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A Comprehensive Exploration of the Digital Startup Ecosystem of Bangladesh*

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Abstract

The aim of this paper is to produce a comprehensive summary of the digital startup ecosystem of Bangladesh. A cross-country analysis focusing on the digital performance of Bangladesh relative to its neighbors as well as the best and the worst performing countries in the world reveals that in spite of making noteworthy progress, Bangladesh still lags behind compared to the rest of the world. In this exploratory descriptive paper, we produce a holistic picture of the digital startup ecosystem of Bangladesh along with the emerging Asian markets startup ecosystem snapshot with a view to adding to the almost non-existent academic literature on the topic. On the basis of a comprehensive literature review and interviews of 6 of the country's leading digital ecosystem experts, we identify the drivers for growth, and challenges pertaining to the ecosystem, and make policy recommendations.

Keywords: Digital Bangladesh, Vision 2021, Global E-Indices, Digital Startup Ecosystem, Emerging Asia Market

1. Introduction

The fourth industrial revolution also known as the digital revolution is upon us. This revolution will fundamentally change how we live, work and relate to each other. It is characterized by a fusion of technologies that is connecting the physical, digital, and biological spheres (Schwab, 2016). According to Digital Planet (1998), a publication by World Information Technology and Services Alliance (WITSA), global ICT spending in 1997 was \$1.8 trillion which was approximately 6% of aggregate global GDP and in 2018, global ICT spending was estimated to reach \$ 3.5 trillion registering a 6.2% annual growth (Deloitte, 2018). According to Naym and Hossain (2016, p. 302), “Embracing Information and Communication Technology (ICT) have been offering a nation with competitive advantage, convenience and quality of life. The way people work, communicate, and spend time is now profoundly being influenced by use of ICT.”

The digital startup ecosystem of Bangladesh is at the driving seat of the Digital Bangladesh vision. Summarizing from the work of Grabowski et al. (2018), the digital startup ecosystem of a country can be thought of as a holistic framework with the digital startup entrepreneurs at the core who are enabled by the supporting network of accelerators, investors, educational institutions and corporations, with the government and political environment providing the foundation; the ultimate goal of the framework is to cater to the needs of the customers.¹ In this exploratory paper, we study all the components of the digital startup ecosystem in the context of Bangladesh.

Bangladesh is on the trajectory to become a digitally enabled nation, considering its pursuit of Vision 2021 – Digital Bangladesh. ICT Earnings have gone up from US\$26 million in 2008 to US\$ 600 million in 2015, a stellar growth of 2,200%+ while ICT Export Earnings have gone up to US\$ 300 million in 2016. The budgetary allocation for ICT has gone up from US \$ 25.6 million in 2008 to US\$ 205.4 million in 2016, a growth of about 700% (Center for Research and Information, 2017). In 2018, Global System for Mobile Communication Association (GSMA) forecasted that Bangladesh will be the 10th largest internet using country by 2020. According to We are Social and Hootsuite (2018) report, as of January 19, 2018, in Bangladesh, 137.2 million (83% penetration) people have mobile connections, 81.7 million people use the internet (49% penetration), 76.2 million use mobile internet (46% penetration), and 30 million people use the social media (18% penetration). Annual digital growth from 2017 has seen an increase of 29% in number of internet users, 14% in mobile connections and 15% in active social media users.

In order to make Vision 2021 a reality, according to BASIS (2018), the Bangladesh government has formulated a roadmap for development in ICT in 2016. The activities are clustered in six categories: industry, infrastructure, e-governance, human resources development, laboratories and services. The roadmap for the industry has set targets to generate 1,000 innovations, raising software export earnings to USD 5 billion by 2021. The government has identified 100 aspects of the judiciary where ICT can be harnessed and assist in the resolution of 3 million cases currently in backlog. The construction of 554 Business Process

¹ The digital startup ecosystem framework is explained in more detail in sections 3.1 and 3.2.

Outsourcing (BPO) centers is underway and 2,100 Sheikh Rasel Digital Lab and Language centers out of the planned 2,972 have already been built. 7-year tax holiday for registered IT companies is already in place. The BPO has set a goal to connect over 3 crore unbanked people with the banking system this year by the digitized 'Daak Taka' which only requires BDT 2 to open an account. Also, ICT exporter's get 10% cash incentive opportunities from July 2017. On top of the above mentioned progresses, some of the planned ICT infrastructures are 16 Hi-Tech parks, 7 Software Technology Parks, 10 IT Training Incubation and Business Centers and a Tier-IV Data Center. (Center for Research and Information, 2017)

Only a few academic papers in the recent years have studied the ICT industry of Bangladesh. Hossain et al. (2011), e.g., survey 160 firms in Bangladesh and India (100 from Dhaka and 60 from Delhi) and derive a set of conclusions on the prospect of development of the ICT industry in South Asia. Shinkai and Hossain (2011) analyze productivity and performance of the IT sector in Bangladesh based on a survey of 202 firms of various sizes and assess the impact of the global financial crisis of 2007-08 on the sector. Naym and Hossain (2016) investigate the impact of ICT investment on economic growth of Bangladesh for the period 1997-2013.² We have not come across any academic paper that explores in detail the digital startup ecosystem of Bangladesh. This paper aims to be the first of its kind in terms of producing a comprehensive exploratory study of the digital startup ecosystem of the country.

The research is based on the synthesis of almost all the available peer-reviewed journal articles, white papers, reports, news and books on the ICT sector and the digital startup ecosystem of the country and carrying out interviews of 6 key ecosystem experts. In this exploratory descriptive paper, we produce a holistic picture of the digital startup ecosystem of Bangladesh along with the emerging Asian markets startup ecosystem. On the basis of the literature review and the interviews, we identify the drivers for growth, and challenges pertaining to the ecosystem, and make policy recommendations. This research further contributes to the academic literature by conducting an updated analysis using the latest available data of Bangladesh's progress in digitization in comparison to its neighboring countries. Mainly three groups of readers are expected to benefit from this paper: fresh graduates who are seeking to enter the digital startup ecosystem as employees or start their own startup ventures; current owners and managers of digital startups and the policymakers. Readers will attain a holistic overview of the digital startup ecosystem of Bangladesh.

The rest of the paper is organized as follows. Section 2 includes a cross-country analysis of digital performance with a focus on Bangladesh using World Economic Forum's Network Readiness Index (NRI), International Telecommunication Union's ICT Development Index (IDI) and United Nation's (UN) E-Government Development Index (EGDI). Section 3 produces a holistic picture of the digital startup ecosystem of Bangladesh. In doing so, the section starts with the essentials of a digital ecosystem, the startup evolution framework, and what makes technology startups successful in the context of Bangladesh with insights from ecosystem experts of the country. It then describes the state of the digital workforce of Bangladesh and the composition of the country's startup ecosystem. The next part of the section produces a deep dive analysis of the 5 most concentrated sectors in the startup ecosystem of

² They find a positive but statistically insignificant association between ICT investment and economic growth. They attribute this lack of statistical significance to relatively small share of ICT investment in GDP and lack of availability of data for a longer time period.

Bangladesh and discusses the state of the supporting network. The section then provides a snapshot of the emerging Asian markets startup ecosystem including Bangladesh and its neighbors. Section 3 ends with a discussion of the digital society and the consumer class. Section 4 identifies the drivers of growth and the challenges faced, and provides policy recommendations to take the digital ecosystem forward. Section 5 concludes.

2. Cross-Country Analysis with a Focus on Bangladesh

Vision 2021 – also regarded as “Digital Bangladesh” – pursued by the Bangladesh Government puts the role of digital capabilities at the core of the country’s ongoing quest for attaining sustainable economic growth. In an effort to understand how far we have progressed in the journey of becoming digital, in this section of the paper, we compare the digital performance of Bangladesh relative to its neighboring countries as well as the best and the worst performers in the world. In measuring digital performance, we use 3 widely used global e-indices: Network Readiness Index (NRI), ICT Development Index (IDI) and E-Government Development Index (EGDI).³

2.1 Network Readiness Index (NRI)

The Network Readiness Index (NRI), a composite indicator made up of four main categories, 10 subcategories, and 53 individual indicators distributed across the different subcategories, measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT).⁴ The NRI is considered as the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations. (The Global Information Technology Report, 2016)

The data-set of NRI is available for the period 2012-2016. Table 1 shows the position of Bangladesh in terms of NRI rank and score relative to 10 of its closest neighboring countries.

Table 1: Network Readiness Index Rank and Score

Country	Rank (Out of 144)					Score (Out of 10)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Singapore	2	2	2	1	1	5.86	5.96	5.97	6.02	6.04
Malaysia	29	30	30	32	31	4.80	4.82	4.83	4.85	4.91
China	51	58	62	62	59	4.11	4.03	4.05	4.16	4.24
Thailand	77	74	67	67	62	3.78	3.86	4.01	4.05	4.20
Indonesia	80	76	64	79	73	3.75	3.84	4.04	3.91	4.01
Vietnam	83	84	84	85	79	3.70	3.74	3.84	3.85	3.93
India	69	68	83	89	91	3.89	3.88	3.85	3.73	3.75

³ In order to track the progress of the digitalization process in Bangladesh, Access to Information (a2i) Program in Partnership with Bangladesh Bureau of Statistics (BBS) and Statistics and Informatics Division (SID) chose to look into these very 3 indices in 2013 (see Global e-Indices' Rankings and Bangladesh: Indicators for Measuring Digital Bangladesh, 2013). Their analysis was based on an older version of the relevant data covering up to 2012 whereas we use updated data covering up to 2018.

⁴ The four main categories are: 1. *Environment*, which includes two sub-categories: Political and regulatory environment (9 indicators), Business and innovation environment (nine indicators); 2. *Readiness*, which includes three subcategories: Infrastructure (4 indicators), Affordability (3 indicators), Skills (4 indicators); 3. *Usage*, which includes three subcategories: Individual usage (7 indicators), Business usage (6 indicators), Government usage (3 indicators); and 4. *Impact*, which includes two subcategories: Economic impacts (4 indicators), Social impacts (4 indicators). (The Global Information Technology Report, 2016)

Pakistan	102	105	111	112	110	3.39	3.35	3.33	3.27	3.35
Bangladesh	113	114	119	109	112	3.20	3.22	3.21	3.31	3.33
Nepal	128	126	123	118	118	2.92	2.93	3.09	3.17	3.18
Myanmar	-	-	146	139	133	-	-	2.35	2.53	2.68

Source: The Global Information Technology Report (2016)

Among Bangladesh's neighbors, the three countries that experienced the highest growth in NRI are Myanmar⁵, Thailand and Nepal. Myanmar achieved 14.1% NRI growth between 2014 and 2016. NRI in Thailand and Nepal grew by 11.1% and 8.9%, respectively, between 2012 and 2016. Bangladesh ranked 112th out of 139 countries in 2016 with a score of 3.33 out of 10. Among the 11 nations included in Table 1, Bangladesh ranked 9th as of 2016. Between 2012 and 2016, ranking of Bangladesh remained more or less consistent (except 2014) while the rankings of two of its most important neighbors India and Pakistan showed steady decline. In terms of growth in NRI, Bangladesh's performance has been considerably better than both India and Pakistan. Bangladesh experienced an increase of 4.1% in NRI between 2012 and 2016 while NRI fell by 3.6% and 1.2%, respectively, in India and Pakistan, during the same period.

Table 2 reports how Bangladesh fared against the top 10 and bottom 10 NRI Scorers of the world as of 2016. From the Table, we can observe that the average NRI score of the top 10 countries is 5.8, which is almost 74% above Bangladesh; while the average NRI score of the bottom 10 countries is 2.4, which is around 39% below Bangladesh. This implies that Bangladesh is still leaning towards the bottom belt of the world in terms of their Network Readiness and in spite of showing promising growth in recent years; the country still has a long way to go.

Table 2: Bangladesh Vs. Top and Bottom 10 NRI Scorers of the World (2016)

Country	Rank (Out of 139)	Score (Out of 10)
Singapore	1	6.0
Finland	2	6.0
Sweden	3	5.8
Norway	4	5.8
United States	5	5.8
Netherlands	6	5.8
Switzerland	7	5.8
United Kingdom	8	5.7
Luxembourg	9	5.7
Japan	10	5.6
Bangladesh	112	3.3
Gabon	130	2.6
Malawi	131	2.6
Nicaragua	132	2.6
Mauritania	133	2.5
Swaziland	134	2.5

⁵ NRI data for Myanmar was available for the period 2014-2016.

Myanmar	135	2.4
Haiti	136	2.3
Burundi	137	2.1
Guinea	138	2.1
Chad	139	2.1

Source: The Global Information Technology Report (2016)

2.2 ICT Development Index (IDI)

The ICT Development Index (IDI), published by the UN International Telecommunication Union, is an index based on internationally agreed upon ICT indicators. This makes it a valuable tool for benchmarking the most important indicators for measuring the information society. The IDI is a standard tool that governments, operators, development agencies, researchers and others can use to compare ICT performance within and across countries. The ICT Development Index is based on 11 ICT indicators, grouped in three clusters: access, use and skills.⁶ (Measuring the Information Society Report, 2017)

The IDI data is available for the period 2010-2017, with the exception of 2014. Table 3 shows the position of Bangladesh in terms of IDI rank and score relative to 10 of its closest neighbors. Although ranked 147th out of 176 countries as of 2017, rising just 1 place from 148th as of 2010, Bangladesh showed significant growth between 2010 and 2017. In fact, it is the 3rd highest growing nation in terms of IDI among the above mentioned 11 nations, registering a whopping 57.1% growth during this period.⁷ Myanmar experienced the highest growth (89.9%) and Nepal registered the second highest growth (64.6%) during this period.

Table 3: ICT Development Index Rank and Score

Country	Rank (Out of 176)							Score (Out of 10)						
	2010	2011	2012	2013	2015	2016	2017	2010	2011	2012	2013	2015	2016	2017
Singapore	11	14	15	16	19	20	18	7.62	7.55	7.85	7.9	7.88	7.85	8.05
Malaysia	61	57	66	71	66	62	63	4.85	4.81	5.18	5.2	5.64	6.22	6.38
Thailand	92	94	91	81	79	79	78	3.62	3.42	4.09	4.76	5.05	5.31	5.67
China	87	79	86	86	84	83	80	3.69	3.86	4.39	4.64	4.8	5.17	5.60
Vietnam	94	86	99	101	104	108	108	3.61	3.65	3.94	4.09	4.02	4.18	4.43
Indonesia	109	97	106	106	115	114	111	3.11	3.14	3.70	3.83	3.63	3.85	4.33
India	125	120	129	129	135	138	134	2.14	2.13	2.42	2.53	2.50	2.65	3.03
Myanmar	150	132	148	150	153	140	135	1.58	1.70	1.75	1.82	1.95	2.59	3.00

⁶ The indicators and sub-indices included in the IDI are weighted on the basis of the Principal Component Analysis (PCA) results obtained when the Index was first computed. The three IDI clusters, indicators within each cluster and the assigned weights (in parentheses) are as follows. 1. *ICT access (0.4)*: Fixed-telephone subscriptions per 100 inhabitants (weight: 0.20), Mobile-cellular telephone subscriptions per 100 inhabitants (0.20), International Internet bandwidth per Internet user (0.20), Percentage of households with a computer (0.20), Percentage of households with Internet access (0.20); 2. *ICT usage (0.4)*: Percentage of individuals using the Internet (0.33), Fixed-broadband Internet subscriptions per 100 inhabitants (0.33), Active mobile-broadband subscriptions per 100 inhabitants (0.33); 3. *ICT skills (0.2)*: Mean years of schooling (0.33), Secondary gross enrolment ratio (0.33), Tertiary gross enrolment ratio (0.33). (Measuring the Information Society Report, 2017)

⁷ According to Measuring the Information Society Report (2017), “Bangladesh has witnessed rapid expansion of 3G networks which is significantly impacting the growth of mobile-broadband users and it is looking forward to introduce LTE technology. However, fixed Internet penetration is increasing day by day as several initiatives and policies have been formulated and implemented by the Government of Bangladesh to successfully achieve the vision of Digital Bangladesh”.

Nepal	140	-	134	131	142	139	140	1.75	-	2.20	2.37	2.32	2.6	2.88
Bangladesh	148	139	146	145	143	146	147	1.61	1.62	1.90	1.97	2.27	2.37	2.53
Pakistan	138	128	141	142	145	148	148	1.79	1.78	2.01	2.05	2.15	2.21	2.42

Source: Measuring the Information Society Report (2017)

India and Pakistan also registered significant growth figures in IDI, the former experiencing 41.6% growth and the latter registering 35.2% growth. Regardless of such growths, both the countries fell in the ranks compared to the rest of the world. This reflects how almost every nation has been significantly investing in developing the IDI, which also explains why in spite of impressive growth performance, Bangladesh ranked 10th as of 2017 among the 11 countries included in Table 3.

Table 4 reflects the performance of Bangladesh compared to the top 10 and the bottom 10 IDI scorers of the world as of 2017. The average IDI score of the top 10 countries is 8.64, which is almost 242% above Bangladesh; while the average IDI score of the bottom 10 countries is 2.03, which is around 25% below Bangladesh. This implies that as in the case of Network Readiness, in terms of ICT Development also, Bangladesh is still leaning towards the bottom belt of the world and although Bangladesh has achieved significant growth over the years, it still has a long way to go.

Table 4: Bangladesh Vs. Top 10 and Bottom 10 IDI Scorers of the World (2017)

Country	Rank (Out of 176)	Score (Out of 10)
Iceland	1	8.98
Korea (Rep.)	2	8.85
Switzerland	3	8.74
Denmark	4	8.71
United Kingdom	5	8.65
Hong Kong, China	6	8.61
Netherlands	7	8.49
Norway	8	8.47
Luxembourg	9	8.47
Japan	10	8.43
Bangladesh	147	2.53
Haiti	167	2.37
Ethiopia	168	2.35
Kiribati	169	2.32
Madagascar	170	2.29
Malawi	171	2.18
Burundi	172	2.14
Chad	173	2.01
Congo (Dem. Rep.)	174	1.68
Central African Rep.	175	1.57
Eritrea	176	1.38

Source: Measuring the Information Society Report (2017)

2.3 E-Government Development Index (EGDI)

The E-Government Development Index (EGDI), a composite index based on the weighted average of three normalized indices,⁸ is widely used to evaluate e-government development at the national level. (United Nations E-Government Survey Report, 2018)

The EGDI data is available for every other year for the period 2010-2018. Table 5 shows the position of Bangladesh in terms of EGDI rank and score relative to 10 of its closest neighbors. As of 2018, Bangladesh ranked 115th out of 193 countries with an EGDI score of 0.49. Between 2010 and 2018, Bangladesh moved up 19 places in ranking and registered the second highest EGDI growth of 63.3% among the 11 countries included in Table 5. During this period, Nepal registered the highest EGDI growth of 80.8%, moving up 36 places in ranking; while India achieved the third highest growth of 58.3% moving up 23 places in ranking. Among the 11 countries included in Table 5, Bangladesh ranked 8th as of 2018.

Table 5: E-Government Development Index Rank and Score

Country	Rank (Out of 193)					Score (Out of 1)				
	2010	2012	2014	2016	2018	2010	2012	2014	2016	2018
Singapore	11	10	3	4	7	0.75	0.85	0.91	0.88	0.88
Malaysia	32	40	52	60	48	0.61	0.67	0.61	0.62	0.72
China	72	78	70	63	65	0.47	0.54	0.55	0.61	0.68
Thailand	76	92	102	77	73	0.47	0.51	0.46	0.55	0.65
Viet Nam	90	83	99	89	88	0.45	0.52	0.47	0.51	0.59
India	119	125	118	107	96	0.36	0.38	0.38	0.46	0.57
Indonesia	109	97	106	116	107	0.40	0.49	0.45	0.45	0.53
Bangladesh	134	150	148	124	115	0.30	0.30	0.28	0.38	0.49
Nepal	153	164	165	135	117	0.26	0.27	0.23	0.35	0.47
Pakistan	146	156	158	159	148	0.28	0.28	0.26	0.26	0.36
Myanmar	141	160	175	169	157	0.28	0.27	0.19	0.24	0.33

Source: United Nations E-Government Survey (2018)

It is important to note that among the three indices that make up the EGDI, Bangladesh registered the highest score in online service delivery (0.78 as opposed to 0.20 in telecommunication infrastructure and 0.48 in human capital index). Chowdhury (2018) commented “Bangladesh has progressed in the online service delivery index mainly because of creating different online services using ICT as a tool and presenting them through mobile or web app”. According to Banglanews24 (2018) the State minister for ICT remarked “At present we are able to provide 40 percent services online. At present we have 5,272 digital information centers at union level where around 60,000 people can have access to services. Almost 250 services are available online. The government is gradually working towards providing 90 percent of government services online by 2021”.

⁸ According to the United Nations E-Government Survey Report (2018), these equally weighted (one-third each) indices are as follows. 1. *Telecommunications Infrastructure Index (TII)*: It is constructed on the basis of data provided by the International Telecommunications Union (ITU) 2. *Human Capital Index (HCI)*: It is constructed on the basis of data provided by the UN Educational, Scientific and Cultural Organization (UNESCO); and 3. *Online Service Index (OSI)*: It is constructed on the basis of data collected from an independent survey questionnaire, conducted by UNDESA, which assesses the national online presence of all 193 United Nations Member States.

Table 6 reflects the performance of Bangladesh compared to the top 10 and the bottom 10 EGDI scorers of the world as of 2018. The average EGDI score of the top 10 countries is 0.89, which is almost 82% above Bangladesh; while the average EGDI score of the bottom 10 countries is 0.16, which is around 206% below Bangladesh. From this, it seems quite evident that in terms of relative performance, compared to NRI and IDI, Bangladesh is doing much better in terms of EGDI.

Overall, the cross-country analysis reveals that regardless of making noteworthy progress over the last few years, Bangladesh still lags behind compared to the rest of the world. These findings are somewhat similar to what Rahman (2015) reported in an opinion piece published in the Daily Star.⁹

Table 6: Bangladesh Vs. Top 10 and Bottom 10 EGDI Scorers of the World

Country	Rank (Out of 193)	Score (Out of 1)
Denmark	1	0.92
Australia	2	0.91
South Korea	3	0.90
United Kingdom	4	0.90
Sweden	5	0.89
Finland	6	0.88
Singapore	7	0.88
New Zealand	8	0.88
France	9	0.88
Japan	10	0.88
Bangladesh	115	0.49
Equatorial Guinea	184	0.23
Dem. People's Rep. of Korea	185	0.22
Yemen	186	0.22
Guinea-Bissau	187	0.19
Central African Republic	188	0.16
Eritrea	189	0.13
Chad	190	0.13
South Sudan	191	0.12
Niger	192	0.11
Somalia	193	0.06

Source: United Nations E-Government Survey (2018)

⁹ He remarked, "In spite of mentionable achievements in the recent past, our position as providers and users of ICT services is far behind many countries. This can be explained by the benchmarking indices of responsible international organizations like the United Nations, World Economic Forum, International Telecommunication Union, etc."

3. Digital Startup Ecosystem of Bangladesh

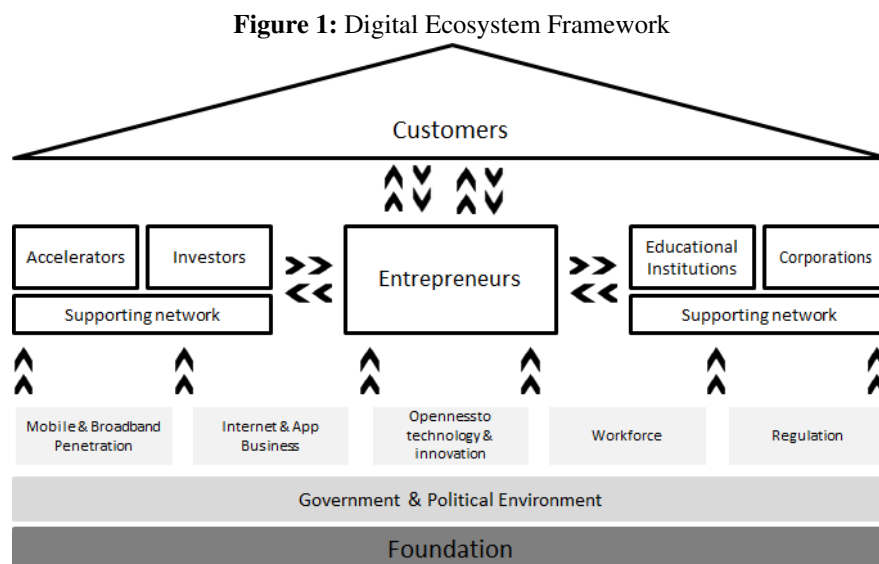
In a very recently published Forbes article, Saleh¹⁰ (2018) pointed out that Ant Financial buying a 49% stake in bKash and an online grocery supplier Chaldal raising \$3 million from IFC are stories coming from an unlikely source: Bangladesh. This section is all about startups in Bangladesh. We will look at the digital startup ecosystem of Bangladesh from a bird's eye perspective and also dive deep into some of the most concentrated verticals of the ecosystem.

3.1 What is a Digital Ecosystem?

Nachira et al. (2002) claim that the concept of digital ecosystem emerged in Europe in the year 2002 as an innovative approach to support the adoption of ICT. They define digital ecosystem as self-organizing digital infrastructure aimed at creating a digital environment for networked organizations that supports the cooperation, the knowledge sharing, the development of open and adaptive technologies and evolutionary business models. The key players of this ecosystem were highlighted as: 1. Innovation centers - research and education organizations, 2. Small and large enterprises with their associations, and 3. local government and public administration.

3.2 The Digital Ecosystem and the Evolution of a Startup

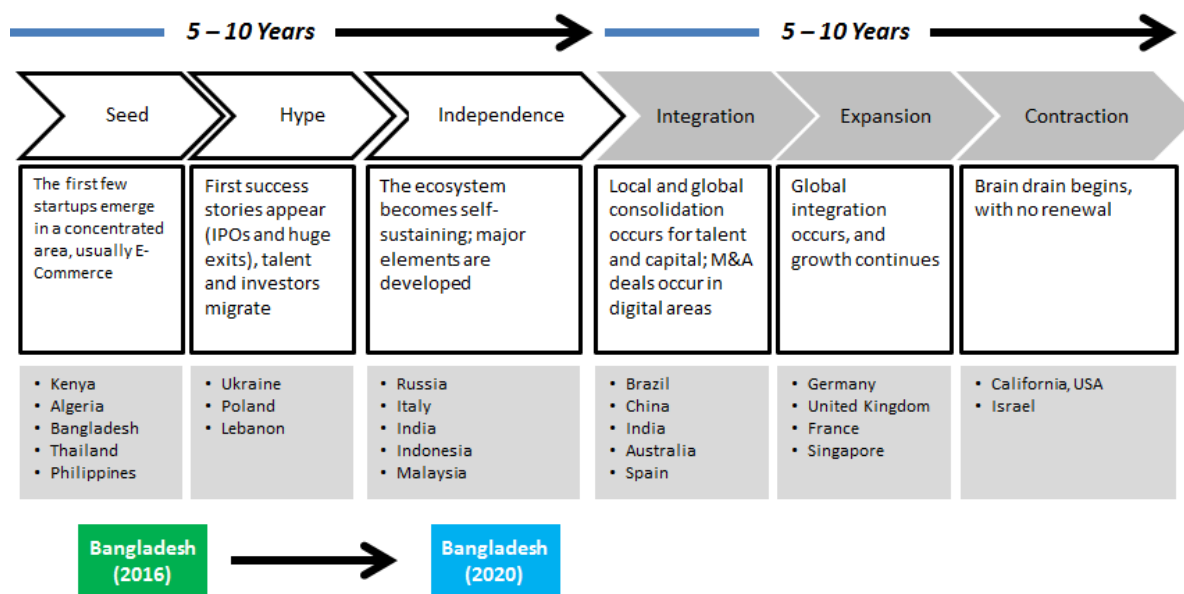
A digital ecosystem framework proposed by Grabowski et al. (2018) supports the claims made by Nachira et al. (2002). The framework outlines the importance of having a solid foundation with the government and political environment at the core. 5 core enablers are mobile and broadband penetration, internet and app business, openness to technology and innovation, workforce, and regulation while the supporting network of accelerators, investors, educational institutions and corporations fire up the entrepreneurs to deliver value to the customers and reap returns in exchange.



Source: Grabowski et al. (2018)

Figure 2: Evolution of a Startup

¹⁰ Fahim Saleh is one of the founders of Pathao, one of the highest valued startups in Bangladesh.



Source: Grabowski et al. (2018)

Grabowski et al. (2018) also propose a framework that explains the evolution of a startup. As elaborated in Figure 2, in the first 5-10 years, a startup blossoms from seed to hype to independence stage, while in the next 5-10 years, the trajectory follows integration, expansion and contraction. Currently the startups in Bangladesh are in the Seed stage and are estimated to travel towards an independent stage by 2020.

3.3 Defining a Successful Digital Startup in the Context of Bangladesh

According to Roure and Maidique (1986), a tech startup company is successful if it has been incorporated for more than three years, has reached a sales level of over US \$20 million, and has achieved greater than 5% after-tax profit margin on sales. They consider a venture to be unsuccessful if it has been discontinued within five years of its initial funding or never reached \$3 million in sales during the same period. Seborá et al. (2008) on the other hand took a different approach and asked e-commerce entrepreneurs to define their own critical success factors. The respondents were asked to indicate the success of their businesses with respect to growth rate, sales volume, business stability, customer acceptance, and overall personal satisfaction.

Taking cue from Seborá et al. (2008), we interview 6 startup ecosystem experts of our country and ask them to redefine the success criteria of Roure and Maidique (1986) in the context of Bangladesh.¹¹ Table 7 presents their definitions of a successful tech startup in the context of Bangladesh.

Table 7: Definition of a successful startup in the context of Bangladesh: views of startup ecosystem experts

Name	Affiliation	Definition of a successful tech startup in the context of Bangladesh
Mustafizur Rahman	CEO and Founder, Startup Dhaka	A startup is successful if it has been incorporated for more than 3 years and has achieved around 30%-40% of paying base of the total user base.
Sajid Rahman	CEO, Telenor Health	A startup is successful if it has been incorporated for more than 3 years and has registered an annual revenue of US \$1 million.

¹¹ All 6 experts shared that the factors recommended by Roure and Maidique (1986) require to be modified to cater to the local context. Especially, considering that the Bangladesh startup ecosystem is at its nascent stage.

Adnan Halim	CEO and Founder, Sheba.xyz	A startup is successful if it has been incorporated for more than 5 years, has registered annual revenue of US \$10 million, and has achieved operational breakeven.
Minhaz Anwar	CEO and Founder, Betterstories	A startup is successful if it has been incorporated for more than 2 years, has registered a lifetime revenue level of US\$ 10 million, and has achieved continuous growth in revenue.
Bijon Islam	CEO and Founder, LightCastle Partners	A startup is successful if it has been incorporated for more than 3 years, has registered an annual revenue of US\$ 300,000+, has achieved 10%-20% after tax profit margin on sales, has registered yearly growth in revenue and has a growth game plan in place.
Hussain M Elius	CEO and Founder, Pathao	A startup is successful if it has achieved monthly user base growth rate of 20%+ for more than 12 months and has a clear path to profit – not a particular number, but clarity regarding how to get there. ¹²

3.4 The Digital Workforce

More than 200 startups are born in Bangladesh every year making the total number of startups to an estimated 1,000+ by the end of 2016. As of 2018, it is estimated to be around 1400+. Almost 90% of the tech startups are based out of Dhaka (Imran, 2017). Bangladesh has a large supply of low-cost IT professionals with an estimated base of 45,000 software developers (3 out of 10,000 as opposed to 17 in India) who are skilled in IT. Around 1500 IT and IT-enabled service (ITES) companies are in operations employing 70,000+ people. 40% of these companies are exporting their services, while around 2/3rd of the firms employ 30 people or less and have annual revenue of less than US\$650,000. Contributing to the rapid economic growth, Bangladesh's domestic ICT service market is generating US\$475 million annually. It is important to note that more than two-third of the startup founders have professional background, around 40% having startup experience and over 70% speak English fluently (Grabowski et al., 2018). There were more than 650,000 freelancers (that too only on Upwork) who earned more than \$21 million in 2013, a number that has only gone up since then (Chowdhury, 2017).

Bangladesh's progress in outsourcing has also been noteworthy. With 500 business process outsourcing (BPO) centers planned, Bangladesh is the 7th most popular outsourcing destination in the world for ICT products. Currently, Bangladesh is ranked 3rd in Odesk. The outsourcing industry is expected to generate a total of 200,000 jobs annually from 2021. A.T. Kearney also ranked Bangladesh in the 22nd position in their Global Service Location Index (GSLI) in 2016. Target export earnings are expected to go up from US \$1 billion in 2018 to US \$5 billion by 2021 (Center for Research and Information, 2017).

Shinkai and Hossain (2011) analyzed productivity and performance of the country's IT sector based on a survey of 202 firms of various sizes and assessed the impact of global financial crisis on the ICT sector. They found that the negative impact of the crisis reflected on the sector in 2007 but most firms seemed to recover in 2008, indicating the inherent strength of the sector in terms of productivity and efficiency. They also observed that e-governance activities contributed to total productivity of the firms that are more than 5 years old.

¹² Hussain M Elius has completely different views compared to others. He adds that factors recommended by Roure and Maidique (1986) are not applicable for Bangladesh and widely in general for tech startups, as even Facebook, Google didn't make money in their first 3 years of operation. He also suggests that higher profit margin doesn't necessarily define success citing the case of Uber which operates at a -2% margin, while Walmart's margin is a mere 1%. He further comments that scaled services at lower margins are sustainable.

Hossain et al. (2011) used firm-level data from India and Bangladesh and found Indian firms to be more mature than the ones in Bangladesh. While Indian firms focus on sophisticated products such as software, Bangladeshi firms mainly deal with IT enabled services (ITES) such as enterprise resource planning (ERP), business process etc. Such differences in product specialization are largely due to differences in the human capital base. They also identified that although cross-border production/distribution networks between Bangladesh and India as well as India and other SAARC countries are almost non-existent, horizontal integration such as networking with other IT firms, forming alliance with big IT firms and clustering within the country are very important for greater market access as well as for increased profitability. While such horizontal integration is very strong in India, it is weak in Bangladesh. They have recommended that for further development of the industry as well as to provide more value added services, firms in this region should follow the Global Delivery Models (GDMs) of Indian firms. On the other hand, Indian IT firms can focus on Bangladesh and other SAARC countries to open up their delivery centers/subsidiaries to take advantage of low-cost IT professionals in this region.

3.5 Startup Ecosystem Composition

The composition of the startups in the digital ecosystem of Bangladesh is presented in Table 8. According to Grabowski et.al. (2018), a total of 190 startups that were more than 12 months old were operating in Bangladesh in 2016. The concentrations are quite evident with E-Commerce and Delivery having the highest number of startups followed by Other (Software related), Marketplaces, E-learning and Content (video, music and games). 81% of the startups were dedicated to local projects. Among all the digital segments, SaaS and IaaS startups have the largest portion of international clients followed by startups engaged in Content (video, music and games) providing services with almost 50% of their projects dedicated to Global clients.

Table 8: Composition of Startups in the digital ecosystem of Bangladesh

	Total No. of Startups	Portion of Work dedicated to local projects (%)
Services		
E-Commerce and delivery	42	93%
E-transportation	10	100%
E-health	9	89%
E-learning	17	76%
E-finance	5	80%
E-travel	6	83%
Classifiers	9	89%
Communication and social platforms	5	100%
Content (video, music, games)	13	54%
SaaS and IaaS	2	50%
Other (software-related)	35	69%
Transaction platforms		
Payment platforms	2	100%
Advertising and big data	11	82%
Marketplaces (many-to-many)	19	84%
Internet of things		
Smart homes	-	-
Smart industry	5	60%
Total	190	81%

Source: Grabowski et.al. (2018)

More than 80% of the startups are replicating established models and not globally scalable. This reflects the great need for localized digital services, especially since the global players haven't yet penetrated the local markets with the exception of Uber – which is currently dominating the ride-sharing vertical; however local players like Pathao are giving them a very stiff competition, and in some cases winning the battle. Of the 1,000 startups launched in 2016 – around 60% are in idea stage, while 30% are in launch stage and the remaining 10% are in sales stage. Startups by customer segments are broken down into 55% catering to only B2C, 23% to B2B and 22% catering to both. (Grabowski et.al, 2018)

3.6 Deep-dives into the Digital Ecosystem Subsectors

In this sector, we dive deep into the top 5 most concentrated sectors of the ecosystem: Software and App Developers (IT and ITES), E-Commerce, E-Learning, Content (Video, Music and Games) and Ride-Sharing. The concentrated sectors also reflect the most pressing needs of the customers in Bangladesh as suggested by Imran (2017).

Table 9.1: Industry Deep Dives - Software and IT Service and E-Commerce

	Software and IT Service	E-Commerce
Inception Year	Late 1990s	Late 1990s
No. of Players	<ol style="list-style-type: none"> No. of registered ICT Companies: 4,500+ No. of BASIS Member Companies: 1,031 	<ol style="list-style-type: none"> E-Commerce: 2,500+ (50 Active) F-Commerce: 10,000+
Key Products/ Services/ Platforms	<ol style="list-style-type: none"> Customized Software development IT Enabled Services E-Commerce/ Web services Mobile Application Development and Maintenance Product Company 	<ol style="list-style-type: none"> Online Marketplace Online Grocery Lifestyle Shopping B2B Ticketing
Major Players	<ol style="list-style-type: none"> Tiger IT Datasoft Brainstation 23 Dream71 Kaz Software 	<ol style="list-style-type: none"> Chaldal.com Daraz Ajkerdeal.com Rokomari.com Shohoz.com
Associations	Bangladesh Association of Software and Information Services (BASIS)	E-Commerce Association of Bangladesh (E-Cab)
Industry/ Market Size	<ol style="list-style-type: none"> Local market size for ICT sector in 2017 was US\$ 1.18 billion. Revenue of Software and ITES Industry (2017) - US\$800 million Revenue of Software and ITES Industry (2014) - US\$600 million 	<ol style="list-style-type: none"> 2017 - US\$ 110-115 million 2016 - US\$ 65-70 million
Key Notes	<ol style="list-style-type: none"> Over the last few years there has been a consistent growth (20-30%) in this market. Industry revenue proportion is split into: ITES 44% and Software 56%. 300,000+ total human resources employed in the industry. Leveraging ICT for Growth, Employment and Governance (LICT) Project will train a total of 75,000+ Youth over next three years and Under the Skills for Employment Investment Program (SEIP), total 1.25 million Youth to be trained by 2021. 70% of the IT companies are involved in development and maintenance of software for their clients. 	<ol style="list-style-type: none"> Annual Growth of the market size from 2016-17 is 65%+. 2 million People purchase product online. 10,000 E-Commerce transactions take place daily during the year. Cash-on-delivery is the most commonly used payment method in Bangladesh, accounting for 95 percent of E-Commerce transactions. After Cash on delivery, bKash is the most preferred payment method for E-Commerce followed by Rocket. Dhaka, Chittagong and Gazipur contribute to 80% of the total shoppers. Dhaka draws 35%, Chittagong, 29% and Gazipur 15%.

Source: Orbitinformatics (2017), Karim and Qi (2017), Source BASIS (2018), and IDLC Monthly Business Review (2018)

The industry deep-dives reported in Tables 9.1, 9.2 and 9.3 look to answer some of the most critical questions regarding understanding the market. The questions range from inception

year, number of players, major players, and key services/products delivered, associations, industry / market size and some key notes. The key notes mainly cover notes accumulated from various relevant sources and range from annual market growth, profit distribution across service portfolio, resources employed, major activities, customer profile and behavior to key metric performance, major initiatives, core industry problems and some additional key facts and figures.

Table 9.2: Industry Deep Dives - E-Learning and Content

Industry	E-Learning	Content (Video, Music and Games)
Inception Year	Mid 2010s	Mid 2010s
No. of Players	17	13
Key Products/ Services/ Platforms	<ol style="list-style-type: none"> 1. Online academic syllabus of the Bangladesh schooling system (Class 1-12) 2. University Admission Courses 3. Skill Course 4. Employee Training and Development 	<ol style="list-style-type: none"> 1. Music Streaming and Offline Downloads 2. Live TV and Video-on-Demand 3. Mobile Games
Major Players	<ol style="list-style-type: none"> 1. Shikkhok Batayon (Teachers.gov.bd) 2. 10 Minute School 3. Lekha Pora BD 4. Repto 5. Durbin Academy 	<ol style="list-style-type: none"> 1. Youtube 2. WowBox 3. Bioscope 4. BongoBD 5. Mindfisher Games
Industry/Market Size	<ol style="list-style-type: none"> 1. Class V-XII Students' Market Size: BDT 5,000 Crores. 2. Online Courses and Corporate Training: US\$ 122 million. 	Bangladesh's total ad market size is BDT 1500-1600 Crore/Year.
Key Notes	<ol style="list-style-type: none"> 1. Access to information (a2i) launched Multimedia Classroom. There are now more than 38,000 multimedia classrooms, of which 23,000 are in secondary schools and over 15,000 at the primary level, with more in the pipeline. 2. a2i has launched an e-learning platform, MuktoPaath, for skills development. 3. JAAGO Foundation in collaboration with Grameenphone Ltd and Agni Systems Ltd introduced the concept of Online School in Bangladesh. 4. Banglalink has launched three education services – Education Portal, MegaMind and MEDU. 	<ol style="list-style-type: none"> 1. Music piracy in Bangladesh currently costs the industry \$180m (nearly BDT14bn) in lost earnings, with only 5%-10% of the total market consisting of legal music purchases. 2. TV used to be the number 1 pastime priority of mass youth; as of 2017, 84% of urban youth moved from TV to digital content watching. 3. 89.82% of all internet users in Bangladesh visit Facebook while 4.97% visit YouTube. 4. 70% of the most played games in Bangladesh are casual games. 5. Bioscope - the leading Live TV and VOD platform of Bangladesh has a monthly active user base of around 2.5 million.

Source: The Deshi Guide (2017), Grabowski et al. (2018), and Statscounter (2018)

Table 9.3: Industry Deep Dives - Ride-sharing

Ride-Sharing	
Inception Year	Mid 2010s
No. of Players	10
Key Products/ Services/ Platforms	1. Car on demand 2. Motorbike on demand 3. Taxi on demand 4. Food-delivery
Major Players	1. Uber 2. Pathao 3. Shohoz Rides 4. Obhai 5. Taxiwala
Industry/Market Size	BDT 2,200 crore, yearly
Key Notes	1. Average traffic speed of only 7kmph—slightly above the average walking speed 2. Currently the population density of Dhaka stands at 50,001 people per square mile, which is considerably larger than other major cities in Asia. 3. There are close to 3,042,853 licensed vehicles currently operating in the country, and officials estimate about 40-50% of these operating in Dhaka city alone. 4. Base fare of the ride-sharing services range from BDT 25-85, Cost per minute from BDT 0.5-4.25 and Cost/KM ranges from BDT 12-34. 5. As of November 2017, an estimated 500,000 commuters have opted to avail ride-hailing on cars and bikes via apps - also known as e-hailing.

Source: Ullah (2017), Grabowski et al. (2018), ILDC Monthly Business Review (2018)

3.7 Supporting Network of the Digital Ecosystem

In this part of the paper, we look into the supporting network of the digital ecosystem of Bangladesh, i.e., how the incubators, accelerators, investors, educational institutions, corporations and the government are enabling the digital entrepreneurs to serve the customers.

The first pillar of the supporting network includes the incubators, accelerators and the co-working spaces. Considering the nascent nature of the digital ecosystem, this component of the support network is growing quite fast. A small but growing component comprises of 4-6 incubators, 6-8 accelerators and 10+ co-working spaces. Startup incubator of Janata Tower (STP), BRAC Urban Innovation Challenge and Banglalink IT incubator are some of the leading incubators, while ICT Division - iDEA accelerator, Grameenphone (GP) accelerator, Spark accelerator are some of the notable accelerators. HubDhaka, Moar and inHouse are some of the most active co-working spaces. A mix of government initiatives, corporations and independent ecosystem enablers, most of which revolve around the capital city, build up this network. The differences between incubators and accelerators, quite nicely articulated by Zamal (2017), are summarized in Table 10.

Table 10: Defining Incubators and Accelerators

	Duration	Cohorts	Business Model	Selection	Venture Stage	Education	Mentorship	Venture Location
Incubators	1-5 Years	No	Rent; Non-Profit	Noncompetitive	Early/Initial	Ad-hoc, HR, Legal	Minimal, Tactical	On-site
Accelerators	3-6 Months	Yes	Investment (Can also be grant-based-non-profit)	Competitive, Cyclical	Early	Seminar	Intense, by self and others	On-site

Source: Zamal (2017)

The accelerators are the most crucial component of this network. GP accelerator, a startup ecosystem enabling initiative by Grameenphone launched in 2015 and since then has accelerated over 30 startups. GP accelerator model reflects the description above. The program enrolls a seasonal cohort of 5-6 startups, some of which (e.g., Sheba.xyz, Repto and BankCompare BD) are serving hundreds and thousands of customers already.

Events surrounding the startup theme also surface on a regular basis in the ecosystem. The first of its kind was held in 2016, called Innovation Xtreme, organized by Startup Dhaka and Grameenphone – two of the most active startup ecosystem enablers of the country. Events such as these bring together startup founders, investors and ecosystem enablers. BetterStories, Aavishkar and the Embassy of Netherlands organized the StartUp Cup, a nationwide entrepreneurship competition, which attracted more than 400 applications in 2015. Digital World is the flagship 3-day long ICT festival hosted by the Ministry of ICT, Bangladesh. (Grabowski et.al, 2018)

One of the biggest commitments of the Government was establishing Startup Bangladesh – iDEA (innovation, Design and Entrepreneurship Academy) Project. In a Startup Dhaka (2017) interview, Md. Abdul Bari, personal secretary of Bangladesh ICT minister remarked, “The startup culture in Bangladesh is yet very new. To take the Bangladeshi startups to the international level, the entire ecosystem needs to be organized. To bring that ecosystem together, ‘Idea project’ is initiated by the ICT ministry.” According to Islam (2018), under project iDEA, the Government is set to invest in 200+ startups. In 2017, a fund of BDT 8,000 crores (US\$ 100 million) was created to nurture innovative ideas on education, agriculture, health, financial services, e-commerce, e-governance and some other service sectors. While the government has already shortlisted four start-ups in which it wants to take a portion of equity in exchange for BDT 5-10 crore (the start-ups are: Maya Apa, Sheba.xyz, HungryNaki and Augmedix), 37 Startups have already received funding. (Akbar, 2017)

Grabowski et.al (2018) stated that from 2012 to 2016, there have been only 18 disclosed venture capital investments in Bangladesh-based start-ups, worth a total of US\$68 million with almost all of them being seed deals and majority investing in ecommerce or fintech. Venture Capital (VC), bank loans and other funding facilities have been identified as the key bottlenecks in the entrepreneurial ecosystem of Bangladesh. 85%+ startup founders have commented that it is very difficult or almost impossible to secure VC or Bank Finance. Most founders use saved up capital and borrow from friends and family or bootstrap¹³. None of the 6-10 local

¹³ As suggested by Campbell (2018), Bootstrapping is the act of starting a business with no money or very little money. It certainly means starting a business without the help of VC firms or even significant angel investment. According to Bhide (1992), “Bootstrapping in a startup is like zero inventories in a just-in-time system”. This

Private Equity (PE)/VC firms specialize in seed funding. Some of the most notable VC firms in the country are IPE Capital, BD Venture Limited and Fenox Capital.

According to Hossain (2018), “Financial institutions, especially banks, have sufficient liquidity but they are reluctant to invest in these funds as it is perceived as a risky investment. Both institutions and individual investors are in 'testing the water' phase instead of putting their money in any VC fund.” A Future Startup (2018) article attributed the shortage in the supply of VC investments to the very small number of active VC firms. Also, more often than not, VC firms prefer to invest in the later stages of a startup. Considering the nascent nature of most startups, VC investment remains low in the Startup ecosystem. However, compared to 2015, investments in startups have increased in recent times. With corporate accelerators, government funding, angel investing and more committed VC firms, the startup founders have secured better deals compared to before.

The “Alternative Investment Fund” declaration by the Bangladesh Securities and Exchange Commission has been one of the key catalysts in the investment industry. According to the Bangladesh Securities and Exchange Commission (BSEC) Alternative Investment Rules (AIR) 2015, the fund has to be operated by a fund manager, registered with the BSEC to raise capital from local and Non-Resident Bangladeshi (NRB) investors. Under the Trust Act 1882, a registered trustee will have to act on behalf of the unit holders, also receive subscription payments for the units from the investors and deposit the money received for the fund in a specified bank account. BDT 100 million is the minimum size of the draft and the initial subscription by the donors has to be 10%+ of the total fund. From the total amount raised, at least 75% will be invested in non-listed securities, so as to fulfill the objective of promoting private firms in their early stages and the rest of the fund can be invested in listed securities and units of alternative funds managed by other fund managers. The lifetime of the fund can be 15 years and be locked for 3 years from the date of issuance of the units. (Khan, 2015)

According to Center for Research and Information (2017), the government has established the following incentives for digital industry investors: 12 Years Tax exemption for developers; 10 years' tax exemption for IT/ITES companies; no VAT on e-commerce; 100% foreign ownership and profit repatriation; duty free vehicle import; and duty free import of capital machineries.

According to Mahbub (2016a), some of the noteworthy investment cases in the digital ecosystem in Bangladesh are as follows: *bKash* started as a joint-venture (JV) between BRAC Bank Limited, Bangladesh and Money in Motion LLC, USA, raising its first equity investment from IFC, then a US\$ 11 million from Bill and Melinda Gates Foundation, finally having Ant Financial (Alipay) acquiring 20%; *Chaldal* raised investments from Y Combinator, 500 Startups, Mohammed Adnan Imam, Tanveer Ali, Sajid Islam and a host of angel investors in Dhaka, with the latest round being US\$ 3 million from IFC; *Pathao* raised over US\$ 10 million from NSI Ventures, Osiris Group and Battery Road Digital Holdings (Russell, 2018); *Sure Cash* raised US \$7 million from Osiris Group; *Doctorola* raised BDT 20 million from BD Venture; and *Handymama* raised US\$ 15,000 from Fenox Venture Capital.

One of the first exits in the industry by a VC firm, BD Venture was announced early last year in a Future Startup (2018) article. BD Venture successfully exited from EON Food, one of its

implies efficient management of finances and inventories, optimization of working capital and reinvesting profits to continue business operations.

earliest portfolio companies, having invested BDT 20 million in 2014. The company said it has turned profitable and the exit has happened because EON has decided to buy back its shares from BD Venture. Although, the return is undisclosed, this will certainly encourage more investments in local startups, improve overall confidence in the market and make it easier for local VCs to raise investment.

Apart from institutional financing, angel investors also play a critical role in the ecosystem, especially, after the announcement of the AIR (2015). According to Mahbub (2016b), there are approximately just over 100 Angel Investors in Bangladesh.¹⁴ The announcement of the pioneering Angel Network, “Bangladesh Angels” mark a noteworthy milestone of the ecosystem.¹⁵ The network will have its first closed-door session between vetted start-ups and investors in January 2019. (The Daily Star, 2018)

According to a report by Centre for Research and Information (2017), in order to expedite the digitalization of the country, the Government of Bangladesh has brought 930 unions under optical fiber connectivity by installing 7,154 KM optical fiber. Under a further mega project, the Government aims to extend optical fiber link to 2,225 unions between January 2017 and December 2020. By the end of 2019, Bangladesh will hook up to the EA-ME-WE-5 and joining (the second submarine cable) to ensure uninterrupted internet connectivity. According to the project paper, the 25,000-kilometre cables would be installed under sea from Singapore to Bangladesh at a cost of US\$ 84.7 million. The second submarine cable will ensure that Bangladesh remains connected to the ICT highway if the –first one gets cut off for any reason. Bangladesh will have 1300 GBPS bandwidth at its disposal and connection to the second submarine cable will facilitate 4G services.

Another important part of the ecosystem support network is the educational institutions. Grabowski et al. (2018) remarked, “collaboration between universities and industry helps businesses innovate, adapt to change, and become more globally competitive. It can also help universities fund more research and commercialize their innovations. Bangladesh appears to be held back by a low level of collaboration between the higher-education sector and business; outdated university curriculums and technologies; as well as a shortage of qualified professors and teachers.” Even after having 90 private universities (half of which has ICT facilities) and 70 public universities in the country, more than 70% of the startup founders interviewed suggest that universities do not provide high-quality IT education. Perhaps the most glaring gap is the failure of technical faculties to include marketing and business courses in their curriculums. Many start-ups are unsatisfied with the quality of Engineering, IT and English education currently provided by the universities in Bangladesh. This aspect of the support

¹⁴ Some of the most notable angel investors of the country are: *Sajid Rahman*: The newly appointed CEO of Telenor Health; a prolific investor having investment in famous Silicon Valley startups like Classpass, uBeam, Shyp, Bluesmart and more; *Tanveer Ali*: One the most active startup investors having investment in GandR, Gateguru [exited], Chaldal.com, Mattermark, and more; *Nash Islam*: Former CEO of GandR and founder of Vallie; a prolific investor having investment in Vidcaster, TigerTrade, Backpack and few more; *Mohammed Adnan Imam*: One of most active investors in Dhaka having investment in IPE Capital, NRBC Bank, Inflection Ventures, Genex, GandR, Chaldal, backpack and few more in Bangladesh, UK and Silicon Valley; *Mustafizur Rahman*: CEO and Founder of the most active startup ecosystem enabler – Startup Dhaka and holds shares in 30+ startups accelerated by GP Accelerator and Startup Dhaka

¹⁵ The governing board includes eminent stakeholders such as Minhaz Anwar (CEO, Betterstories), Samad Miraly (Cofounder, Startup Dhaka), Tina Jabeen (Investment Advisor, Startup Bangladesh, ICT Division), Sajid Rahman (CEO, Telenor Health) and Sanchayan Chakraborty (Partner, Aavishkaar).

network is the weakest in the ecosystem and requires significant attention for development. (Grabowski et al., 2018)

3.8 A snapshot of the Tech Startup Ecosystems of Bangladesh and its Neighbors

To understand how the Digital Ecosystem of Bangladesh fares against 10 of its closest neighbors, we provide a snapshot of the startup ecosystems in all 11 countries featuring some key indicators in Tables 11.1 and 11.2.

Considering the fact that the Digital Startup Ecosystem of Bangladesh is at its nascent stage, there have been an influx of startups over the past few years. As is evident from Tables 11.1 and 11.2, in comparison to the closest neighbors, digital startup ecosystem in Bangladesh is similar in nature to that of Nepal and Myanmar. Although Bangladesh has significantly larger number of startups than these two countries, in terms of the other indicators, the countries are pretty similar. Even after being ahead of Pakistan in various Socio-Economic indicators, Bangladesh is lagging behind in several key tech startup indicators. China, India and Singapore are leading the Asian diaspora in terms of having the most advanced digital startup ecosystem.

3.9 Digital Society and the Digital Consumer Class

The end users of the digital products and services, i.e., the digital society and consumers are the final piece of the digital ecosystem puzzle of Bangladesh. As of 2017, Bangladesh has an estimated population of 165 million+; the median age of the population is 27.1 years, 36% reside in urban areas; PPP-adjusted yearly Real GDP per capita is US\$ 3,869; and the literacy rate is 62% (The World Bank Group, 2017).

According to We are Social and Hootsuite (2018) report, 137.2 million (83% penetration) people have mobile connections, 81.7 million people use the internet (49% penetration), 76.22 million use mobile internet and 30 million people use the social media (18% penetration). Between 2017 and 2018, the number of Internet users has increased by 29%, number of mobile connections has increased by 14%, while the number of active social media users has gone up by 15%. Share of Web traffic by device are as follows: Laptop and Desktops – 25% (Growth rate between 2017 and 2018 was 13%), Mobile Phones – 74% (Degrowth rate between 2017 and 2018 was 4%) and 1% Tablet Devices (Degrowth rate between 2017 and 2018 was 14%). 97% of the mobile users use prepaid connection, while the remaining 3% use postpaid and only 29% mobile connections are 3G-4G enabled. 31% of the population have a bank account; only 0.3% have credit cards; 3% make and/or receive mobile payments via GSMA; and only 0.4% make online purchases and/or pay bills online.

Alexa ranking of Top 5 most visited websites from Bangladesh in 2018 were: google, youtube, facebook, yahoo and kalerkantho. Magnito Digital (2018) – one of the country's fastest growing and largest digital marketing firms published the top google searches in 2018 by Bangladesh. The top 5 topics were: Cricbuzz, World Cup, SSC Result, HSC Result and Live Football. In the world of Social Media, among the 30 million active monthly users of Facebook, 74% are listed as male while the remaining 26% are female and over 93% are accessing Facebook via mobile phones. Total number of Instagram users is at 1.8 million with a Male:Female ratio of 75:25 (We are Social and Hootsuite, 2018).

Table 11.1: Emerging Asia Markets Startup Ecosystem Snapshot

Startup Ecosystem Indicators	Bangladesh	India	Pakistan	Nepal	Myanmar
No. of Startups	800 - 1000	40,000 - 60,000	1500+	250-300	150+
No. of Incubators	4-6	130+	25+	6-8	4-6
Notable Incubators	1. Startup Incubator of Janata Tower (STP) 2. BRAC Urban Innovation Challenge 3. Banglalink IT Incubator	1. Amity Innovation Incubator 2. AngelPrime 3. CIIE IIMA	1. Plan9 2. The Nest I/O 3. Lums Centre for Entrepreneurship	1. Kathmandu University Business Incubation Center 2. Yunus Social Business Center at King's College 3. Microsoft Innovation Center Nepal	1. UMG Idealab 2. Ideabox 3. Project Hub Yangon
No. of Accelerators	6-8	130+	10-12	5-7	4-6
Notable Accelerators	1. ICT Division - iDEA Accelerator 2. GP Accelerator 3. Spark Accelerator	1. 500 Startups 2. GSF Accelerator 3. 50k Accelerator	1. PlanX 2. Invest2Innovate (I2I) 3. Telenor Velocity	1. Rockstart Impact 2. Enterprise (Nepal Business Accelerator Program) 3. Women Rural Enterprises Accelerator Program	1. Phandeeyar Accelerator 2. Rockstart Impact Accelerator 3. Telenor Accelerator
Notable Accelerator Graduates	1. Sheba.xyz 2. BankCompareBD 3. Repto	1. Pricebaba 2. Pokkt 3. PeeSafe	1. Popinjay 2. 3RESTART 3. Eco Energy Finance	1. AeroRoots 2. Burger Shack 3. Green Road Waste Management	1. White Merak 2. Chate Sat 3. GOP
No. of Coworking Spaces	10+	350+	65+	12+	20+
Notable Coworking Spaces	1. HubDhaka 2. Moar 3. inHouse	1. Regus 2. WeWork 3. Springboard	1. DotZero 2. OfficeSpace.pk 3. Kickstart 2.0	1. Adda 2. Bikalpa Art Center 3. Clock B	1. Phandeeyar 2. Hintha Business Centers 3. Zayat
No. of Angel Investors	100+	6,000+	100+	100+	100+
Notable Angel Investors	1. Sajid Rahman 2. Tanveer Ali 3. Nash Islam 4. Mohammed Adnan Imam 5. Mustafizur Rahman	1. Binny Bansal 2. Rajan Anandan 3. Girish Mathrubootham 4. Kris Gopalakrishnan 5. Lakshmi Narayanan	1. Faisal Aftab 2. Raza Shaikh 3. Hassan Qureshi 4. Burak Buyukdemir 5. Yusuf Jan	1. Arun Chaudhary 2. Prakash Tiwari 3. Niraj Khanal 4. Mahesh Murthy 5. Ajeet Khurana	1. Mark Pui 2. James Chan 3. Patrick Kershaw 4. Sukhi Singh 5. Boyd Jones
No. of VC/PE Firms	20+	150+	15-20	10+	10+
Notable VC/PE Firms	1. IPE Capital 2. BD Venture Limited 3. Fenox Capital	1. Accel Partners 2. Sequoia Capital India 3. IDG Ventures	1. 10XC Seed Fund 2. Arazi Ventures (Pvt) Ltd. 3. Central Depository Company of Pakistan	1. One to Watch 2. Dolma Impact Fund 3. Business Oxygen	1. Delta Capital Myanmar 2. Anthem Asia 3. Myanmar Investments International Limited (MIL)
Notable Startups	1. bKash 2. Pathao 3. Chaldal.com	1. Flipkart 2. Ola 3. Paytm	1. Daraz 2. Rozee.pk 3. PakWheels	1. Sunfarmer 2. Cutesat 3. Honeyguide	1. Shwe Property 2. Chate Sat 3. World Wide Myanmar
Top 5 Concentrated Sectors	1. Software and IT Services 2. E-Commerce, Delivery and Classifiers 3. E-Learning 4. Content (Video, Music and Games) 5. E-Transportation	1. Enterprise Software 2. Marketplace 3. FinTech 4. HealthTech 5. EdTech	1. On-Demand Consumer Service 2. E-Commerce and Marketplaces 3. Software and IT Services 4. Content 5. E-Health	1. E-Travel 2. Marketplace 3. Software and IT Services 4. Content 5. E-Learning	1. Software and IT Services 2. Content 3. Marketplace 4. E-Travel 5. E-Learning

Sources: Morle (2014), Sareen (2014), Trautwein (2014), Mahbub (2016a, 2016b), Sijapati (2016), Chapagain (2017), Giri (2017), Grabowski et al. (2017), Nepal Entrepreneur's Hub (2017), Saaed (2017), Zamal (2017), Azhad (2018), Beyourownboss.pk (2018), Bhalla (2018), Bhat (2018), Grabowski et al. (2018), MYHQDigest (2018), Nasscom (2018), Navani (2018), Nitta (2018), Parajuli (2018), Reaz (2018), Sharma (2018), Sunuwar (2018)

Table 11.2: Emerging Asia Markets Startup Ecosystem Snapshot

Startup Ecosystem Indicators	Thailand	Malaysia	Vietnam	Indonesia	China	Singapore
Startups	500+	1200	3,000+	1,000+	100,000+	50,000+
Incubators	*Incubators and Accelerators are	* Incubators and Accelerators are	10+	15+	3,000+	100+

	considered the same in Thailand	considered the same in Malaysia				
Notable Incubators	-	-	1. Vietnam Silicon Valley Project 2. X-Incubator 3. 5Desire	1. Techbator 2. Batavia Incubator 3. Indigo Incubator	1. Innovation Works 2. Legendstar 3. Tsinghua Science Park	1. PayPal Innovation Lab Incubator 2. Unframed 3. NUS Enterprise Incubator
Accelerators	15+	20+	10+	10+	3000+	100+
Notable Accelerators	1. KrungsriRISE 2. AIS 3. dtac Accelerate	1. Selangor Accelerator Programme by SITEC 2. MaGIC Startup Accelerator 3. RAVE Accelerator by MyNEF	1. VIISA 2. Hatch! 3. Founder's Institute	1. Digitalaya 2. Plug and Play Accelerator 3. GnB Accelerator	1. Microsoft Accelerator Beijing 2. Chinaccelerator 3. Shanghai Valley	1. AirMaker 2. Entrepreneur First 3. The FinLab
Notable Accelerator Graduates	1. Baania 2. Stock Radar 3. Ricult	1. Homa 2. Kwikcar 3. Dropee	1. Wisepass 2. Monkey Junior 3. hiSella	1. Hijup 2. Pomelo 3. Jurnal	1. BEAM 2. Snapask 3. SMS Coupon	1. Docturnal 2. 42 Lab 3. Paykey
Coworking Spaces	120+	150+	100+	150+	4,000+	110+
Notable Coworking Spaces	1. Hangar 2. HUBBA Ekamai 3. Open House Central Embassy	1. WORQ TTDI 2. Co. Bangsar 3. Nook	1. CirCO Hoang Dieu - Coworking Space 2. Toong Coworking Space 3. BKHUP - UP Coworking Space	1. WeWork 2. Cocowork 3. Menara	1. SOHO 3Q 2. UR Work 3. Naked Hub	1. WeWork 2. The Great Room 3. JustCo
Angel Investors	100+	100+	100+	200+	10,000+	6,000+
Notable Angel Investors	1. Chatchaval Jiaravanon 2. Kris Nalamlieng 3. Pawoot Pongvitayapanu 4. Piyaphan Wongyara 5. Khailee Ng	1. Khailee Ng 2. Mark Pui 3. B. Paul Santos 4. Vinnie Lauria 5. Nic Lim	1. Jonah Levey 2. Dat Le Viet 3. Hung Dinh	1. Danny Oei Wirianto 2. Ben Soebiakto 3. Grace Tahir 4. Shinta Kamdani 5. Victor Funkon	1. Kaifu Lee 2. Xu Xiaoping (Bob Xu) 3. Cai Wensheng (Mike Cai) 4. Xue Manzi (Charles Xue) 5. Lei Jun	1. Paul Bragieli 2. JP Lee 3. Shuying Tang 4. Khailee Ng 5. Julien Mialaret
VC Firms	100+	90+	50+	20+	200+	150+
Notable VC/PE Firms	1. 500 Startups/Tuktuks 2. Inspire Ventures 3. Nvest Venture	1. Softbank Capital 2. Sequoia Capital 3. 500 Startups	1. IDG Ventures Vietnam 2. Monk's Hill Ventures 3. Dragon Capital	1. East Ventures 2. GDP Ventures 3. Venturra Capital	1. GSR Ventures 2. Sequoia Capital China 3. Matrix Partners	1. B Capital Group 2. Golden Gate Ventures 3. Jungle Ventures
Notable Startups	1. aCommerce 2. omise 3. Pomelo	1. iFlix 2. MOL (Money Online) 3. Carsome	1. VNG 2. tiki.vn 3. Foody.vn	1. Tokopedia 2. Bukalapak 3. GoJek	1. Ant Financial (Formerly Alipay) 2. Bytedance 3. Didi	1. Grab 2. Lazada 3. StarHub
Top 5 Concentrated Sectors	1. E-Commerce 2. Fintech 3. Logistics 4. Payments 5. Food and Restaurant	1. E-Commerce 2. Marketplace 3. Fintech 4. On-demand Services 5. Enterprise Software	1. Ecommerce 2. On Demand Services 3. Enterprise Solution 4. Fintech 5. E-Travel	1. E-Commerce and Marketplace 2. Fintech 3. E-Healthch 4. Software and IT 5. On Demand Services	1. Data and analytics 2. Fintech 3. Healthcare 4. Internet software and services 5. On-demand services	1. Consumer Digital 2. Enterprise Tech 3. FinTech 4. EdTech 5. HealthTech

Sources: Do (2015), Chopra (2016), Chopra (2017), Bhardwaj and Ruslim (2018), Das (2018), Fetalvero (2018), Garcia (2018), Huang (2018), Lee (2018), Manalastas (2018), Namjatturas (2018), Nanalyze (2018), Nikkei Asian Review (2018), Pagan Research (2018), Pham (2018), Poh (2018), Priscillayap (2018), Quek (2018), Sherman (2018), Sitec (2018), Startup SG Media Factsheet (2018), Tay (2018), Techsauce (2018), Umali (2018), Xinhua (2017), Yongjiranon (2018), Tech in Asia (2019)

3.10 Who are the Digital Consumers?

According to Rogers (1962) he digital consumers can be referred to as the adopters of technology. Reflecting on years of research, in his book "Diffusion of Innovation", he

categorized the adopters into innovators, early adopters, early majority, late majority, and laggards.¹⁶

According to a LightCastle Partners (2016) research, the concept of ‘digital consumerism’ is still evolving and the defining parameters are changing every day. The traits also change between countries, depending on the socio-economic and technological infrastructure. In order to understand the digital consumers of Bangladesh, they surveyed over 450 respondents in Dhaka, Chittagong and Sylhet – the three most developed markets in the country. Coming from emerging middle and the middle and affluent class (monthly income within USD 251-650 range) households, around 64.4% of these respondents are aged between 20 and 40 with 35% representation from the 20-30-year age bracket. In the context of today’s Bangladesh, LightCastle Partners (2016) classify the digital consumers of Bangladesh into 4 broad categories:

1. **Early Starters:** These are respondents who have just started looking into online platforms for making purchase decisions. 51% of the respondents are early starters. 26% of them are from Chittagong and the rest live in Dhaka.
2. **Digital Aspirants:** Concentrated in Dhaka, digital aspirants are one step closer to being truly digital. Around 19% of the respondents purchase low-cost items (clothing, baby products etc.) online and prefer cash on delivery as the primary payment option.
3. **Traditionalists:** 23% of the respondents receiving product information online are dependent on physical options for product evaluation and purchase/ payment. Living in Chittagong, Sylhet and the growing neighborhoods in Dhaka, they spend time online for communication purposes mostly.
4. **Connected Maestro:** Though roughly 7% of the respondent base, connected maestros have the highest potential to create an impact. Having 100% access to laptop and smartphones, this group also involves chief wage earners of the family preferring online/mobile payment for online purchases.

A couple of relevant key findings from the research are as follows:

- Frequency of E-Commerce Purchase: Daily (18%); Weekly (22%); Less than once per week (9%); Monthly (23%); Less than once per month (28%)
- 3 key Decision making factors for E-Commerce Services are: Home Delivery (ranked as no. 1 by 22%); Time and Convenience (ranked as no. 1 by 19%); Price (ranked as no. 1 by 14%)

¹⁶ *Innovators:* Rich, risk-tolerant individuals first to adopt technologies, even the ones that may fail; *Early adopters:* Financially solvent individuals who are more discreet and judicious in adoption choices than innovators; *Early Majority:* Individuals who adopt an innovation significantly later than the innovators and early adopters; *Late Majority:* Individuals who approach an innovation with a high degree of skepticism and adopt an innovation after the average participant; *Laggards:* Individuals with an aversion to change-agents and are the last to adopt an innovation. After synthesizing research from over 508 diffusion studies across the fields that initially influenced the theory, Rogers (1962) reported that about 2.5% of the consumers tend to be innovators, 13.5% tend to be early adopters, 34% tend to be early majority, 34% tend to be late majority, and 16% of the consumers tend to be laggards.

LightCastle Partners (2016) also compared the current trend for online purchase with intention to go digital in the future over different product categories and made the following predictions:

- In the near future, a significant portion of traditionalists and early starters are likely to shift from “see online and buy retail” trend and move to “Digital Aspirant” group for more than a couple of items.
- Digital market of consumer electronics and grocery items are likely to experience the highest growth rate in the near future.
- The growth rate in consumers seeking digitized food services remains more or less stagnant, which indicates a need for expanding business in emerging regions as a long-term business strategy.
- People seem to be interested to move online for purchasing/leasing home/apartment also. Traditional real estate businesses could take this into account while designing future business strategies.

While people in the urban areas are making their way into technology themselves, the rural population is getting significant facilitation by the government. Digital Centre – one of the largest innovations of a2i project serves as one-stop shop for the digital needs of the rural population. Chowdhury (2017) remarks that, “There are currently more than 5,000 one-stop digital centers throughout the country, which ensure that rural people, including women, people with disabilities, and the elderly, regardless of their literacy, computer skills, or location, have effective access to vital information and services. Digital centers have substantially reduced the average 20 km commute to the sub-district office and the 35 km journey to the district office.” These centers are run by “citizen entrepreneurs” jointly with locally elected representatives. Services include land records, birth registration, telemedicine, passport, and overseas job applications as well as mobile financial services, insurance, and online training. Translated into monetary terms, the digital centers have saved poor Bangladeshis more than US\$1 billion (Chowdhury, 2017). According to Center for Research and Information (2017), there are 4 million monthly users of the Digital Centers that are generating US \$0.6 million monthly income for local entrepreneurs.

As the digital consumer class of Bangladesh continues to mature, it is essential for the entire ecosystem to evolve accordingly. The evolution of the digital ecosystem needs to be governed by technology trends at the world stage. According to a Telenor Research (2019), the seven tech trends that will shape the world in 2019 are: 1. Deepfake¹⁷, 2. Artificial Intelligence, 3. 5G Network, 4. Industrial Internet of Things (IOT), 5. Voice Chatbots, 6. Change in consumer behavior: reduction in screen time and opting into simpler connectivity (For Example: Mobile-free meals with family and friends, mobile-free meetings, using flip-phones), and 7. Mobile driven green tech

4. Drivers of Growth, Challenges and Policy Recommendations

According to Gauthier (2018), “an ecosystem should focus on a startup sub sector most closely related to its strongest traditional strengths relative to global competition. These constitute the

¹⁷ Amalgamation of deep learning and fake news used to combine and superimpose existing images and videos onto source images or videos, which results in a fake video that shows a person or persons performing an action at an event that never occurred in reality.

core competencies of a startup ecosystem: the business cluster of related traditional industries, research centers and institutions of higher educations, intellectual property, and successful corporations produced by that innovative sub-sector.” Synthesizing the literature review (Shinkai & Hossain, 2011; Hossain et. al., 2011; Naym & Hossain, 2016; BASIS, 2017; Grabowski et.al, 2018) and the interview of the 6 local startup ecosystem experts, we identify the following drivers of growth and challenges pertaining to the tech startup ecosystem of Bangladesh and make the following recommendations.

4.1 Key Drivers of Growth of the Digital Ecosystem

- **Government vision:** The Government of Bangladesh is committed to realizing the Vision 2021 - Digital Bangladesh and is aggressively driving towards it.
- **A growing consumer market:** The Bangladesh consumer market has a youthful population looking to adopt digital services into their lifestyle. Average consumer spending is increasing by 11% on average every year and mobile financial services are already being used by 31 million people.
- **Internet use on the rise:** 81.7 million people now use the internet, registering a 29% growth from 2017. This number is only expected to grow in 2019.
- **Growing appetite for digital services:** With 36% of the population residing in the urban areas of the country and a median age of only 27.1 years, the nation seems to be eager to embrace digital services.
- **Fast growing support network:** The corporations, academia, investors, accelerators, incubators and coworking spaces have already started seeing the fruits of their labor. With digital startups taking off, the ecosystem support network is expected to grow in the coming days.
- **Combination of demographic and density dividends:** Bangladesh is one of the most densely populated countries in the world with over 65% of its population aged between 15 and 64. This unique combination of demographic and density dividends of the country is considered to be a major driver of growth for the digital ecosystem.

4.2 Key Challenges Faced by the Digital Ecosystem

- **Gaps in Regulations:** Although the regulatory framework is becoming more conducive for the development of the digital ecosystem of the country, there still exists gaps regarding dealings with foreign markets, impediments to registering private equity firms and obstacles preventing a robust and a faster growth of online payment platforms.
- **Immature Digital Market:** While the addressable target market is very large and acts as a driver for growth, the technology adoption level is still very low. Majority of the population is yet to be comfortable with a digital lifestyle.
- **Lack of Skilled Founders:** With a relatively poor digital education, the entrepreneurship ecosystem of Bangladesh lacks the required business and global market knowledge.

- **Limited Capital Supply:** The need for seed capital is still very high for founders to take the leap and begin their ventures. The follow-on capital such as Series A financing¹⁸ are practically non-existent in Bangladesh.
- **Inadequate Supply of Software Developers:** Although the supply pipeline is growing, a shortage of software developers exists in the country. For example, Bangladesh has only 3 software developers per 10,000 people compared to 17 in India.

4.3 Policy Recommendations

1. Speed up the digital infrastructure development in conjunction with the education of digital entrepreneurs to establish a pipeline of digital innovation aimed towards solving real problems existing in Bangladesh.
2. Noticing the chronic lack of startup financing, the government has taken active steps towards allocating funds to deserving startup projects. Effective awareness campaign needs to be undertaken so that entrepreneurs can avail the funds.
3. Incentivize private institutions to provide seed as well as follow-on financing, e.g., private firms that would invest in startups may be rewarded with tax benefits, access to low cost loans etc.
4. Remove the barriers for global startup ecosystem enablers and fund managers to enter the market and collaborate with local players, e.g., revisiting the bureaucratic bottlenecks in obtaining required permissions/ licenses/ certificates from government agencies, taking effective measures to alleviate the persistent challenges with respect to legal necessary transfer of funds out of the country while maintaining appropriate regulations to prevent illegal money laundering, etc.
5. Improve intellectual property rights of the tech companies in the country, while establishing technology transfer offices at research centers.
6. Take the necessary steps to improve ease of doing business,¹⁹ e.g., make the required regulatory amendment to simplify the registration process of private equity firms.

5. Conclusion

The digital startup ecosystem of Bangladesh, which lies at the core of the Vision 2021: Digital Bangladesh is still nascent, but growing at a rapid pace. In this exploratory descriptive paper, we produce a comprehensive summary of the digital startup ecosystem of Bangladesh with a view to contributing to the almost non-existing academic literature on the topic by synthesizing all the relevant and latest publications, reports, news and interviews. A cross-country analysis focusing on the digital performance of Bangladesh in comparison to its neighbors as well as the best and the worst performing countries in the world reveals that in spite of making noteworthy progress, Bangladesh still lags behind compared to the rest of the world. A detailed analysis of the various aspects encompassing the digital ecosystem of the country gives us the encouragement that with the commitment displayed by the government, and the enthusiasm of

¹⁸ Series A financing is the first round of financing given to a new business once seed capital has already been provided.

¹⁹ This is an area of serious concern as according to The World Bank Group (2019), Bangladesh ranked 176th out of 190 countries, which is the lowest ranking for a South Asian nation.

the supporting network, if some key policy reforms are made, ambition of a Digital Bangladesh can be fulfilled.

The paper has important managerial implications. Startup founders and managers tend to develop a tunnel vision due to specializing on one specific sector, and thus can be benefitted by gaining a holistic perspective of the digital ambition as well as the digital performance of Bangladesh, and the overall digital startup ecosystem to refresh and reevaluate their business viewpoint, especially given the spillover effects that one component in the ecosystem has on the others. Students and fresh graduates looking to enter the digital workforce or start their own digital startup ventures can benefit from having a basic understanding of the digital startup ecosystem. Finally, the policymakers have a direct call to action emerging from the recommendations of this paper.

One of the limitations of the study is that it focuses on tech startups only and although it provides important insights for startups in other sectors, the findings cannot be completely generalized. Also, policy recommendations have been provided for the tech startup sector as a whole, which potentially overlooks product specific regulatory barriers and policy issues.

While writing this paper, we have identified a number of potential future research avenues that are relevant and important for understanding the digital ecosystem of the country and for suggesting ways to improve it: Conducting an empirical study employing econometric techniques to compare Bangladesh's progress in digitalization against the rest of the world using the global e-indices; Carrying out a survey to obtain the relevant data and employing econometric techniques to identify the critical success factors of Bangladeshi startups; Carrying out an assessment of the development initiatives being undertaken by the Government, especially in developing the workforce; Examining the effectiveness of the supporting network of the ecosystem: incubators, accelerators and investors; and Carrying out a behavioral study of the urban and rural population to understand their needs to propose better tech-based innovations.

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