complex commercialization, IP Strategies, venture financing and capitalists involvements in startups to new models of business incubation (Accelerators) within some universities for more matured phase idea funding. These transformation and innovation in UBIs (initial) business models based on different structures and cognitive (schemas, analog reasoning and conceptual combination)(MARTINS, L., RINDOVA, and GREENBAUM, 2015; Daniela et al., 2019) require a conceptual and theoretical ground to identify the transition, evolution and sustainability of the evolving UBI models and integration of new concepts such as the circular economy in UBI study themes (Richardson, 2005; Nenonen and Storbacka, 2009) .

Several intriguing questions are also left unanswered and these include:

- (-) What UBI models have emerged and evolved overtime (last three decades)?
- (-) What are the triggers (exogenous and endogenous factors) that have caused (and could cause) UBI business models innovation (BMI)?
- (-) How do typical UBI BM(I) transform overtime across their lifecycle?
- (-) What evolving structures, schemas (cognitive) can be identified within these UBI models and
- (-) How do these UBI BMs inter-relate with UBI identified typologies or taxonomies in co-creating values with other BIs entities such as CBIs (Corporate Business Incubators), TBIs (Technology Business Incubators) and Accelerators.

In view of this, this study as part of a larger research would expatiate on UBI classification based on their Business models, value co-creation using integrative review, meta-synthesis and or meta-analysis of related UBI cases with deeper insight into their value based Business Models (BMs) using extant literatures (case studies, empirical data) to investigate the different UBI BM(I) classifications, triggers for changes in BMs and value co-creation.

UBI Business Model(BM) Conceptual Development

Universities Business Incubators (UBI) and their models have evolved over the last three decades from the 1st generation of UBIs established primarily to provide rent spaces and basic UBI facilities or amenities to the 2nd and 3rd Generations of UBIs with more sophisticated management and entrepreneurship functions(Grimaldi and Grandi, 2005b; Bruneel et al., 2012a). Due to several factors such as global financial meltdown, internet boom, climate changes, regional tech renewal and adoption, advances in technologies with advent of new tech trends, UBIs and their startups are adapting to these changes via BM innovation. While these exogenous changes have impacted changes in UBI structural evolution, another school of thought postulated that endogenous factors also impact on BM changes i.e. cognitive and schemas (Lüdeke et al., 2018).

The causes and impact of these UBI evolution with their BMs cause for more theoretical and conceptual illustration that could capture all the elements within each phase of BM evolution while aggregating all the BMs components and elements. A holistic approach towards the BM classification has also been suggested. In this view, this section will build on the BM conceptual framework below while investigating different cases of UBIs taking cognizance of different RISs and EE, UBI forms' (across several industrial sector and their clusters) and specific elements within their BMs. An initial typology classification is deduced in this article taking a holistic approach of UBI BMs into consideration (Fielt,2013; Lambert,2015) as shown in figures 1 and 4. While later stages of the research would involve taxonomy classifications via quantitative design with the use of clustering and

machine learning. This research hopes to contribute to the literature on UBI Business Model conceptual thinking, design, innovation, adaptation sustainability and evolution into the circular economy.

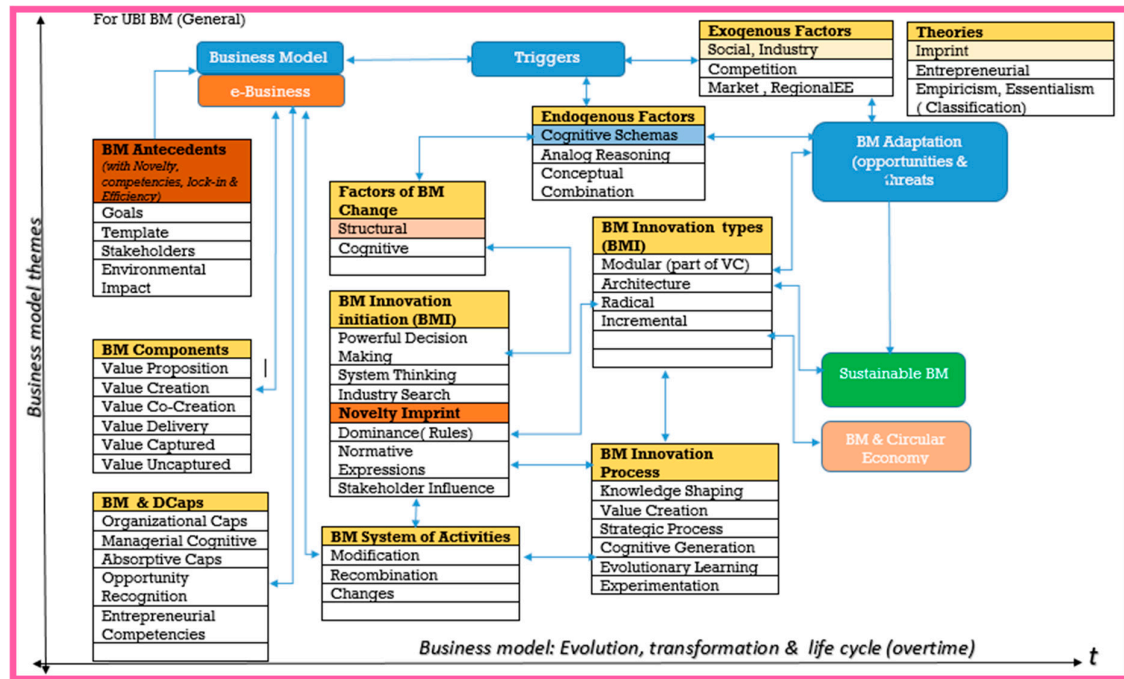


Figure 1. Conceptual Framework for typical Business Model themes.

In general, this research which is an extension of a doctoral research has facilitated the holistic view of UBI studies beyond the traditional UBIs type research (majorly Digitech startups) by extending cases of UBIs across industrial sectors and clusters such as Medtech, Biotech, Nanotech, Luxury and Fashion, Automobile, Space and Network UBIs (Taiwo, 2024c; Taiwo and Provodnikova, 2025) and the use of sequential exploratory mixed methods which combines the benefits of both ‘interpretivism and positivism’ research philosophies. This has the benefits of extending criteria and search strategies across diverse disciplines (management, entrepreneurship, innovation, regional development, life science, space and luxury). Figures 2,3 and Appendix A and B illustrate the procedures of selection, research design strand(s) and selected articles and cases.

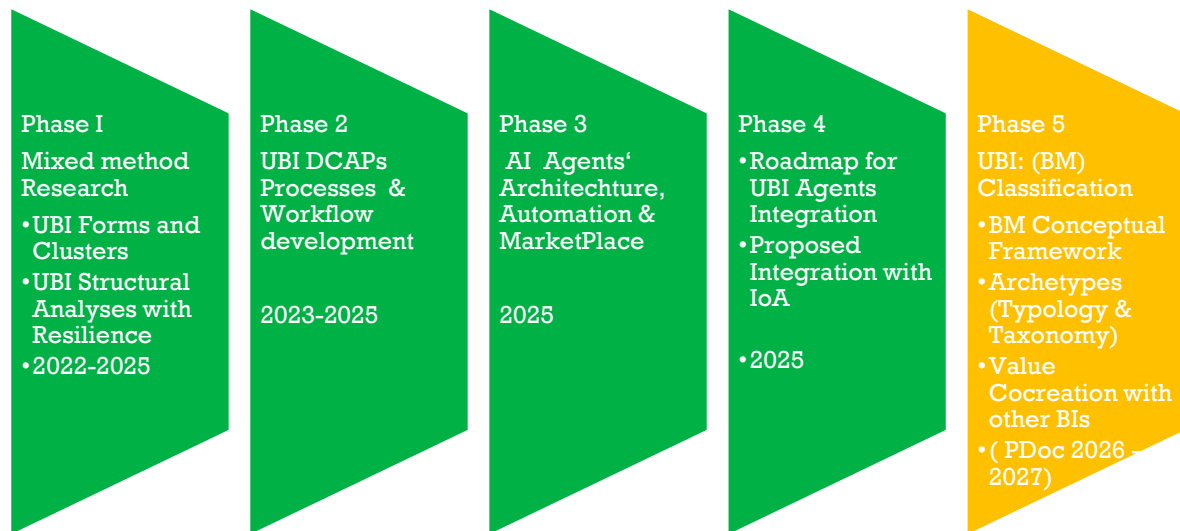
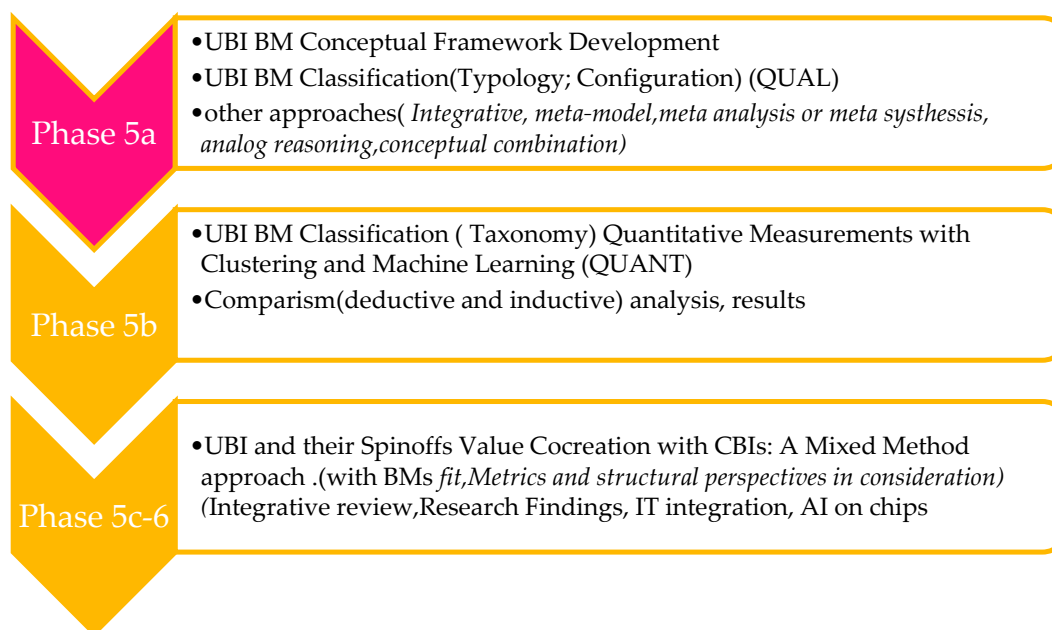


Figure 2. Research Project Strands and Phases (*Phase 5 as the present study*).**Figure 3.** Research Phase 5 highlights: UBI Business Models classification and Co-creation.

Methodology

This study (i.e. Phase 5), combines multi and mixed method research methodologies. A multi-method is used at the initial stage and Sequential Exploratory Mixed Method at the final phase. In the first phase a Qualitative approach would be employed with descriptive and investigatory case study research, in the first phase segment (phase 5a i.e. this particular study), a qualitative research design is employed to facilitate the typology classification of UBI BMs using existing cases. This would aid the understanding of a new concept that has not been fully investigated or to unravel new themes and concept behind the UBI BM(Kathleen M., 1989; Yin, 2013). The aim of this stage includes a conceptual framework development, an archetype(typology) and an integrative review of UBI BMs that would be used for later stages of research (interviews and surveys). This stage is followed with a quantitative method (taxonomy classifications, clustering, machine learning, surveys) to further develop the finding from phase 5a. The final stage would involve the mixed method approach (Creswell, 1999; Collins, Onwuegbuzie and Jiao, 2007) for value co-creation between the ensued UBI typology in phase 5a. The next sections discuss in detail the ensuing UBI typologies and further research agenda.

UBI Business Model Typology: A First Look

Based on the conceptual framework from established BM studies as shown in Table 3, the resulting typology classifications are discussed below. Five typologies for UBI BM ensued based on the UBI BM antecedents (Goals, Templates, Stakeholders activities (influence, impact) and Environmental (Hedman, J. and Kalling, T., 2003; Mason and Spring, 2011), triggers for UBI BM implementation as well as BM components, innovation, adaptation and sustainability. Other concepts like UBI BMs in circular economy which are rarely discussed in UBI studies is added for future research agenda.

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RINDOVA, and GREENBAUM, 2015) triggers for UBI BM implementation as well as BM components, innovation, adaptation and sustainability. Other concepts like UBI BMs in circular economy which are rarely discussed in UBI studies are added for future research agenda.

Discussions

Five distinguished BM typologies (as shown in Figure 4) based on their antecedents, triggers, value proposition, delivery and (co)creation exist. These include: UBI BMs with Core Business Management and Entrepreneurship functions, Core R & D Commercialization, Regionally Initiated, Industry Focused and Opportunity Based UBI BMs.

The Core Business and Management based UBI BMs are characterized with the provisioning of general BI facilities which (Lagos and Kutsikos, 2011; AL-Mubarak and Busler, 2014) termed VSMPs Valuable Service Management Provisions. These are further divided into: management (business plans development, assessment and reviews, consulting (financial, professional), general business services (rental, amenities and other shared facilities) entrepreneurial (team development and management, entrepreneurial skills development, risk management via incubation), networking and relational (networking (mentors), incubator and incubatee relationship development, venturing (idea generation, incubation and commercialization) and innovation functions. This UBI BM typology are triggered via the need for the University to take up roles (developmental or transformational) within their ecosystem. This core UBI BM function are also triggered via the Venture Champion(s) who could be an Entrepreneurship or Business Professor or Group of Lecturers. Cases of this UBI BM model are typical of traditional UBIs whose major concentration are on basic or general incubation phases or design. These UBI BM is typically suited for Digital technology startups with no complexity in developing MVPs and can rollout and easily design systems or products within weeks or months. While there could be mix of other startups from other industries, majority of the startups are focused on software or apps development, macro engineering, electronics with no major regulation pruned or policies impact. Such UBI BM models value proposition and delivery are based on pre-incubation, incubation and post-incubation consultations and evaluations with selection strategies tailored to the UBI BMs value captured portfolio (Mian, 1994, 1997; Clarysse, Tartari and Salter, 2011; Nkosinathi and Robert, 2014; Klonaridis, 2020; Taiwo, 2024a; Taiwo and Provodnikova, 2025). For these cases, value captured is based on the UBI' operating models (revenue and economic models) (Nenonen and Storbacka, 2009; Yang et al., 2017). The ultimate goal of such UBIs with this BM type is continual startups spinoffs with or without equity (Taiwo, 2024:2025; Clarysee, 2013) as the case maybe. The typology breakdown is shown in Appendix Table A2.

Core R & D Commercialization UBI Models

These UBI BM Models are based on developing a R & D critical mass, research commercialization and tech transfer. This UBI BM involves deep research in science, engineering and IT. These are mostly backed up with R & D investment from the University or in alliance with firms (regional or national), lab facilities for research funding and an integrated University collaboration networks with innovation hubs to enhance the Firm-University relationships via joint research implementation and collaboration for tech transfer. This is especially seen in developed countries with high innovative indices (e.g. Scandinavian, US and other parts of Europe, South Korea, Japan). A typical case in this study was Automobile innovation partnership with Scandinavian Universities and their UBIs or Ventures (Chalmers, Lund Universities) (Gabriel, Sörvik, Anna and Matilda, 2019) and also Karolina Institute (KI) organizational structures (Baraldi, Ingemansson and Launberg, 2014; Baraldi and Havenvid, 2016). This UBI BM (co)create value with firms via: IP Strategies implementation which includes: licensing, transfers (to firms), agreement, patenting and incubation of research ideas with IP alliances and Safeguards development between the Firms, University and the UBI. Some ideas are spurn off directly from the University or UBI or passes through incubation phase of the UBI. With these agreement or mode of IP licensing the researcher in question (mostly PhD students) or lecturers have agreements with the University and UBI on IP (intellectual property)

ownership(Walter, Auer and Ritter, 2006) and also with the license purchasing firm. In another mode it could be the incubation of a research idea based for a product development. Such ideas are incubated within the UBI based on the UBIs incubation phases (pre-incubation, incubation and commercialization, post-incubation).

Industry Focused UBI BMs:

These UBI BMs are characterized by extensive research yet integrated in cluster agglomerations. These are majorly special industry focused UBIs triggered based on both exogenous and endogenous factors such as Government (EU, National or Regional) initiated UBIs and regional cluster (Cooke, 2001a, 2001c; Taiwo, 2024a). Typical examples are found in the Life science ecosystem or clusters (Biotech, MedTech, Nanotech, Pharma) an also the Space Industry. Their major goal is based on a joint facilitation of projects with firms (MNCs and SMEs). Such Business Models are also enacted based on the heritage of the region or the city in scientific discoveries, healthcare services and the University heritage in academic research. Examples include the cases of Boston 128 route Biotech Cluster(Waxell and Malmberg, 2007; Wonglimpiyarat, 2010) a German Medtech Cluster Nuremberg-Erlangen (Taiwo and Provodnikova, 2025). Some typical UBIs within these clusters have also changed their business models to focus only on a single segment in the value chain due to the huge investment required in expanding into a full-fledged life science value chain. A typical example is in Israel where a UBI focused only on the R &D segment of the value chain(Breznitz, O'Shea and Allen, 2008; Breznitz, 2013) and innovation is charged towards intensive research. Such value chain segment focus is also seen in some Space Based UBIs (ESABICs) BM with focus on the lower segment and data applications (e.g. Tele-Medicine, Satellite data analytics and weather observations) while they co-create with other UBIs or regional and academic partnerships to deliver value at the Upper segment of the Space value chain(Taiwo, 2024b). In co-creating and delivering exceptional value in the UBI BMs, a high-level of scientific capabilities (know-how) and labor mobility is highly essential. The formation of cluster in some UBI BMs also denotes a high relational alliance with firms. All the cases examined showed joint project collaborations, knowledge spillover from the University to firms and also investments in tangible and intangible resources in the University and entrepreneurial training for students via Internships with companies and firms(TORCH Consortium, 2022)

Due to the high regulations, standards and policies in this Industries, the value chain segments are different from typical UBIs. Adaptation is required at every stage in the value chain during research, innovation, product development, compliance, regional and national levels due to disruption in the market dynamics. Internal adaptation is also essential in making strategic decisions for Business Model innovation as seen in the case of the German Cluster (Taiwo, 2024c) where digitization enhanced innovation across the Cluster value chain. It is also pertinent to note that specific capabilities are required by each of these UBIs and their clusters as expatiated by (Taiwo and Provodnikova, 2025) for life science based UBIs and their clusters. BMI (business model innovation) have also resulted based on strategic decision based on a major firm (MNC)(Pharmacia) movement away from a life science cluster (Uppsala, Sweden) resulting in the inward looking and cognitive decision making of the cluster executives to focus more on spinning off startups via relational alliance with their Universities and UBIs and also joint project and research collaborations with small firms (Waxell and Malmberg, 2007). This led to a major turning point in the Uppsala region quest for a Robust and sustainable life science ecosystem.

Regionally(Government) Initiated UBI BMs:

These UBI BMs are initiated based on regional, national or transnational (e.g. EU) to facilitate regional economic development and growth, combat recession and financial meltdown, enhance entrepreneurial activities in less favored regions, adapt to technology trends and disruptions via technology renewal and adoption. At inception of such BIs, the host University and UBIs are in firm partnerships on the role (transformational and developmental) the UBI plays in regional development. Such cases are seen with UCF (University College Florida) and Austin Tech Incubator(Wiggins and Gibson, 2003). In these cases, the Universities were in firm partnership with

the Region in turning students' innovative ideas to viable products in the market. In co-creating values in these cases, the regional community has an ample amount of investment in the UBI mostly without equity from the startups. Value is majorly captured by such UBI BMs based on the amount of startups spinoff from the incubator and the regional economic contribution e.g. in terms of job creation, entrepreneurial skills development and overall contribution to GDP development. Such UBI BMs could specialize in diverse industries (Mian, 1994) or focus on an industrial sector (Mason and Spring, 2011). It's important to note that such BMs are subjected to high influence by stakeholders due to funding expectations from the Governments (being the major source of funding) and this has impact on the UBI BM. Such was discussed in McAdam, Miller and McAdam (2016b) where cases of influence and impact of UBI BMs affected the overall performance of a BI. However, UBIs are expected to innovate and adapt to such influence and impact via indirect or direct partnerships and collaboration with firms or changing their BM via strategic decision making as in the case above. The UBI firstly partnered with local firms for investment in their startups while also developing a new Virtual incubator to reduce costs. As such the UBI was able to create a fit based on their BM and their performance via changes in their economic and operating models (Michael, Minet and Jeffery, 2005; Nenonen and Storbacka, 2009). Further examples of these BMs could also be found in Network of UBIs. An example is the Nimela OUI Alliance case which was an Alliance formed between Universities and regions of Oulu (Finland, Tromsø (Norway) and Luleå (Sweden) (Hintsala, Niemelä and Tervonen, 2017) initiated under the EU Horizon Project to enhance entrepreneurial activities in harsh climatic regions of Europe.

Opportunity Based UBIs BMs:

These BMs type are developed based on a need and demand in a region which opens up the opportunity for product development and easier market access. Such cases are prevalent in a scientific or engineering driven environment with potential tangible and intangible resources and experts' availability required for such development. Cases of these include the Nanotech based products in healthcare development for Phoenix, Arizona (US) residents due to the aging population and also to tap into the photovoltaic (PV) solar market in the Arizona region (Rider W. and Arnim, 2013). This was substantiated with UBI funding and a highly Government controlled commercialization process. The UBI BMs are integrated with a phased or place based incubation model. In the case above, a 4-phased incubation model and innovation was deployed for the Nanotech based UBI with different portfolios in defense, healthcare, solar (cells and energy). A place-based BM, innovation and ecosystem was also employed in another case of Automobile Industry in the Scandinavian. This involved the aggregation of several ecosystem actors in the Automobile industry within a region (around Gothenburg, Sweden) (Gabriel, Sörvik, Anna and Matilda, 2019). Two Universities (Chalmers and Lund) and their UBIs played a major role in the ecosystem via facilitation in accelerating research and problem solving with industries and firms, while also engaging in the testing of AV (autonomous vehicles) in the test lab with the University. Students are also engaged with the firms via Internships and entrepreneurial training at the Industrial sites. For successful co-creation in such UBI BMs, relational, alliance, network capabilities (for partnership and coordination), tech know-how, innovative, financial (funding) (integrated) support system are essential. While there is also a dire need to continually adapt to the changing technological advancement and disruption due to the scientific and engineering dispositions of such UBIs and Government influence on the business models. The next section discusses UBI BM triggers for innovation, components, changes and adaptation, BMI Processes and the dynamic capabilities that facilitate the BM innovation.

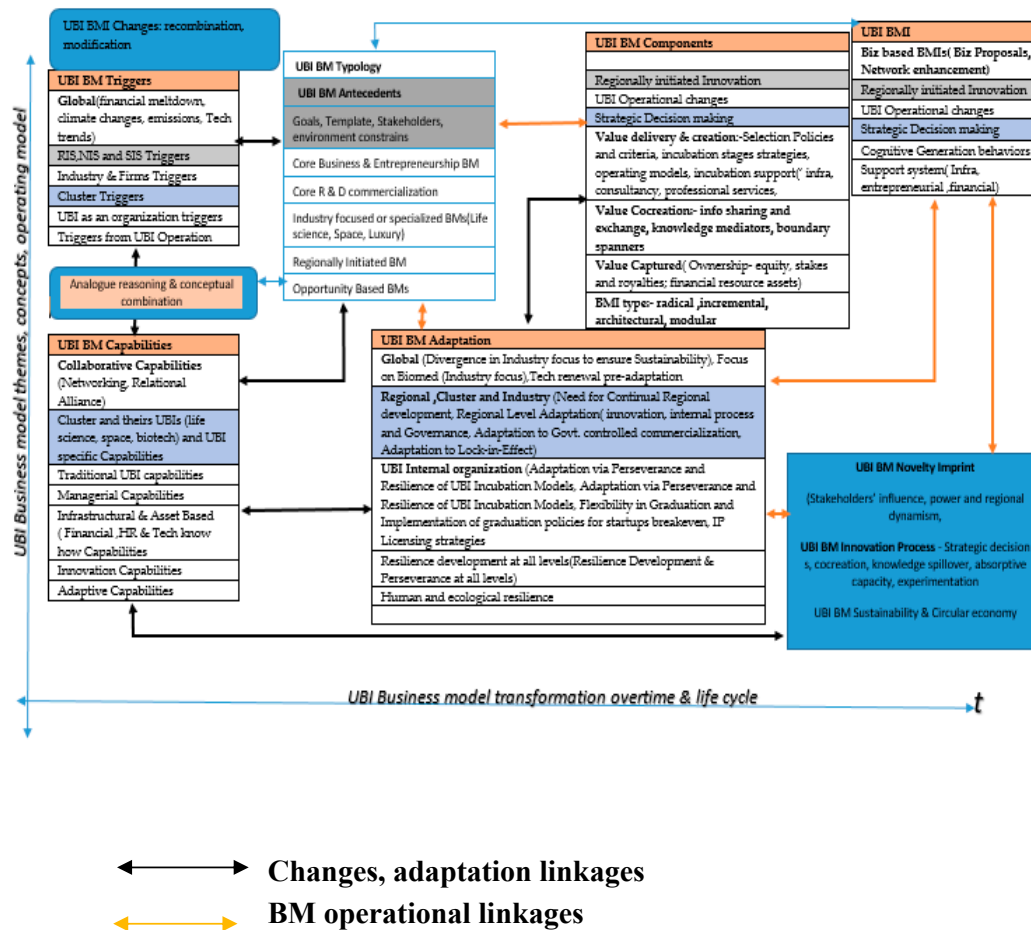


Figure 4. UBI BM Conceptual framework showing the typologies and components.

UBI BM Triggers

It has been already established by literatures that UBI BM changes could be both exogenous and endogenous i.e. based on both external influence such as government or industry regulations, policies, market dynamics and disruptions via technologies and also internal process changes via the managers cognitive and strategic decision making abilities (Hedman, J. and Kalling, T., 2003; MARTINS, L., RINDOVA, and GREENBAUM, 2015; Gabriel, Sörvik, Anna and Matilda, 2019; Massa and Tucci, no date). Applying these concepts to UBI BMs based on the conceptual framework developed above, seven paths to BM triggers and innovation are identified. These include Global (climatic conditions, climate changes, financial meltdown, global tech disruption or evolution (e.g. IoT, AI), firm triggered disruption via innovation or a major firm departure from an ecosystem as seen in the case of Pharmacia which led to a growing and bustling startups ecosystem in Uppsala and the emergence of KI in the UBI scene (Waxell and Malmberg, 2007; Baraldi, Ingemansson and Launberg, 2014).

SIS (Supra IS e.g. EU), NIS and RIS) initiated regulations and policies as seen in the EU enacted policies for enhancing activities in low favorable regions with harsh climatic conditions and also ESA establishment of ESABICs (business incubation centers) across Europe to combat the disruption of a new market entrant (X, Tesla) and to continually stimulate Space Based entrepreneurship among students (Moranta and Donati, 2020; Eldering and Hulsink, 2021; Taiwo, 2024b) and also regionally facilitated goals towards development, innovation and economic diversification. Cluster and Industry specific triggers occur due to quest for Life science cluster development SMMEs failure (Klonaridis, 2020), funding difference in life science clusters compared to EU or US (Breznitz, 2013,

2013) in the case of Israel life science cluster which led to adaptation to focus on R & D segment of the value chain, Short Product Life Cycle(PLC) as experienced in the luxury and fashion industry (Tarek E and Mark, 2014), Sourcing in Manufacturing, Maintaining Industry dominance by large fintech firms(LFF) due to the disruptions of startups firms (Fintech organization dominance)(Harris, 2021). Other triggers include Cluster and Industry specific triggers (due to formal industry links that enhances University spinoffs, presence of VCs and innovative firms). Organizationally triggered BM changes occur with UBI in an organizational context and UBI operationally triggered changes such as stakeholder influence on UBI BM and power exertion, questionable UBI impact, internal UBI process and workflow changes, flexibility in incubation process, lack of time and expert during incubation processes. The UBI BM Triggers are illustrated in Appendix Table A3.

UBI BM Components:

The basic elements of a BM include value proposition, creation and co-creation, delivery, capture and uncaptured. UBI value proposition are based on their roles and goals (antecedent components) as discussed earlier. A breakdown of the major elements across the UBI BMs are shown in the appendix. The UBI BM includes entrepreneurship and professional services delivery components which include: mentoring provisions, business plans review, best service delivery, infra support and entrepreneurship education. For value (co)creation the essential components include: value co-creation with firms and actors in the ecosystem, regional value based co-creation, Value creation via Research institutes, University spinoff network structure, Public & Private Organization Manufacturing companies presence for Information exchange, IP (Intellectual Property) alliance with Universities for IP Safeguards, high value co-creation among actors in Clusters for Cluster competition (national level-biotech, medtech competitions)(Cooke, 2001b; Nelsen, 2005), towards achieving a high level EU status cluster and Joint research collaboration with foreign(local) students as seen in the case of Beijing and Shenzhen (China)(Kun and Martin, 2005). To achieve these co-creation activities, collaborative and networking efforts are required as part of the value delivery processes and these include: linkages with firm (for projects collaboration and support) and tech transfer facilitation between University and Industry, community and firm relationships with the UBI, access to networks, interactive events including Hackathons, students' engagements to stimulate entrepreneurial mindset, labor and expert mobility, students-mentor linkages for entrepreneurship development, integrated University networks for collaboration via Innovation hubs development An essential factor in the BM is also knowledge and information exchange via continual learning through the role the UBI plays as knowledge mediator and boundary spanners(Kitagawa and Robertson, 2015) development of a knowledge based cluster(e.g. for Industry focused UBI BM) for both tacit and codified knowledge(Cooke, 2001b; Nelsen, 2005; Pillay and Uctu, 2013). Further value delivery channels by the UBI are also integrated in their business processes or routinely activities which includes: flexible or rigorous selection strategies and criteria, incubation strategy and phases (e.g. pre. Incubation, incubation, commercialization and post commercialization and or post incubation)(Rider W. and Armin, 2013) in the Phoenix, Arizona case, incubation support (entrepreneurial and traditional such as; consultancy services:-legal, accounting, administrative and infrastructural) and the operating model vis -a-vis (economic and revenue models) i.e. how the UBI spend(cost) and make money and how they capture value via equity, stakes or royalties or based on the number of ventures formed or spinoff within the region(mostly for regional based UBI BM which are non-profit).

UBI BMI Processes:

Due to the triggers and adaptation required in UBI BMs, innovation becomes essential and new pathway might be created that could change the novelty imprint (Nicola J. and Tina, 2018) of existing BM templates to new ones. Based on this, UBI BM processes that foster innovation are identified and categorized into: Business and Network via startups business proposal refinement and evaluation, funding system upgrade, network enhancements for partnership introduction, commitment to regional development and establishment of a regional capital fund (in the case of insufficient funding for startups)(McAdam et al., 2006; Obaji, Oluju and Obiekwe, 2015; McAdam, Miller and McAdam,

2016a; Muathe and Otieno, 2022). Furthermore, strategic decision(making) as seen in the UBI business process management, strategic decision making for incubation model changes for adaptation, reducing the roles of non-biotech market actors in policy development as seen in the case of Cambridge Biotech, internal process modification for expansion, strategic cluster digitization (Taiwo and Provodnikova, 2025)and exposure and adoption of new technologies also aid BM innovation processes. Another important UBI BM process is the impact of cognitive generation (Daniela et al., 2019, 2019; Massa and Tucci, no date) on value creation and co-creation via UBI Managers, venture champion or UBI staffs' behavioral tendencies during decision making. These include: (personal) self-development for UBI success, 'just do it mentality', self-belonging and awareness within a cluster (i.e. proud to be part of a cluster)(Waxell and Malmberg, 2007) and students' entrepreneurs mindset attitude (e.g. 'Brain block' during entrepreneurial activities). It is worthy to note that these changes in BM that spurs innovation and transition into a new BM emanate from changes, recombination and modification of BM components which could be due to: need for interaction(horizontal and vertical to improve incubator-incubatee and stakeholders bonding), policies modification that suits researchers and commercialization efforts, change in students(incubatee) entrepreneurial behavior overtime or recombination leading to Accelerator formation with intakes of matured startups from the incubator to facilitate equity generation for the UBI , recombination leading to accelerator formation with intakes of matured startups from the incubator to facilitate equity generation for the UBI (Taiwo, 2024a; Taiwo and Provodnikova, 2025), workflow process changes or modification, continual BM modification and adaptation of processes e.g. extension of market entry to foreign firms, recombination for Trans-regional collaborative project in the upper segment of the space value chain, knowledge creation within clusters, inter-firm healthy competition giving rise to innovation, internal and external strategic collaboration for knowledge exchange, tech and cluster rejuvenation, early stage funding and high involvement of academia at the initialization phase(R&D), Recombination of operational processes to facilitate business model expansion for innovation, modification changes of organizational structures via changes to Holding firm(Baraldi, Ingemansson and Launberg, 2014; Baraldi and Havenvid, 2016)and modification of existing LFFs(Large Fintech Firms) structure and BMs and imbibing partnership with Startups to maintain dominance(Kun and Martin, 2005; Harris, 2021).

UBI Capabilities:

It's essential to note that capabilities (dynamic) are required for BM innovation process along with collaborative actors within the ecosystem. In this vein capabilities were outlined across all the UBI BM cases that facilitate BMI processes and BM changes. These are divided into: Collaborative Capabilities (relational, alliance and network capabilities) which are essential in joint project facilitation for the Core R & D Commercialization BM or the Industry focused BMs. Networking Capabilities(NCs) ensures firm partnership collaborations, coordination, communication and marketing activities with industries during IP licensing negotiations, spinoff agreements and knowledge spillover and exchanges. NCs are also essential for Cluster collaboration as seen in many of the cases of the industry focused BMs and also Regionally Initiated UBI BMs. For the regionally initiated UBI BMs, Stakeholders' impact, salience power and influence on resource or assets munificence are important as they can deeply affect the successful implementation of value creation and capture of the UBI BM as illustrated in the McAdam, Miller and McAdam (2016a) case. Apart from these, the essential capabilities required at Clusters operational levels must also be orchestrated during BM activities as illustrated in Taiwo and Provodnikova(2025) for industry focused UBI and their Clusters such as MedTech, Biotech and ESABICs dynamic Capabilities. The detailed breakdown is shown in figure 5 below.

Networking Capabilities (partnership,coordination,marketing _communication)
Relational Alliance(Collaborations)
Innovative Caps(OI,DI,CI)
Managerial Capabilities (Competencies,decision making (strategic))
Coproduction_Coevolution_Cocreation Caps
Trad UBI(Entp. Mindset,Opportunity Recog, Risk taking,Perseverance...)
Cluster Med_UBI Dcaps (Robust & Sustainable,TTO actor impact,Adaptation_Challenges, Project_Idea Commercialization)
Infra Caps
FinCap(funding:-sourcing,generation,provision)
Tech Know-How Cap(expertise)
HR Caps(asset:-human,... and competencies mgt)
Adaptive_Adjustment Caps
Univ and Regional Heritage(s)

Figure 5. UBI BMI Capabilities.

Redefining New UBI BM Structures: A First Look and Proposition

Having elucidated on the UBI BMs, it is important to understand that new structures could emerge from the highlighted UBI BMs typologies defined as (core entrepreneurship and biz functions, core R &D, regionally initiated UBI BMs, Industry focused UBI BMs and Opportunity Based UBI BMs). To facilitate this new BMs refinement, a clue is taken from the cognitive reasoning perspective of business innovation triggers and corporate entrepreneurship perspectives (Becker and Gassmann, 2006a, 2006b; MARTINS, L., RINDOVA, and GREENBAUM, 2015) on how new BMs emerge via innovation and changes facilitated by endogenous and exogenous events or factors which could be based on rationalization, evolutionary or cognitive generation (analog reasoning and conceptual combination) based on 'schemas'.

For this case we would consider schemas as embodied knowledge of concept, i.e. world view about a thing with its attributes(slots), subschemas(fillers) and relationships. For instance, we could define a basic Business Incubator schema with slots(attributes) like UBI, CBI, fillers and relationships like for profit and non-profit, Corporate organization and University Based and linkages with firms. We could also define a UBI schema with attributes(slots) Industry focused UBI BM and filler (or relationships) like co-facilitation of projects, cluster agglomeration, common with life science and fintech etc. A new schema for UBI BM change is proposed using analog reasoning whereby a schema component can be changed or modified and transferred with a new targeted schema resulting. For example, using our UBI BMs typologies we could define schema for each of the ensued typology and develop a concept in which a typical typology could transform or its attributes be transferred to another cognitive generation schema which is due to managers' cognitive behavior via decision making and reasoning strategically to adapt to changes based on endogenous factors and not necessarily exogenous (policies, regulations, etc.), We would assume a case of a transition from one of the UBI BM typology(e.g. Core business and Entrepreneurship) to another schema which is a combination of one or more of the highlighted typology. For example, a UBI with a UBI BM of core entrepreneurship and business functions could transform into a UBI that combines both entrepreneurship and business functions with Core R & D and commercialization BMs due to increase in the value delivery portfolio of the University and UBI to focus on both business incubation function and technology transfer with IP licensing and patenting. In such cases, the UBI would expand its fillers from just business and entrepreneurship provision support to licensing office, IP policies and strategy creation together with the UBI. Such UBI BMs are seen majorly with high-tech based Life science environment such as Boston 128, ETH, UNIBE, LMU (Wonglimpiyarat, 2010). Another schema could result from a combination of attributes and fillers for three UBI BMs e.g. Core

R & D function, Core Entrepreneurship and Business Function and also an Industry focused UBI BM. The author has encountered such UBI BM models in Europe (Switzerland and Germany) where some UBIs have all the three attributes and fillers of a core business and entrepreneurial function, Core R & D Commercialization and Industry focused UBIs. Such UBIs have diverse industry specialization for spinoffs in life science (MedTech, Biotech) Nano, Fintech Space, Digitech, Electronic, Cybersecurity etc.) in a single UBI and its clusters. Figure 5 is used to illustrate this.

Another interesting schema could be redefining a University and UBIs relationships as a Corporate Entrepreneurship as seen in the study of Public Universities professor in Public Universities professors in Sao Paulo Brazil (Sao Paulo)(Gustavo et al., 2021). In this case we could define a CBI schema with attributes such as corporate venturing formation of startups within the organization based on the resources available to individuals or group of individuals, strategic renewal (based on business process transformation or changes) and Innovation (open or disruptive) based on an organizational wide policies to encourage innovation focused or deep within a firm(Yang et al., 2017). Based on this, a University could be viewed from a CBI perspective(schema) with the (C)UBI attribute with fillers of spinning off ideas and startups, innovating with firms for project facilitation (now stands as the University CBI). In this concept, a schema(source) 'University as a Corporate Entrepreneurship Organization' is transferred and recombined into another target a UBI as a corporate innovation and intra and entrepreneurship target. With this conceptual combination schemas described above, an important question and research agenda is to investigate how UBIs can adjust to internal changes by transforming their related attributes(slots) and fillers with CBI(corporate business incubators') properties and attributes also transferred to them as also suggested by Becker and Gassmann (2006a). The authors proposed that fast profit and leverage incubator type of CBIs characteristics could be transferred to a UBI due to focus on spinning off ventures and leveraging on R & D for IP licensing to firms. As a prognosis to this UBI BMI schema changes, a mathematical model (shown below) could be written based on the attributes, fillers and relationships and other factors within the analog reasoning context such as the capabilities required to effect changes with the firm and adaptive measures required for change management.

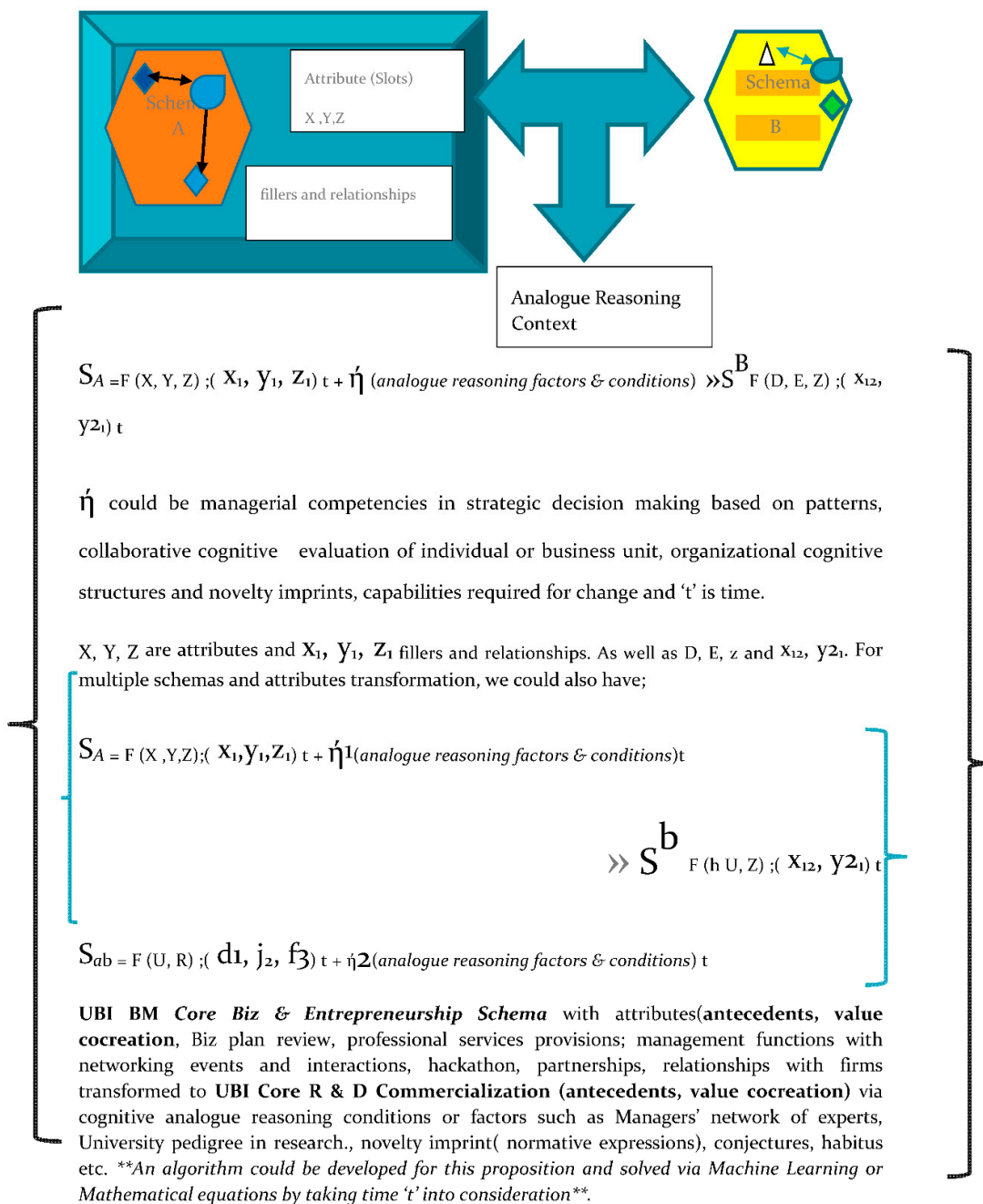


Figure 5. Illustration of schema transformation to another schema via analogue reasoning with mathematical assumptions.

Conclusions and Further Research Agenda

Having established the UI BM typologies and the value creation and co-creation components with adaptive and innovation processes, this research has provided the foundational framework for how UBI BMs should be viewed, however further research areas still exist within the UBI BM components. While UBI captured value and value creation might have been discussed, the concept of Uncaptured value i.e. value missed, in surplus or wasted(Wiggins and Gibson, 2003; Yang et al., 2017) in UBI is less discussed and how this fits into the circular economy Business model would be an important discuss moving forward. It would also be expedient to capture how UBI BMs change overtime based on a longitudinal study.

In addition to this, how UBI BMs antecedents (goals, mission, stakeholder activities and environmental constraints) discussed in this study enhance UBI Sustainability and Survivability could be investigated. It would also be novel to explore case studies of UBI BMs in Circular economy based startups e.g. DeepTech, clean energy. Further studies can also be conducted on UBI BMs typology while comparing their performances overtime based on sustainability and survivability of their startups. Other interesting topics would be investigating how UBI BMs have transformed their schemas into related BM typologies. Due to the emerging typologies, how ownership of the UBI and equity affect their performance could be studied. Another interesting emerging UBI BM typology for further research agenda is the UBI Ownership based BM which includes Non Profit, State and University owned with city support, Separate university entity with R&D, Regional & Government supported, Government and private funding Ownership BMs. How this new UBI BM typology impact UBIs' performance would be expedient in further studies.

Overall, this study has paved way for the articulation of UBI BM via typology. Further studies would examine classification(empiricism) and machine learning applications. This study has contributed to BMs knowledge via taking a holistic overview and approach to understanding the rudiments of UBI BMs via the conceptual framework developed across different industrial sectors and UBI Clusters. Mathematical algorithms and machine learning models can also be developed as proposed to study the schema changes processes overtime and how the combination of attributes(*slots*) and relationships(*fillers*) are transformed into other cumulative attributes for a new schema.

This study and its subsequent investigations would serve as a template for UBIs and other BIs manager to understand the BM components that correlate to their establishments and roles within their ecosystem and cluster and how they can adapt to both exogenous and endogenous factors towards BM Innovation.

Appendix A

Table A1. Selected articles across different industrial sectors: Traditional UBI, Space(ESABIC), Biotech, MedTech, Luxury & Fashion, Nanotech, Networked of UBI and Automobile.

Article Description	BM Antecedents	Triggers (Exo & Endogenous factors)	BMI type	BM components_	BM Capabilities	BM System of activities_	BMI Process_
UK_ Univ. of Southampton	Biz plan assessment startups mgt. team development founder_incubator_incubatee relationships	Govt. policies via HEIF Uncertainties in high tech proposal commercialization flexibility in incubation process	Incremental	Mentoring provisions Joint Biz plan & proposal review	Network capabilities	Process modification as needed steady flow of Biz proposal to push the commercialization agenda	professional service firms mentors supporting firm Biz proposal refinement fund access provision training initiatives VC availability external

							support network
<p>University Innovation System research commercialization (Bwen Kwee Ng et al,2019)</p>	<p>R&D investment & commercialization Stimulating entrepreneurship among graduates</p>	<p>IP commercialization policy changes to favor researchers and R & D Networks to innovative firms & entrepreneurial communities</p>	<p>Incremental and modular : btw 2000 and 2016 government and UBI took steps in shaping knowledge sharing, value delivery & policies to favor R & D, researchers</p>	<p>IP Alliances with Universities, Research Institutes & Corporations Info know-how sharing Tech transfer facilitation btw Universities & Industry</p>	<p>- collaborative development btw UBI Director and startups</p>	<p>policies modification that suits Researchers and commercialization efforts</p>	<p>R& D investment & commercialization Stimulating entrepreneurship among graduates</p>

<p>UCF Florida(USA)</p>		<p>Regional _community partnerships to provide high-growth enterprise</p>	<p>Regional economy c diversifi cation lack of interacti ons between incubato r and clients(st artups)</p>	<p>Modular</p>	<p>Best practice in service delivery, community relationships , facilities provisions interactions fostering</p>	<p>Regional community part nerships Network Capabilities</p>	<p>need for interactio ns(horizontal and vertical) boards, communit y, clients, mentors</p>
<p>UNTEC; Vale DioRos, BRAZIL</p> <p>The University- firm interaction process in a UBI the case of Vale dio Ros, BRAZIL (Pinto, Magdalena, Bignetti,2004)</p>					<p>Firms relationships with UBI</p>	<p>Managerial, Innovation, Financial</p>	

<p>Austin Tech Incubator USA</p> <p>Wiggins and Gibson,2003</p>	<p>help startups stabilize generate wealth for stakeholders aid continual University value creation</p> <p>bringing innovative ideas to the market</p> <p>For profit-1% equity stake in startups</p> <p>Biz plan review facilitate regional economic development</p>	<p>Recession and economic downturn</p>	<p>Architectural & Modular based on US NBIA best practice for incubation success</p>	<p>strategic, financial & infrastructural value delivery(facilities, funding, mentorship)</p> <p>joint biz plan review</p>	<p>help startups stabilize generate wealth for stakeholders aid continual University value creation bringing innovative ideas to the market</p> <p>For profit-1% equity stake in startups</p> <p>Biz plan review facilitate regional economic development</p>	<p>Recession and economic downturn</p>	<p>Architectural & Modular based on US nbia best practice for incubation success</p>
<p>Hungary_ Zoltan Baltmozy ,2006</p>	<p>UBI in less favored regions</p>	<p>Focus on life science</p>	<p>Regional Development Strategy via Life science startups</p>	<p>Incremental (evolutionary approach)</p>	<p>Pre-Incubation strategy Selection Policy</p>		<p>Changes in Entrepreneurial behaviors overtime</p>

			development and diverse fields.				
<p>South Africa_ Startups and Established Organization_ requirements with UBI</p> <p>Klonaridis & De Klerk,2017</p>	<p>physical facilities general business services management services financial consulting networking & professional services</p>	<p>high SMME failure rate need for regional development</p>		<p>focus on high techstimulates and launches Tech based startups</p>	<p>high growth potential startupsselection criteria based on innovativenessinfrastructure and management provisionsaccess to entrepreneurial support</p>	<p>physical facilities general business services management consulting networking & professional services</p>	<p>high SMME failure rate need for regional development</p>
<p>Situated Regional UBI_ Stakeholder context (2 Cases)</p> <p>McAdam et al,2016</p>	<p>Regional partnership with UBI for Venture creation</p>	<p>excessive stakeholder' influence on incubation model excessive power exertion from stakeholders</p>	<p>focus on digital, connected health, advanced engineering (Biotech, Nanotech)</p>	<p>traditional incubation support: infra ,networking, collaboration, knowledge exchange, consultancy</p>		<p>Changes ,modification in BM due to regional influence, stakeholder power/salience impact on BM</p>	<p>Regional partnership with UBI for Venture creation</p>

			Radical innovation in BM :- based on changes in full dependency on funding source(Govt.) Transition of Incubator to Virtual due to funding issues				
TH Venture Lab, Germany Case study Taiwo,2024:2025	Foster venture formation among students(Engineering) Venture Champion triggered	Quest for funding Need for workflow changes	'Radical Incremental":- resource mgt. changes	Initial Consultation with student entrepreneurs on ideas; Local Hackathon, weekend startup meets with mentors	At inception: (Low) Entrepreneurship . Mindset among students; Low(Network	Changes ,modification due to workflow process expansion of resources due to fund received	Foster venture formation among students(Engineering) Venture Champion

					Capabilities) Regional Funding support		n triggered
INNOV_ unibator Case study (Taiwo,2024:2 025)	stimulate venture formation among students Diverse startups portfolio Support from Group of distinguished Venture champions(Professors)	Strong University Heritage in Entrepreneu rship	Increme ntal:- addition of Accelera tor for matured startups	rigid incubation selection criteria due to flurry of ideas	Robust Ecosystem due to University & UBI location Funding (Financial)Ca pabilities	Recombination :- leading to Accelerator formation with intakes of matured startups from the incubator to facilitate equity generation for the UBI	stimulate venture formation among students Diverse startups portfolio Support from Group of distinguis hed Venture champion s(Professo rs)
ESA_ESABI Cs (Eldering and Hulsink,2022)	Incubation for space Space for Incubation-ESA Network of Incubation Centers						
Case study (Taiwo,2024:2	EU initiated(EU Template via ESA,IVO) but locally competed for		increme ntal:- gradual	Rigorous selection criteria due to high competitive Space Ecosystem Joint Project facilitation Readily available funds	Coproductio n & Project collaboration	recombination for Trans- regional	Case study (Taiwo,20

025) 2 cases	Heritage in Space Research startups creation at all Space segments(Case 1) -focus on lower segment and other applications(waste management,, telemedicine, Data Analytics & AI) Case 2)		collaborative efforts		with Firms and Entrepreneurs ; Open(Innovation)	collaborative project in the upper segment of the space value chain	24:2025) 2 cases
University Sponsored Tech Incubators Case of 6 US U(T)BI	Goals: Regional, state & local economic development research commercialization, tech transfer, Entrepreneurship. Skills development Non Profit, State and University owned with city support, Separate university entity with R&D	Profit and nonprofit UBTIs External stakeholder support & collaboration Post incubator-startups linkages after graduation	incremental and architectural based on NBIA standard practice	IP Safeguards Equity stakes and royalties Graduate firm linkages	Regional(state) collaboration with Universities		Affordable rent space
University Sponsored Tech Incubators Case of 6 US U(T)BIs	Goals: Regional, state & local economic development research commercialization, tech transfer, Entrepreneurship. Skills	Profit and non-profit UBTIs External stakeholder support &	incremental and architectural based on NBIA	IP Safeguards Equity stakes and royalties Graduate firm linkages	Regional(state) collaboration with Universities	Goals: Regional, state & local economic development research	Profit and non-profit UBTIs External stakeholder support

<p>Mian S.A,1994</p>	<p>development Non Profit, State and Univ. owned with city support, Separate university entity with R&D</p>	<p>collaboration Post incubator-startups linkages after graduation</p>	<p>standard practice</p>			<p>commercialization, tech transfer, Entrepreneurship. Skills development Non Profit, State and University, owned with city support, Separate university entity with R&D</p>	<p>& collaboration Post incubator-startups linkages after graduation</p>
<p>Comparing Demand & Supply Sides of UBIs cases of UBIs, Germany</p> <p>Brunel, Clarysse, Groen 2014</p>	<p>venture formation idea generation & spin-offs</p>			<p>infrastructure, biz support , access to networks</p>			
<p>Commercializing Science in Europe the Case of</p>	<p>Research and Development ideas generation and startups spinoffs</p>	<p>linkages btw firms and Universities Need for</p>		<p>Lab facilities for research funding by regional government Resources (finance) tech license offices</p>	<p>In-depth-scientific capabilities</p>		

<p>Cambridge University Biotech</p>		<p>Firm University project collaboration Triggered by Government policies</p>					
<p>Boston 128 Model US_</p>	<p>Regional & Govt. supported Heritage of Tech Universities spinoffs</p>	<p>Continual spinoffs from Ivy league Universities (MIT, Stanford, Harvard, Boston)</p>	<p>Architectural:- Boston 128 route shapes biotech spinoff activities</p>	<p>value c8tn via Research institutes, University spinoff network structure, Public &Private Org. Manufacturing companies presence for Info exchange</p>	<p>opportunity recognition & exploitation capabilities of biotech researches by VCs</p>	<p>Regional & Govt. supported Heritage of Tech Universities spinoffs</p>	<p>Continual spinoffs from Ivy league Universities (MIT, Stanford, Harvard, Boston)</p>
<p>Case of Israel, Biotech Breznitz,2012</p>	<p>Focus on R & D in the production segment of lifescience value chain Govt. initiated</p>	<p>funding differences across lifescience clusters compared to Europe or US Incubators silo operations due to complex</p>		<p>knowledge supply based cluster R&D focused</p>	<p>R &D Capabilities Presence of Highly ranked Universities in Science</p>	<p>Cluster Sustainability_ Israeli Life science Industry</p>	

		working relationships with firms and lack of time and support for firms lack of experts in later stages of production					
Biotech MG Centers: Toronto Montreal Niosi_Bas,2002	Formed from Govt. initiated strategy Govt.(Montreal) and private(Toronto) funding Continual University spinoffs	presence of VCs private and public		Presence of large firms(MNCs) for project collaborations Readily available VC support	Funding ,R&D, Integrated support system Collaborative ecosystem	Formed from Govt. initiated strategy Govt.(Montreal) and private(Toronto) funding Continual University spinoffs	presence of VCs private and public
What is glocal and local: Case of Biotech Cluster in Uppsala, Sweden	Highly intense Biotech activities city known for Biotech research heritage	weak representation of local VCs proximity to Stockholm thereby		Presence of large firms(MNCs) for project collaborations Labor mobility	loyalty and trust among actors and to cluster fostered a growing relationship	Highly intense Biotech activities city known for Biotech research heritage	weak representation of local VCs proximity to Stockhol

<p>Waxell and Malmberg,2007</p>		<p>attracting pool of experts</p>			<p>Global market interactions</p>		<p>m thereby attracting pool of experts</p>
<p>Case of Biotech UBIs Taiwo,2024:2025</p>	<p>Research Commercialization Joint projects execution with firms Startup and venture formation</p>	<p>Triggered by Firm presence Government Policies University-Firm collaboration (Projects)</p>			<p>Capabilities required for: Early Stage, Matured Stage, Entrepreneurial Survival, Regional Biotech, Perseverance (throughout Value chain)</p>	<p>Research Commercialization Joint projects execution with firms Startup and venture formation</p>	<p>Triggered by Firm presence Government Policies University-Firm collaboration(Projects)</p>
<p>Case of MedTech_ UBIs_ DE Taiwo,2025</p>	<p>Collaboration for joint cluster projects with Univ. and Firms Patenting of research and new firm spinoffs from clusters</p>	<p>Continual support from Regional & National levels Heritage of Univ. UBI in MedTech Research, spinoff & Patenting</p>	<p>Incremental: Based on adjustment of BM /Cluster processes to Regional &</p>	<p>Presence of large firms for project support proximity of firms- University & cluster executives for extensive knowledge creation and flow (exchange) High value cocreation among actors thereby achieving Top Cluster status in Europe</p>	<p>Robust & Sustainable Cluster Adaptation & Challenges Idea Gen & Startups Success, TTO/ Actor Impact</p>	<p>Collaboration for joint cluster projects with Univ. and Firms Patenting of research and new firm spinoffs from clusters</p>	<p>continual BM modification and adaptation of processes. e.g. Extension market entry to</p>

		<p>(Pre-historic) Regional heritage for MedTech based activities</p> <p>A Municipal RIS based Cluster surrounded with robust EE attributes and leverage on RIS Infra and support</p>	national changes				foreign firms
<p>Providing Business Support for small and medium enterprises in London Fashion Sector UK</p> <p>Tirani and Banks,2014</p>	<p>Grow high-end fashion businesses</p> <p>Reduce business risks</p> <p>Question reactionary fashion culture</p> <p>expand ability to connect</p>	<p>short fashion product life cycle</p> <p>sourcing in manufacturing materials</p>		<p>Grow high-end fashion businesses</p> <p>Reduce business risks</p> <p>Question reactionary fashion culture</p> <p>expand ability to connect</p>	<p>short fashion product life cycle</p> <p>sourcing in manufacturing materials</p>		

<p>Promoting Innovation Within the Fashion-tech Sector. The Role of Pan-European Projects</p> <p>Colombi, Lodovico, Roncha,2021</p>	<p>provide network opportunities for fashion designers provision of funding for ideas and startups in the fashion sector</p>	<p>Technologies disruptions e.g. IoT, AI, data analytics, ML in Fashion & Luxury</p>	<p>provide network opportunities for fashion designers provision of funding for ideas and startups in the fashion sector</p>	<p>Technologies disruptions e.g. IoT, AI, data analytics, ML in Fashion & Luxury</p>			
<p>Nanoscience and Nanotech: How an emerging area of scientific agenda of core countries in Latin America</p>	<p>Invernizzi, Matthieu Hubert and Dominique Vinck ,</p>						

<p>Rejuvenation sleeping anchor nanotech clusters: pre-adaptation & lifecycle</p>	<p>for Regional & economic development</p>	<p>triggered by major actor STM microelectronics, networks formation via clusters and continual technology adaptation</p>	<p>Incremental via tech pre-adaptation</p>	<p>co-creation with firms Universities and major MNC, project and research enhancement via Univ.</p>			
<p>Patterns of nanotechnology innovation and governance within a metropolitan area</p> <p>Foley and Wiek,2013 Phoenix, US</p>	<p>cater for an aging population in the Phoenix region with new Nano based high-tech products</p> <p>tap into the solar PVAs resources of the Arizona region</p>	<p>changing and divergent tech landscape</p> <p>government controlled commercialization process</p>	<p>incremental :- phase based innovation from :initialization to commercialization</p>	<p>a place based innovation ecosystem with diversified portfolio(defense, healthcare, solar)</p>	<p>regional infra support</p>	<p>knowledge creation within clusters; inter-firm healthy competition giving rise to innovation(Grenoble),day(internal) and external strategic collaboration for knowledge exchange and</p>	<p>cater for an aging population in the Phoenix region with new Nano based high-tech products</p> <p>tap into the solar PV resources of the</p>

						tech & cluster rejuvenation	Arizona region
Japanese nanotech and industry landscape	Andre Zägar,2014	early stage funding and high involvement of academia at the initialization phase(R&D)					
Robertson and Kitigawa, 2011 ...mediating regional ...Case of SET Squared, UK	Build 'critical mass' of R & D Accelerate spinoffs from Universities and incubators via joint facilitation Develop vast networks of actors within each regional ecosystem and towards regional and national growth and economic development	Joint regional collaboration via HEIF Universities heritage and pedigree in research and spinoff e.g. Southampton compared to Stanford Changes in internal governance and processes without	incremental: for regional adaptation Architectural: for central changes Radical: from regional each University e.g. Director Bath forming	Cocreation with actors in the system via partnerships and networks(Business) like BEN-Business Enterprise Networks Enhanced Regional value cocreation via projects collaboration. Universities as Knowledge Mediators and Boundary Spanners.	Collaborative :- Network Capabilities (partnerships, coordination, marketing, communication) coupled with enhanced EO(risk and proactiveness with innovation)	Build 'critical mass' of R & D Accelerate spinoffs from Universities and incubators via joint facilitation Develop vast networks of actors within each regional ecosystem and towards regional and national growth and economic development	Joint regional collaboration via HEIF Universities heritage and pedigree in research and spinoff e.g. Southampton compared to

		impacting the central governance and control	developing regional network outside the central network. Each Director has the authority to implement changes at the regional level				Stanford Changes in internal governance and processes without impacting the central governance and control
	Build 'critical mass' of R & D Accelerate spinoffs from Universities and incubators via joint facilitation Develop vast networks of	Joint regional collaboration via HEIF Universities heritage and pedigree in research and spinoff e.g.	incremental: for regional adaptation Architectural: for central changes	Cocreation with actors in the system via partnerships and networks(Business) like BEN-Business Enterprise Networks Enhanced Regional value cocreation via projects collaboration. Universities as Knowledge Mediators and Boundary Spanners.	Collaborative :- Network Capabilities (partnerships, coordination, marketing, communication	Shared rent facilities mentorship and training on entrepreneurship Networks of entrepreneurs	Shared rent facilities mentorship and training on entrepreneurship

	<p>actors within each regional ecosystem and towards regional and national growth and economic development</p>	<p>Southampton compared to Stanford</p> <p>Changes in internal governance and processes without impacting the central governance and control</p>	<p>Radical: from regional each University e.g. Director Bath forming developing regional network outside the central network. Each Director has the authority to implement changes at the</p>		<p>on) coupled with enhanced EO(risk and proactiveness with innovation)</p>	<p>Networks of entrepreneurs</p>
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			regional level				
NIMELA, Artic Region Case of Oulu, Tromso and Lulea	<p>For Innovative Infrastructural development with the respective innovative tools and processes</p> <p>To facilitate students integration with firms via internships and mentorship while providing consulting services</p> <p>develop innovative spinoffs in high-tech(biotech)</p> <p>Development of innovation hubs for effective innovation concentration</p>	<p>Triggered by aging population, peripheral, border regions entrepreneurial activities disadvantages</p> <p>Harsh climatic disadvantages and the need to ensure continual innovation within the Scandinavia n region to facilitate project funding rather than</p>	<p>Radical:- Innovation is key to survive in the entrepreneurial disadvantaged region</p> <p>Incremental:- assessment of Innovations in the early stage would take some time</p>	<p>Presence of value cocreation actors between Universities and firms for research commercialization and spinoffs.</p> <p>Engagement of students in entrepreneurial related activities to stimulate Ent. Mindset(e.g. Business Kitchen)</p> <p>Creating the right environment for labor & expert mobility</p>	<p>Relational Alliance Capabilities</p> <p>Innovative Capabilities</p>	<p>Recombination of operational processes to facilitate business model expansion for innovation</p> <p>modification of processes</p>	<p>Build 'critical mass' of R & D</p> <p>Accelerate spinoffs from Universities and incubators via joint facilitation</p> <p>Develop vast networks of actors within each regional ecosystem and towards regional and</p>

		<p>continual development on public funds</p> <p>Heritage of research and academic pedigree(OULU)</p>					national growth and economic development
<p>The Role of University in Agro innovation development in Africa</p> <p>Rukarwa, Mensah, Egeru, 2018</p>	<p>development of Innovation hubs testing students' business models at the incubation phase.</p> <p>Aid the University to develop innovation ecosystem that fosters agric-hubs</p> <p>developing entrepreneurship agro-hubs via knowledge and information mechanisms and innovation development</p>	<p>the need for regional development via agro biz facilitate innovative agro biz development via Universities partnerships</p>	<p>Modular :- based on RUFORUM, REC AP activities among institutions of participation.</p>	<p>encourage Universities partnerships and integration via the RUFORUM network.</p> <p>Funding provision via proposals from participating universities</p>			
<p>URI Universities</p>	<p>For continual Research commercialization</p>	<p>Effect of rising infra</p>	<p>Radical- establish</p>	<p>Co-creation via joint research collaboration with firms ,foreign local students(Chinese) in the US</p>	<p>Scientific and knowledge</p>		<p>For continual</p>

<p>Research Institutes) and RIS: the cases of Beijing and Shenzhen</p> <p>Kun Chen ,2017</p>	<p>and spinoff- regionally and nationally facilitate spinoffs among Universities in both regions</p> <p>Enhance linkages with firms and graduates(abroad) for local venture formation</p>	<p>shortages and cost stemmed for new innovation milieu</p> <p>Need for an Holding firm to cater for spinoff and incubation expansion</p> <p>Procedures and Equity or stake in spinoff companies</p>	<p>ment of holding firms for funding, management and linkages of spinoffs/ incubators within the park</p> <p>Incremental:- linkages with local firms and infrastructural and entrepreneurial support provision due to expansion</p>	<p>Provision of amenities:- rent or shared space, mentoring network and professional consultations for incubators in the Park</p> <p>Increased R& D activities via project funding and researchers' availability</p>	<p>research (academic) capabilities</p> <p>Networking Capabilities</p> <p>Human Resource availability (Munificence)</p>	<p>Research commercialization and spinoff- regionally and nationally facilitate spinoffs among Universities in both regions</p> <p>Enhance linkages with firms and graduates (abroad) for local venture formation</p>
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			n of incubators'				
ALLIANCE:- Transforming Open Research and Innovation through CHARMS - TORCH: An EU Horizon Project 2022	Develop entrepreneurship mindset among students provide support: funding and incubation services to students engage students in entrepreneurial related activities to facilitate valorization To provide training via mentorship, networking and collaboration to students	EU based policies for entrepreneurship development among students University collaboration and alliance formation for collective yet distributed advantages	Incremental :- gradual and planned (roadmap) innovation development for students and each University Architectural :- Based on the EU project plan and goals, each University	Provision of pre-incubation and incubation training and support for students linking students with mentors for training and entrepreneurship development funding for startups Unique Entrepreneurship education programs at each Universities	Entrepreneurial Mindset (development) capabilities	modification of organizational structures via changes to Holding firm. Recombination of NIS, RIS resources to foster enhanced infrastructural support in	Develop entrepreneurship mindset among students provide support: funding and incubation services to students engage students in entrepreneurial related activities to facilitate valorization To

			ty develope d a continge nt plan for entrepre neurship develop ment				provide training via mentorshi p, networkin g and collaborat ion to students
<p>Why Universities create and foster BIs_ Case of New Mexico State University(N WSU)</p> <p>Ejiro Osiobe and Kraer WinningHam ,2020</p>	<p>Develop National Security Technologies via incubation support startups creation for regional economic development in the La Crunes region</p>	<p>Overall Impact of the UBI at that point was questionable</p> <p>Regional policies for development via tech support program and incubation</p>	<p>Incremen tal participa tion and support for student entrepre neurs</p>	<p>provision of amenities across different departments</p> <p>stages or phases of incubation for entrepreneurs</p> <p>supporting entrepreneurs with fund</p>	<p>entrepreneur ial activities development among students via participation in Entrepreneu rship Training</p>	<p>Develop National Security Technologies via incubation support startups creation for regional economic development in the La Crunes region</p>	<p>Overall Impact of the UBI at that point was questionable</p> <p>Regional policies for developm ent via tech support program and incubatio n</p>

FINTECH_I NSURETEC H							
Facilitating Innovation in Fintech: a review	Alssard, Laurie, Helge Aas,2021	incubators impact on fintech requires more research					
RSO lifecycle and banking relationships and incubation dev_ case of Italy	Fassano et al., 2023						

Table A2. UBI Models Typology Classification.

Typology	CORE BIZ & MGT function	CORE R& D Commercialization	Regionally Initiated	Opportunity Based UBIs	Industry Focussed (Lifescience)	CORE BIZ & MGT function
	Biz plan assessment Biz plan review general business services management services financial consulting networking & professional service	R& D investment & commercilaization	Regional_community partnerships facilitate regional economic development	cater for an aging population in the Phoenix region with new Nano based hightech products	Focus on life science mixed manufacturing startups Focus on science (biomed)	Biz plan assessment Biz plan review general business services management services financial consulting networking & professional service

	provision of funding for ideas and startups in the fashion sector		Regional partnership with UBI for Venture creation	tap into the solar Pv resources of the Arizona region Create software tech products		provision of funding for ideas and startups in the fashion sector
	startups mgt.team development Entp. Skills development Reduce Biz Risk	commercialization,tech txfer,	Regional,state & local economic development research Joint projects execution with firms		heritage in space research startups creation at all space segments Focus on lower segments and other applications	startups mgt.team development Entp. Skills development Reduce Biz Risk
	<i>founder_incubator_ incubatee relationships</i> <i>expand ability to connect</i>	Research and Development Build 'critical mass' of R & D	Collaboration for joint cluster projects with Univ. and Firms	Create startups for software tech development	Heritage of Tech Universities spinoffs Question reactionary fashion culture	<i>founder_incubator_ incubatee relationships</i> <i>expand ability to connect</i>
		Research Commercialization For continual Research commercialization and spinoff- regionally and nationally	for Regional & economic development		Focus on R & D in the production segment of lifescience value chain	Research Commercialization For continual Research commercialization and spinoff- regionally and nationally

	<p>Stimulating entrepreneurship among graduates</p> <p>Foster venture formation among students(Engineering)</p> <p>stimulate venture formation among students</p>		<p>Develop National Security Technologies via incubation support</p> <p>startups creation for regional economic development in the La Crunes region</p>		<p>Highly intense Btech activities</p> <p>City known for Biotech research heritage</p>	<p>Stimulating entrepreneurship among graduates</p> <p>Foster venture formation among students(Engineering)</p> <p>stimulate venture formation among students</p>
	<p>To provide high-growth enterprise help startups stabilize</p>		<p>EU initiated but competed for locally</p> <p>Govt. Initiated</p> <p>Formed from Govt. initiated strategy</p>		<p>cater for an aging population in the Phoenix region with new Nano based hightech products</p> <p>tap into the solar Pv resources of the Arizona region</p>	<p>to provide high-growth enterprise help startups stabilize</p>
	<p>bringing innovative ideas to the market</p> <p>aid continual University value creation</p>					
	<p>venture formation</p> <p>idea generation & spin-offs</p>					

	Continual Univ. spinoffs					
	ideas generation and startups spinoffs					
	Startup and venture formation					
	Patenting of research and new firm spinoffs from clusters					
	Grow high-end fashion businesses					
	Accelerate spinoffs from Universities and incubators via joint facilitation					

Table A3. UBI BMs Triggers based on Extant literature.

Global	SIS_EU	NIS_RIS(Regional & National)	Cluster (Industry specific)	Organizational (Firms and UBI)	Organizational_UBI	Operational (UBI)
Climatic conditions Climate changes, CO2 Emissions						
Recession, meltdown/Financial meltdown		Regional Economic diversification	Life science development,			Flexibility in incubation process
Global Tech disruption Change Tech landscape		Regional Development, Continual Regional Support, Regional heritage in specific research, RIS municipal ecosystem, Innovation development, Regional policies for development via Tech support programs and incubation	SMMEs failure, Funding difference in life science clusters compared to EU or US, Short PLC, Sourcing in Manufacturing Industry , dominance(Fintech organization dominance)	Formal Industrial linkages and collaborations Presence of Innovative firms VC Firms presences University spinoff in Ivy league	Interaction gap between incubator and incubatee Stakeholder influence on incubate model Power exertion by Stakeholder Funding Generation Questionable UBI Impact	Commercialization Silo Operations Lack of time and experts Stakeholder influence on incubation model Power exertion by Stakeholders Questionable UBI IMPACT Funding Sourcing and Generation
Tech Evolution Uncertainties in High-Tech commercialization (proposal) Firm triggered disruption by STM Microelectronics: causing innovation Development in Nanotech and Pharmacia leaving a region in Karolina Institute(KI)	EU Govt. Policies on Entrepreneurs hip development EU Regulations					

Appendix B

Table A4. Business Model literatures for Conceptual Framework Development.

Article Description	Author(s)	Journal	Context BM,BMI, etc.
1. Value uncaptured perspective for sustainable business model innovation	Yang, M; Evans, S; Vladimirova, D; et al.	ORE Open Research Exeter	Extracting uncaptured values in BMs
2.what-drives-business-model-adaptation-impact the impact of opportunities, threats and strategic orientation	Tina Saebi, Lasse Lien, Nicolai J Foss	Long Range Planning, 50 (5). pp. 567-581.	BM Adaptation
3. unlocking the hidden value of concepts: a cognitive approach to business model innovation	Luis I. martins, violina p. rindova, and bruce e. greenbaum ,2015	Strategic Entrepreneurship Journal Strat. Entrepreneurship J., 9: 99–117 (2015)	BM Innovation(Cognitive Generation)

		Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/sej.119	
4. The entrepreneur's business model: toward a unified perspective	Michael Morrisa*, Minet Schindehutteb, Jeffrey Allen	Journal of Business Research 58 (2005) 726 – 735	BM concepts
5. The business model: recent developments and future research	Christoph Zott, Raphael Amit, Lorenzo Massa, Feb, 2011	ssrn-1674384.pdf	
6. The Business Model in Practice and its Implications for Entrepreneurship Research	GERARD GEORGE, ADAM J. BOCK, September 09, 2009	Entrepreneurship theory & practice (forthcoming)	BM Perspectives and concepts with Discourse Analysis
7. Designing your future business model: an activity system perspective	Christoph Zott Raphael Amit, 2009	IESE ,Navara	BM Design as activity system
8. The business model: an integrative framework for strategy execution	James Richardson	ssrn-932998.pdf	
9. The Genesis and Metamorphosis of Novelty Imprints: How Business Model Innovation Emerges in Young Ventures	https://www.researchgate.net/publication/331797722 Yuliya Snihur, Christian Zott		
10. Business model innovation: a review of the process-based literature	Daniela Andreini · Cristina Bettinelli · Nicolai J. Foss · Marco Mismetti, 2021	Journal of Management and Governance (2022) 26:1089–1121 https://doi.org/10.1007/s10997-021-09590-w	
11. The business model concept: theoretical underpinnings and empirical illustrations	Jonas Hedman and Thomas Kalling	European Journal of Information Systems (2003) 12, 49–59	
12. Business model design: conceptualizing networked value co-creation	Suvi Nenonen and Kaj Storbacka	The 2009 Naples Forum on Services: Service-Dominant Logic, Service Science, and Network Theory	Network valued cocreation with capabilities
13. The sites and practices of business models	Katy Mason a, *, Martin Spring, 2011	Industrial Marketing Management	Tech, Network and market offering in BMs
14. Crafting business architecture: the antecedents of business model design	Raphael Amit and Christoph zott	Strategic entrepreneurship journal copyright © 2015 strategic management society strat. entrepreneurship j., 9: 331–350 (2015)	
15. Conceptualizing a "Sustainability Business Model"	Wendy Stubbs and Chris Cocklin, 2008	Organization Environment 2008; 21; 103	

16. Business Model Innovation	Lorenzo Massa, Christopher Tucci,	The Oxford Handbook of Innovation Management. Edited by Mark Dodgson, David Gann & Nelson Phillips. ISBN: 9780199694945	
17. The Importance of Classification to Business Model Research	Dr. Susan C. Lambert	Journal of Business Models (2015), Vol. 3, No. 1, pp. 49- 61	BM Classification (typology and Taxonomy)
18. The Sustainable Business Model Pattern Taxonomy – 45 Patterns to Support Sustainability-Oriented Business Model Innovation	https://www.researchgate.net/ publication/325957687 Florian Lüdeke-Freund*, Sarah Carroux, Alexandre Joyce, Lorenzo Massa, Henning Breuer	https://www.researchgate.net / publication/325957687	
19. Business Models as Models Charles Baden-Fuller* and Mary S. Morgan	Baden-Fuller, C & Morgan, MS (2010). Business Models as Models. LONG RANGE PLANNING, 43(2-3), p156-171		
20. A typology of sustainable circular business models with application in bioeconomy	Erika De Keyser* and Erik Mathijs		
21. Classification tools for business models: Status quo, comparison, and agenda	Thorsten Schoormann, · Julia Schweihof · Ilka Jussen3 · Frederik Mölle	Electronic Markets (2023) 33:7 https://doi.org/10.1007/s125 25-023-00639-2	
22. Cluster Typology of Business Models of Start-Ups. (Example of Slovakia)	Štefan Slávik * , Richard Bednár , Ivana Mišúňová Hudáková and Katarína Moravčíková, 2020	MDPI Administrative science	
23. Business model innovation: a typology	Elena Casprini, 2015	sinergie Italian journal of management Vol. 33, N. 97, 2015	
24. Taxonomy of Carsharing Business Mo dels	Gerrit Remane , Robert C. Nickerson, Andre Hanelt , Jan F. Tesch University of and Lutz M. Kolbe	Thirty Seventh International Conference on Information Systems, Dublin 2016	
25. Typology-of-digital-business-models-in- tourism	Zentner_Spremi_2021	IJESM	

Table A5. showing the UBI BM Typology.

UBI BM Typology
UBI BM Antecedents
Goals, Template, Stakeholders, environment constrains
Core Business & Entrepreneurship BM
Core R & D commercialization
Industry focused or specialized BMs(Life science, Space, Luxury)
Regionally Initiated BM
Opportunity Based BMs

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