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Analyzing Social Media Activities of Startups Incubated in the Business Incubators of North East India

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Startups are slowly becoming a lead player in fostering economic prosperity of a nation. Despite its prominence in socio-economic systems, it is confronted with numerous challenges like lack of funds, expertise, mentoring and many more making them vulnerable and putting their survival at risk. Literature provides enough evidence that incorporation of social media strategy in the overall business strategy is beneficial for multinational businesses. However, limited studies have been found that deals with social media in the context of startups especially that are incubated in Business Incubators (BIs). A study has been carried out to address this gap by exploring the use of social media by 65 startups that are incubated in four BIs of Assam, the economically most developed state of north-east India. A total of 2795 social media posts have been identified from the verified profiles maintained by the startups on four popular social networking sites - Facebook, Instagram, Twitter and LinkedIn. Data were collected on different social media metrics for a period of 3 months (91 days) and were analyzed that led to some interesting insights. This study has put up recommendations based on the analysis that may be implemented by the startups in formulating their social media strategy.

Startups are nascent business entities, prominently owned by an individual or a group of individuals focused on devising creative and innovative solutions to the unmet needs of the market or solving pressing social issues. These tiny enterprises are now regarded as agents for fostering economic prosperity in any nation by creating employment and income (Paul et al., 2017; Rogerson, 2018). Emerging economies like India have recognized the role of startups in economic development which is evident from the budget allocation for the development of startups for the financial year 2022 – 23 which increased by 34% from the previous financial year (Business Standard, 2022). India launched a flagship initiative – the Startup India Scheme on 16th January 2016 to nurture, empower and provide financial assistance (Gandhi et al., 2019) to startups. As a result, India has registered exponential growth in the number of startups which stood at 72,993 as on 30th June 2022 from a mere 471 startups in the year 2016 (Livemint, 2022). As per the economic survey 2021-22, India has surpassed the UK to become the third nation in terms of the number of Unicorns registered after the United States of America and

China (Patwardhan, 2022). However, despite its importance in socio-economic development and Government support mechanisms, startups are confronted with numerous bottlenecks, particularly in the early stages of the entrepreneurial journey like the inadequate supply of resources, unavailability of market knowledge, lack of management skills, technology, funds and other infrastructural issues (Reijonen, 2010; Tanha et al., 2011). Earlier research by Honjo (2000), Nucci (1999) and Patel (2015) reported that there is a high failure rate of small business ventures. Even the established businesses faced failure according to Lai and Lin (2015) and Hayward et al. (2006). To overcome these constraints of small business ventures, social media may be a viable option that enables them to explore marketing opportunities and build a social capital that may ensure their sustenance. Social capital theorist exerts that followers on social media influences sales. Social media is a platform that facilitates its user to interchange their thoughts, opinions, preferences with other users. Kaplan and Haenlein (2010, p. 61) defined social media as a group of Internet-based applications built on the ideological and

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technological foundations of Web 2.0, which allows the creation and exchange of user-generated content. With the advent of social media, the way of doing business has changed tremendously. Social media offers a plethora of opportunities to business organizations that range from creating awareness of their brand or offerings, communicating the events, sharing knowledge till the background checking of the potential employees. The literature related to social media and business is primarily focused on multinational or established businesses (for example, Chahine & Malhotra, 2018; Culnan et al., 2010; Paniagua & Sapena, 2014). Few studies are there relating to small business or startups that primarily acknowledged the importance of social media and its impact on businesses (for example, Chen et al., 2017; Fischer & Rebecca Reuber, 2014; Men et al., 2017; Paniagua & Sapena, 2014; Smith et al., 2017; Stelzner, 2015). The list of literature for social media importance and use for the businesses would go on; therefore, it is well understood that social media is becoming an indispensable part of any business organization (Men & Tsai, 2016). However, there are limited studies that are dedicated to the measurement or evaluation of social media activities with respect to small business ventures.

Given the importance of social media for business and the need for more up-to-date research in this domain, the current research work makes an attempt at exploring the social media activities in the context of startups. To guide the study, the following research questions have been formulated and an attempt has been made to answer these queries – how and why startups use social media? What content the startups posts in their social media platforms and which content their online audience likes? How those startups communicate with their online community and how does the online community interact with online content of social media platforms? How to measure the online community or follower interactions with the user generated content (UGC)? Keeping these queries in mind, the following research objectives have been framed: Firstly – To explore the purposes of using social media for the startups in their business. Secondly – to identify the factors that have an impact on follower's engagement of a UGC. And lastly – to measure quantitatively the social media activities on the UGC and followers' reactions on those contents. To address the stated research questions, this study has considered and analyzed the various social media metrics which are publicly accessible and have been extensively used by other researchers to understand the social media phenomenon. By analyzing the data gathered from the social media accounts of startups, this study discusses how optimally social media may be used. It has highlighted strategic use of social media to reap the maximum benefits. This work by its very nature carries relevancy for the social media managers of startups.

Literature Review

Social Media and Startups

Startups are small, newly formed business ventures that target a small segment of customers within a small ge-

ographical location. They often have restricted access to vital resources and cannot afford quality inputs for their business operations due to limited financial and infrastructural support. The business strategies of startups are quite different from large corporations in many aspects (Reijonen, 2010; Stokes, 2000; Walsh & Lipinski, 2009). The studies of Bresciani and Eppler (2010) and Chen et al. (2017); Tajudeen et al. (2018) reiterate the same and which are also supported by social media experts, Babych (2020) and Montoya (2022) affirmed that the startups should use social media to achieve their business goals, as there are 4.7 billion active social media users which is 59 % of the global population (DataReportal, 2022). It is proven that the use of social media has a significant impact on business operations of small businesses – marketing, sales and customer services (Schaupp & Bélanger, 2014); moreover, it enhances brand image of the organization (N. Jones et al., 2015). Social media presence for startups not only has positive influence on marketing, branding and customer relationship management but research has also revealed that it has an impact on financial performance of the business (Ainin et al., 2015). In fact, social media adoption for small business is very crucial and its adoption would benefit the business as it is cost effective and require low technical expertise (Constantinides et al., 2010).

For business, social media has proved to be a boon, as it has its role in every aspect of the business and have positive impact on overall business performance (Bouwman et al., 2018; N. B. Jones et al., 2021; Kim, 2020; Smits & Mogos, 2013). Businesses efficiently promote their offerings on social networking sites and successfully commit sales (Mangold & Faulds, 2009). Business houses have realized that their presence on social media could bring magnified brand connections and awareness among their online fans and followers (Hanna et al., 2011; Manchanda et al., 2015), thereby having a resilient impact on business activities. According to the Australian government, social media is used to communicate with the online followers, reach existing customers as well as potential customers, sell and promote the product and services and recruit skilled staff. It has now become imperative to integrate the social media strategy into their mainstream business plan (Australian Government, 2021; Jansen et al., 2009). Charles (2018) asserted that for small businesses, it is a requisite to edifice social media activity for business growth. Social media is beneficial for the startups and related literature has stressed on how social media is being used by them. The issue at hand is of measuring the social media activities of the startups. Researches on social media measurement affirms that the measurement of social media may be done using various metrics, which are discussed in detail in the next sub section.

Social Media Measurement using Metrics

Businesses incur costs and investments on social media adoption in business operations, so social media needs a performance assessment. As stated by Men and Tsai (2016) "No evaluation, no improvement" (p. 99), but how the social media contribution or its effectiveness can be measured

has attracted a considerable amount of interest among researchers. Social media is a great tool for communication, especially for business firms who use it efficiently to reach their targeted audiences. On the other hand, the audience can also communicate with their preferred brands. Hence, social media facilitates two-way interchange of opinions or thoughts. According to Heath (2006), such exchanges are called engagement in communication perspective, which in turn benefits both the parties involved. On the same essence of thought, social media engagement reflects the quantum of communication between the business and the online community on UGC posted by the business, and reactions to it by the online audience. Studies of Kane et al. (2014) and Luo and Jiang (2012) point out that the calculation of return on investment in social media is extremely difficult and challenging due to which small business avoid measuring it (Michaelidou et al., 2011). For measurement of social media activities, researchers have used different metrics available in social media which are quantitative indicators of activities. There is an ongoing argument on systematic ways and standard procedures to measure the social media activities (Chen et al., 2017; Saxton & Waters, 2014). A practical measurement approach of social media engagement should be implemented to bring the true picture of social media use (Saxton & Waters, 2014). The use of indicators (metrics) available on social media platforms is a reliable one to investigate the activities (Cho et al., 2014; Ji et al., 2017). The targeted audience interacts with the UGC in the form of different metrics, for example, Likes and Replies in Facebook, Instagram, Twitter and LinkedIn, Shares in Facebook, Instagram and LinkedIn and Retweets in Twitter. The aggregate of these metrics is engagement which is used to measure social media performance.

The metrics are of different types: according to Etlinger and Li (2011) metrics are either activity-based metrics, such as followers, likes, and shares, or result-based metrics, such as conversions rates and impression rates. The volume of Likes, Comments and Shares indicate the acceptance and agreement of the organization's content by the users (Zell & Moeller, 2018). For instance, the study of Saxton and Waters (2014) used these indicators to realize the level of engagement of US Non-profit organizations on Facebook. Zell and Moeller (2018) also featured the importance of Likes and Comments in their study on Facebook. Likewise, to evaluate the social media, Facebook and Twitter posts were analyzed by Wilcox and Kim (2012) in terms of reach, frequency and engagement. The reach factor includes the size of the community; the frequency includes the number of posts on Facebook and tweets on Twitter; and the engagement counts the number of likes, comments, shares, clicks on the links, replies and retweets on Twitter. According to Hoffman and Fodor (2010), measurement of comments, size of audience, likes, and shares enhances the interaction on social media. Dahl (2015) argued that there are two segments to measure social media. First are quantitative measures that includes the metrics – number of followers, likes, and posts. Second are sentiment measures – to measure the emotions of the audience on social media. In another study from marketing perspective, He and Garnett (2016) found

that likes or shares show brand equity and brand engagement is shown by comments and shares.

A comprehensive social media interaction framework has been forwarded by Spiller and Tuten (2015). They divide the different social media metrics into three categories – activity, interaction and return metrics. The activity metrics signify the actions taken from the organization's point of view like number of communications or messages or updates posted on social media platforms, reply to the queries, and types of content (Image, Video or Text) with the message, which shows the social media presence. The interaction metrics are the measure of engagement with the content posted – volume of likes, comments and shares by the target audience as a response. The outcome of the activity metrics and interaction metrics are return metrics which could be in the form of conversion rate, revenue generated per customer, site visits, or ranking. The first two metrics (activity and interaction) may be considered to access the efficiency and effectiveness of social media activities. The third one – return metrics which is a financial measure of social media interaction that may be understood as resultant of the whole social media exercise. Pencarelli and Mele (2019) did an extended review on literature, and suggested five categories of social media measures – Activity measurement metrics (Posts, tweets, response to comments and private messages); Sharing or brand visibility metrics (Reach, likes on post, retweets, shares, brand mentions, sentiment analysis); Dimensional metrics (Fans, followers); Engagement or interaction metrics (Interaction with posts or engagement, media interaction with posts); and Performance or business metrics (number of leads, number of pre-sales interactions, average duration of the contact). Men and Tsai (2016) found five antecedents of social media engagement – content strategies, message appeals, message tactics, functional interactivities, and vividness. Content tells about the type of content to post on social media to bring interactions from the target audience. Tafesse and Wien (2017) analyzed the brand posts and suggested twelve types of posts of social media. They are Emotional, Functional, Educational, Brand resonance, Experiential, Current event, Personal, Employee, Brand community, Customer relationship, Cause-related and Sales promotion. For this study, we have grouped Emotional, Brand resonance and Experiential posts into Brand Identity posts. And Personal and Brand community is grouped into Customer Relationship. Hence, we have considered eight types of posts in this study which are discussed in [Table 1](#).

The message appeals include the emotional appeals that adhere to the content. Message tactics is related to the tone of the message. Research supports that the human conversational tone of message lead to higher engagement with the content and facilitates two-way communication (Kelleher, 2009). Functional interactivity relates to the functionality of the social media platform. Researches of Guillory and Sundar (2014) and Pettigrew and Reber (2010) proved that higher functional interactivity of the website generates higher proactive behaviour from the audience that leads to engagement. The selection of social media platforms is

Table 1. Post Types used in this Study

Posts types	Description
Brand Identity	Correspond to the brand promise and identity such as brand image, brand personality, brand association and branded products.
Functional	Highlights the functional attributes of the products and services. Quality, performance or design is promoted through these posts.
Educational	These posts are used to educate and inform consumers by sharing with them the skills to operate the product; give information on how to apply or use knowledge.
Current Event	Informs the audience about cultural events, festival wishes, holidays, special days, etc.
Employee	Posts related to employees; Sharing employees' technical expertise, their managerial philosophies, or their personal interests, hobbies or views.
Customer Relationship	These posts are centered on consumers' personal relationships which promotes and reinforces the brand's online community.
Cause Related	These posts highlight socially responsive programs; promote worthy social causes and initiatives and encourage customers and fans to support them.
Sales Promotion	Promoting brands, offers, discounts, coupons to get sales.

Note. Please refer to Tafesse and Wien (2017)

an important decision in social media adoption strategy (Ashraf, 2022; Montoya, 2022). Lastly, vividness refers to sensory perception in the form of image, video or text accompanied with the content.

Form the above discussion, it is understood that social media has become utmost important and has proved beneficial for a business entity. Its adoption consumes resources and as a strategic tool, it calls for proper measurement and mechanism for evaluation. To measure the social media activities, researchers have used various metrics, viz., likes, comments and shares, etc. that have an impact on engagement. However, measure of such metrics to ascertain the social media activities have not been adequately studied in the context of startups that are hosted by BIs. This research work tries to bridge this gap and studied how to strategically use social media platforms based on the engagement it generates. Moreover, it has suggested what type of content to be posted on social media platforms so as to generate more engagement.

Methodology

This study used an analytical approach on the use of social media in startups, identifying the factors that influences engagement and measure the social media activities in the context of startups incubated in BIs. The startups that are incubated in the four main BIs of Assam have been taken for the study. They are: the Assam Nest (129 startups, 40%), Indian Institute of Technology – Guwahati (26 startups, 8%), Assam Down Town University (78 startups, 24%) and Assam Agricultural University – NEATEHub (89 startups, 28%). These BIs are supported by the Government and play a prominent role in fostering an entrepreneurial ecosystem in the state. A list of startups was provided by the respective BIs and also taken from the incubators' official website which accounts for a total of 322 startups. Therefore, the total number of startups under consideration is 322. For this study, we have taken into account four popular social networking sites – Facebook, Instagram,

Twitter and LinkedIn. For all 322 startups, the social media profiles have been verified first. The verification of social media accounts on four social media platforms was done by confirming the backlinks. Backlinks that are directed to the social networking sites from the startup's official website when clicked are considered verified and authenticated profiles. Social media profiles which are unauthenticated were marked as unverified and were not considered in this study. Upon completion of social media profile verification of 322 startups, a total of 116 startups (approx. 36%) were found to be verified and authentic profiles on at least one social networking site among the four considered in this study.

In this study we have considered various variables (or metrics) for which data were collected for analysis that are presented in [Table 2](#) with its definitions. Data on different metrics as given in [Table 2](#), relating to the interactions for 3 months (91 days) posting period beginning from 1st April 2022 to 30th June 2022 were collected on 1st July, 2022 for Facebook accounts, on 2nd July, 2022 for Instagram accounts and on 3rd July, 2022 for Twitter and LinkedIn accounts. There are sufficient studies where similar kinds of variables and metrics in the context of social media have been considered and analyzed; for example, Hoffman and Fodor (2010), Etlinger and Li (2011), Wilcox and Kim (2012), Saxton and Waters (2014), Dahl (2015), He and Garnett (2016), Tafesse and Wien (2017), Zell and Moeller (2018), Pencarelli and Mele (2019) and Gkikas et al. (2022). Past researchers, for instance, Adebayo et al. (2018), Paniagua and Sapena (2014) and Peeroo et al. (2016) took one month period to extract social media platform data. Xu and Saxton (2018) considered three months from Twitter. So, three months data is enough to understand and get insights of the interactions on social media. Out of 116 startups, only 65 startups (56%) posted contents on social media during the window period of 91 days. These 65 startups have been finally considered for the study. Publicly available data were collected from social media profiles on different metrics (shown in [Table 2](#)) across all the four social media platforms.

Table 2. Social Media Metrics (variables) Considered in the Study and their Definition

Metrics of interest	Variable Type	Definition on metrics
Likes	Continuous	Number of Likes received on the post.
Comments	Continuous	Number of Comments received on the post.
Shares#/ Retweets*	Continuous	Number of Shares / Retweets received on the post.
Follower Size	Continuous	Number of followers on Facebook, Instagram, Twitter and LinkedIn.
Posts / Tweets*	Continuous	Number of user generated contents posted.
Post Type	Categorical	The message or idea or information attached with the content. Posts are segregated into 8 types - Brand Identity, Cause Related, Current Event, Customer Relationship, Educational, Employee, Functional and Sales Promotion.
Media Type	Categorical	The type of content posted on the social media platform. Media accompanied with the post description. The media falls into three categories - Image, Video and Text.
Focus Area	Categorical	The area or industry where the startup is performing or operating their business. Startup's area of operation falls into 7 focus areas - Agri and Allied, Art and Handicraft, Service and Consultancy, Tea and Food Products, Technology & Engineering, Travel and Tourism, Others.
Social Media type	Categorical	Different social media companies facilitating information exchange. We considered 4 platforms - Facebook, Instagram, Twitter and LinkedIn
Engagement	Continuous	This is the sum of number of likes, comments and shares generated by the content. This signifies how the online community interacted with the user generated content.

Note. Shares metric is not publicly available for Instagram. Tweets and Retweets metrics are only available in Twitter
Source: Authors

Table 3. Number of Active Startups and the Total Number of Posts

Social media platforms	Startups with verified profile	Startups active during 91 days period	Total number of posts by startups during 91 days period
Facebook	101	54	1055
Instagram	66	44	985
Twitter	38	12	382
LinkedIn	55	21	373

Source: Data analyzed by the authors

The profile pages of 65 startups were first downloaded in the local disk with an (.html) file extension (Coelho et al., 2016). Later these saved html files were used to extract the required data. During the 91 days window period, a total of 2795 posts from 65 startups across social media platforms were extracted. The popular metrics of social media – Likes, Comments, Shares / Retweets, Post Type, and Media Type were recorded for 2795 posts and Follower size and the number of posts were recorded for each of the 116 startups on all the four platforms. Focus Area of the startup was also considered and all startups are divided into seven focus areas as already elaborated. Summary of extracted data is as depicted in [Table 3](#).

Analysis

This section presents the analysis of 2795 posts identified from the period of 3 months on different social media metrics. Cross-tabulation (or contingency table) technique is used to analyze the number of posts with other metrics – media type, post type and focus area of the startup. According to the contingency table analysis, it is found that out of 2795 posts, Facebook has the highest number of 1055 posts

with Instagram close behind at 985 posts accounting for 37.8% and 35.2% of the total posts respectively. Twitter and LinkedIn had 382 (13.7%) and 373 (13.3%) of the total posts respectively. Image posts accounted for 2202 (78.8%) of the total posts whereas, video and text posts accounted for 511 (18.3%) and 82 (2.9%), respectively. Among the three post types, the image posts have dominance across all the social media platforms, whereas, video posts are highest in case of Instagram (238), followed by Facebook (128) and Twitter (51). Text post is predominantly used on Twitter. According to the type of posts, the Functional type post constitute the highest number of 865 (30.9%) of total posts, followed by Customer Relationship 578 (20.7%). Least number of posts are registered on Cause related posts numbering at just 12 (0.4%). Out of the total Functional type posts (865), 76.3% are image, 18.7% are video and text posts constitute only 5%. The contingency table on the focus area of the startup and the media type revealed that the highest number of posts falls under Technology and Engineering 1008 (36.1%) followed by Art and Handicrafts 575 (20.6%). Startups whose focus area is Agriculture and Allied services have 14 posts (0.5%) which is the least among all focus areas. The number of posts of Technology and Engineering

Table 4. Variables and its Corresponding F-Value

Variable_1	Variable_2	F - Value	Significance
Media type	Engagement	4.078	0.017*
Post type	Engagement	1.085	0.370
Focus area	Engagement	2.074	0.053
Social Media type	Engagement	0.616	0.604

* Significant at 5% level of significance

Source: Data analyzed by the authors

startups have 79% image posts followed by 17% video posts and 4% text posts.

Identification of Factors using Association Analysis

Social media platform propagates information meant for the online followers or stakeholders from the businesses with an intent to create interactions with the posts. The online community interacts with a post by liking the post, commenting on the post or sharing the post with other members. All these interactions with the post are called overall engagement of the post. In this study, we have collected data on different metrics – number of likes, number of comments and number of shares for each post on Facebook, Instagram, LinkedIn and Twitter. But for Instagram, the share metric is unavailable in the public domain; hence, it could not be extracted. However, it may distort the results while analysing; therefore, these are regarded as missing values. A treatment of missing data was required and as suggested by Cooper et al. (2019), the predictive replacement technique could be performed where the central tendency value of the same or other variables could be taken as the value for missing data. Accordingly, the missing values for Share variable in Instagram is replaced with the mean score of the same variable for the other three platforms taken together. For 2795 posts, we have calculated the engagement by adding all interactions per post. The engagement on a particular post may depend on various factors considered in this study like Media Type, Post Type, Focus Area and Social Media Type. An attempt is made to identify the factor(s) that could have an impact on the engagement. For this purpose, One Way ANOVA is performed to compare the means of one dependent variable (Variable_2) by different paired groups of another variable (Variable_1) having more than two categories. The result of ANOVA analysis is presented in [Table 4](#).

As a result of the analysis, it is found that only media type has an impact on engagement as p -value of F (4.078) is 0.017 which is statistically significant at 5% level of significance. However, other factors (Post type, Focus area and Social Media type) have no impact on engagement as all other F values are statistically not significant as shown in [Table 4](#). The differences in mean engagement of these factors may be attributed to chance. The Media type has significant impact on engagement, but the obvious question that arise is which pair of categories? To find out the pair, the *Post Hoc Analysis* (Tukey HSD) is carried out and the re-

sult is shown in [Table 5](#) which compares the means of all categories. It can be observed from [Table 5](#) that among all the pairs of categories, the mean difference corresponding to image category and video category is statistically significant as the p -value is 0.013 which is less than 5% level of significance. Moreover, the video posts category has generated the highest mean (average) engagement, whereas least mean engagement is generated by the text posts category.

Therefore, after performing ANOVA tests to identify the factors that have an impact on engagement, it is confirmed that the type of media used while posting on social media, could decide the engagement of that post. As per the result of the analysis, the posts or messages accompanied by a video brings higher engagement compared to the Image and Text type of media. Except the type of media, all other factors (Post type, Focus area and Social Media type) do not have a direct impact on engagement.

Startup's Social Media Interaction Value

Social media facilitates two-way communication between the organization and their online followers. The intensity of social media activities can be measured using the efforts initiated from two sides – the organizations and the online community. The forward interactions are the effort made by the organizations by posting content or message and choosing the post type (image, video or text), hence it remains in the control of the organization (author) what to post and what type to post. The importance of forward interactions is also highlighted in a study done by Barman (2020). The backward interactions are the reactions to the post in the form of likes, comments or shares received from the online follower which is not in the control of the organization (or author). If any one of the interactions is absent, say an organization is good in the forward interaction (posting good content or message) but those forward interactions are not generating enough backward interactions (likes, comments or shares), the true sense of communication would not be met. Therefore, the actual value of the use of social media could be determined by accumulating both forward interactions and backward interactions together.

In this study, we have measured the social media activities quantitatively which is termed as Social Media Interaction (SMI) value. The SMI value is the sum of the Forward Interaction and Backward Interaction. The higher the value of SMI, higher will be the interactions and would reflect the good use of social media by the startups. For a particular

Table 5. Comparison between Different Categories of Media Type Variable

Type of media (I)	Type of media (J)	Mean difference (I-J)	Std. Error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Image	Video	-817.88200*	287.98361	.013*	-1493.1902	-142.5738
	Text	43.98595	659.62095	.998	-1502.7946	1590.7665
Video	Image	817.88200*	287.98361	.013*	142.5738	1493.1902
	Text	861.86794	697.70518	.432	-774.2184	2497.9543
Text	Image	-43.98595	659.62095	.998	-1590.7665	1502.7946
	Video	-861.86794	697.70518	.432	-2497.9543	774.2184

Note. Dependent Variable is Engagement

* The mean difference is significant at 5% level of significance.

Source: Data analyzed by the authors

Table 6. Weights Calculation for the Types of Media

Platform	Media type	Engagement	Weight
Facebook	Image	43203	.108
	Video	355381	.892
	Text	2	.000
Instagram	Image	58240	.402
	Video	86560	.598
	Text	0	.000
LinkedIn	Image	4621	.815
	Video	762	.134
	Text	288	.051
Twitter	Image	792	.868
	Video	42	.046
	Text	78	.086

Source: Data analyzed by the authors

social media platform, the Forward Interaction is sum of the times of the number of posts of each type of media and their corresponding weights (as shown in eq. 1).

$$Foward Interaction = (I_n * \omega_i) + (V_n * \omega_v) + (T_n * \omega_t) \quad (1)$$

Where,

I_n , V_n and T_n = the number of image, video and text posts.

ω_i , ω_v and ω_t = the weight of image, video and text post.

The weightage for each type of media for each social media platform is calculated using its contribution to the total engagement generated on that platform as shown below in Table 6, which is supported by the analysis done using ANOVA in the previous section that the media types have different impact on engagement.

Likewise, the Backward Interaction is the sum of the times of the engagement generated by each type of reactions and their corresponding weights (as shown in eq. 2).

$$Backward Interaction = (L_e * \omega_l) + (C_e * \omega_c) + (S_e * \omega_s) \quad (2)$$

Where,

L_e , C_e and S_e = the engagement generated by likes, comments and shares.

ω_l , ω_c and ω_s = the weight of likes, comments and shares.

The weightage for each social media platform for each type of reaction is calculated using its contribution to the total engagement generated on that platform as shown below in Table 7. The weights for types of reactions (likes, comments and shares) for each social media platform are different as their contribution to the total engagement is different.

Calculation of Social Media Interaction Value using Collected Data

In this section, we have calculated the SMI value using the equations discussed above and using data collected on different metrics for the period of 91 days for 2795 posts from the verified social media profiles of the 65 incubated startups. The SMI value of four social media platforms and total SMI value for 65 startups in descending order is shown in Table 8.

It is observed that the highest SMI value on Facebook is found to be 631315.53. For the startups on Instagram, the highest SMI value is 54283.24. The highest value of SMI on Twitter is 493.42 and on LinkedIn, the highest SMI value is 4465.10. Therefore, across all the social media platforms, Facebook has the highest average SMI value. Taking

Table 7. Weights Calculation for the type of Reactions on the Posts

Platform	Reaction Type	Engagement	Weight
Facebook	Likes	362381	.909
	Comments	8045	.020
	Shares	28160	.071
Instagram	Likes	127477	.880
	Comments	1563	.011
	Shares	15760	.109
LinkedIn	Likes	5237	.923
	Comments	154	.027
	Shares	280	.049
Twitter	Likes	624	.684
	Comments	51	.056
	Shares	237	.260

Source: Data analyzed by the authors

all the SM platforms together for a startup, the highest total SMI value is 685598.77 having contributions from Facebook 631315.53 and Instagram 54283.24. Therefore, SMI value may also be used to assess the startup's relative position in using social media. The SMI values would also help in making decisions as to which social media platform(s) to use to connect with the online community. Hence it could be used in formulating the social media strategy. [Table 9](#) shows the different combinations of SM platforms and their respective average SMI value.

From the above [Table 9](#), it is seen that, that the best strategy for startups is to choose the two social media platforms, Facebook and Instagram as it shows the highest SMI value of 34375.30. The startups deciding to have social media presence on only one platform; Instagram is the best choice as it generated average SMI value of 9050.48. If the startups have decided to have presence on three social media platforms, Facebook, Twitter and LinkedIn is the best combination as the SMI value is 2468.57 which is highest among all three platform combinations. Having a presence in all the four SM platforms is not worth it as this combination resulted in a low SMI value of 1005.90.

Further, correlation analysis is also done to analyze the relationship between the follower size on social media platforms and the SMI value on that platform. The result is presented in [Table 10](#).

It is seen from the above [Table 10](#) that, the Pearson Correlation (r) between follower size and SMI value is very high in the cases of Facebook ($r = 0.99$) and LinkedIn ($r = 0.89$), whereas, it is moderate in the cases of Instagram ($r = 0.50$) and Twitter ($r = 0.57$). This result supports the study of Kim (2020) which highlighted how the online followers share positive contents with others and significantly contribute towards sales performance. Therefore, we may conclude that to increase the SMI value, the startups should increase their followers.

Findings and Discussion

From the analysis, it has been observed that the startups' most preferred social media platform is Facebook followed by Instagram to communicate and interact with their target audience among the four platforms considered in this study. LinkedIn is the least preferred social media platform based on the number of UGC posted by the startups. While posting a content on social media platforms, Image followed by Video is the most preferred type of media; the text media type is the least preferred according to the number of posts for each media type. But interestingly, posts containing videos generated the highest engagement in comparison to posts containing images or text. It is also revealed from the study that the Technology and engineering startups are ahead in terms of frequency of posts in their social media platforms. According to the contingency table analysis, it is found that out of all types of posts, Functional posts are the highest in number, followed by posts relating to Customer relationship. This means that the startups have primarily concentrated on engaging their audiences with functional and customer relationships posts. This study also identified the factors that have an impact on engagement using One Way ANOVA between engagement and the factors. The result lent support to the fact that the type of media used in the post has a positive impact on engagement. The video posts have generated high engagement on the contents; it affirms that if the startups wish to increase interactions or engagements on their UGCs on social media, they should post video content. Other factors (focus area and post type) have shown no relationship or association with the engagement.

The study also tried to give a quantitative measurement to access the social media activities of the startups and interactions by the target audiences. The Social Media Interaction (SMI) value was calculated based on the equations that were developed taking into account the important metrics of social media. Social media facilitate two ways communication and the effectiveness of the communication should be judged based on the senders' as well as the

Table 8. Social Media Interaction (SMI) Values of Startups in Descending Order

Startup_ID	Facebook	Instagram	Twitter	LinkedIn	Total SMI
ST24	631315.53	54283.24	-	-	685598.77
ST32	-	41833.47	-	-	41833.47
ST14	32.72	19456.12	-	-	19488.84
ST06	177.19	18884.84	-	-	19062.04
ST47	-	11970.10	-	-	11970.10
ST17	6251.07	3336.13	-	-	9587.20
ST42	101.38	8869.02	-	-	8970.41
ST41	5764.11	939.20	-	38.84	6742.15
ST57	287.81	4858.70	-	-	5146.51
ST52	4957.43	-	-	-	4957.43
ST29	55.20	-	159.83	4465.10	4680.14
ST54	114.88	4489.55	-	6.13	4610.57
ST08	96.91	2984.54	-	-	3081.45
ST34	79.86	2563.00	5.55	-	2648.41
ST07	379.36	1032.07	61.58	1084.80	2557.82
ST01	1059.07	-	59.15	1362.46	2480.68
ST20	314.98	1206.85	-	887.80	2409.63
ST36	10.17	1666.31	102.79	-	1779.27
ST18	271.38	1237.56	-	-	1508.94
ST10	39.37	1117.04	340.82	-	1497.23
ST39	9.15	1464.62	-	10.48	1484.25
ST43	291.53	807.51	-	112.52	1211.56
ST02	55.75	385.85	493.42	193.29	1128.31
ST63	77.91	902.73	-	-	980.64
ST49	45.50	931.26	-	-	976.76
ST61	35.74	930.84	5.99	-	972.57
ST27	74.80	442.76	-	43.67	561.23
ST45	33.94	456.55	-	-	490.49
ST40	392.45	-	-	-	392.45
ST31	-	343.93	-	-	343.93
ST12	78.66	255.98	-	-	334.64
ST04	20.82	311.28	-	-	332.09
ST03	-	-	-	319.99	319.99
ST62	6.41	233.08	13.25	17.92	270.66
ST15	21.87	-	1.64	221.37	244.88
ST38	12.20	230.84	-	-	243.04
ST33	222.17	-	-	-	222.17
ST28	25.08	103.97	-	46.93	175.97
ST44	17.44	145.82	-	-	163.26
ST22	-	-	-	152.00	152.00
ST13	91.85	8.18	-	10.89	110.92
ST50	98.44	-	-	7.63	106.08
ST48	87.85	-	-	-	87.85
ST25	76.40	-	-	-	76.40
ST05	33.57	41.19	-	-	74.76
ST53	7.12	47.12	9.05	3.52	66.81
ST55	17.65	45.38	-	-	63.03

Startup_ID	Facebook	Instagram	Twitter	LinkedIn	Total SMI
ST56	-	62.41	-	-	62.41
ST60	-	56.58	-	-	56.58
ST65	15.02	30.94	-	-	45.96
ST23	36.45	-	-	-	36.45
ST59	-	36.38	-	-	36.38
ST21	8.14	27.09	-	-	35.23
ST26	5.09	25.33	-	-	30.41
ST58	7.30	18.43	-	-	25.73
ST09	0.00	16.35	-	-	16.35
ST19	-	-	-	14.79	14.79
ST35	14.24	-	-	-	14.24
ST11	-	-	6.63	3.53	10.16
ST37	-	-	-	5.27	5.27
ST51	2.03	-	-	-	2.03
ST64	1.02	-	-	-	1.02
ST16	0.36	-	-	-	0.36
ST30	0.00	-	-	-	0.00
ST46	0.00	-	-	-	0.00

Source: Data analyzed by the authors

Table 9. Average SMI Value According to Number of Platform(s) Criteria

No. of platforms	Platform Combinations				Avg. SMI Value
	Facebook	Instagram	Twitter	LinkedIn	
4 Platforms	√	√	√	√	1005.90
3 Platforms	√	√	√	X	1724.37
	√	√	X	√	2136.28
	√	X	√	√	2468.57
	X	√	√	√	*
2 Platforms	√	√	X	X	34375.30
	√	X	√	X	*
	√	X	X	√	106.08
	X	√	√	X	*
	X	√	X	√	*
	X	X	√	√	10.16
	X	X	X	√	10.16
1 Platform	√	X	X	X	482.53
	X	√	X	X	9050.48
	X	X	√	X	*
	X	X	X	√	123.01

* Startups with this combination of platform was not found in the study

Source: Data analyzed by the authors

receivers' perspective. So, Forward Interaction is pertaining to the activities initiated by the startups that includes the number of posts and the media type (as it has a positive impact on engagement). On the other side, Backward Interaction is from the target audience or online community for whom the message or content is directed, which includes volume of likes, comments and shares received on the content posted. Forward Interaction is taken into this

framework as until and unless, there are no activities from the startup, interactions will not be generated. So Forward Interaction is equally important while performing the social media activity assessment. The SMI value was calculated for 65 incubated startups. The high SMI value signifies high social media activity, i.e., both involved parties – the startup and their online community are active on social media. Using this SMI value, startups can formulate

Table 10. Correlation Analysis between Follower Size and SMI Value

Social Media Platform	Pearson Correlation (r)	Interpretation
Facebook	0.99	Very High (Positive)
LinkedIn	0.89	Very High (Positive)
Twitter	0.57	Moderate (Positive)
Instagram	0.50	Moderate (Positive)

Source: Data analyzed by the authors

their social media strategy of which platform to use. The study reveals that the SMI value is highest in case the startups have presence on Facebook and Instagram and in case the startup is using three different social media platforms, then the best combination that gives highest SMI value is Facebook, Twitter and LinkedIn. If use of single social media platform is the strategy, Instagram provides the highest SMI value. Lastly, the study also found that there is a positive correlation between the follower size on social media and the SMI value of the startup. Therefore, we can infer that, for all social media platforms (Facebook, Instagram, Twitter and LinkedIn), the followers' size is a deciding factor for social media interaction. The startups should formulate strategies to increase their follower size on social media platforms.

Practical Implications and Scope

This study by its very nature has further extended the existing body of contributes to adding new directions in social media research. It unveils a methodology to measure social media activities or interactions on social media content taking into account the forward interactions and backward interactions. Moreover, this study provides a base for formulating social media strategy for startups. It is recommended for the startups to have two social media accounts, preferably at Facebook and Instagram, instead of having presence in one and more than two social media platforms. In order to engage the online audience, startups should post video content in their social media platforms that has the potential to generate much more interaction rather than posting image or text content.

This study is confined to the startups those are incubated in BIs of the state of Assam in the north-eastern part of India; hence, there will always be a scope for further study by delimiting the geographical scope. The SMI value could be calculated for other startups using stated equations that would certainly enhance the generalizability, validity and reliability of the measurement technique. Moreover, the true picture of social media use is always the outcome of the use. In this sense, a study may be undertaken to relate SMI value with other financial measures or return on investment of using social media. And lastly, there is a scope for extension of time duration. Taking more than 91 days would definitely add more credibility to a similar study.

Conclusion

There is increasing momentum in the use of social media on business operations. There are evidences that the business organizations are doing well in the market by adopting social media. The social media strategy is now an essential part of overall corporate strategy. From multinational corporations to small businesses, the use of social media and its benefits are well drafted. However, the literature relating to social media use by the incubated startups have not drawn much interest of the scholars. Therefore, this study has tried to fill this particular gap in the literature by exploring the use of social media by the startups incubated in the four BIs of Assam. Analyzing a total of 2795 posts on four social media platforms – Facebook, Instagram, Twitter and LinkedIn from 65 incubated startups has helped to reveal some interesting insights. The startups like to connect with their online community through Facebook and mostly through image posts. However, content accompanied with video proved to have high interactions or engagement. Therefore, it is safe to infer that, to generate high engagement on the UGC, the startups should emphasize on the type of media used while generating UGC. Our analysis suggests that video content generates more engagement than image or text irrespective of what the type of post is, no matter what is the focus area (or business) the startup is and which social media platform is used to post the content. A quantitative value is assigned to the interactions on the contents on social media as Social Media Interaction (SMI) value. SMI value, which is the combination of the two facets – Forward Interaction and Backward Interaction, may be used to in devising social media strategy. This study breaks the notion of using many social media platforms to get high reach. It is suggested that for startups, having two social media platforms, preferably Facebook and Instagram is sufficient as it generated the highest SMI value. The study also cautions the startups to not be present on all the four social media platforms as it resulted in low SMI value.

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