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The Role of Data Analytic to Enhance Design Thinking Process in Producing Social Media Contents

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Abstract. *Introduction.* This research explains how the integration of roles and optimization of data analytics within the design thinking process can develop social media accounts organically. *Method.* This study uses an auto-netnography method that focuses on the process of figuring out the output of the data from content analysis and active participant observation on a *YouTube* channel. *Analysis.* The triangulation process is carried out by confirming the data from observations as well as the analytics data provided for users and account managers on *YouTube*. We carry out the interpretation process reflectively, drawing from personal experiences on social media to enrich the meaning. *Results.* Data analytics enhances the reliability of data on audience behavior due to its ability to optimally process big data and present the data in visual form, thereby increasing the speed and accuracy of decision-making. Data analytics plays a role in all stages of design thinking from empathizing, ideating, creating, to socializing. *Conclusions.* This research found the effective role of social media platform data analytics in the account development process through the design thinking process. This finding fills a research gap regarding social media data analytics, which has not been widely linked to the content production process.

Keywords: data analytics, design thinking, social media, big data, machine learning.

Duomenų analizės vaidmuo stiprinant dizaino mąstymo procesą kuriant socialinių tinklų turinį

Santrauka. *Įvadas.* Šio tyrimo tikslas – išnagrinėti, kaip duomenų analizės vaidmens integravimas ir optimizavimas dizaino mąstymo procese gali padėti plėtoti socialinių tinklų paskyras bei organiškai kurti kūrybinį turinį. *Metodai.* Tyrime taikomas autonetnografijos metodas, orientuotas į duomenų, gautų iš turinio analizės ir aktyvaus dalyvavimo stebėjimo „Calvin Channel“ „YouTube“ kanale ketverių metų laikotarpiu, reikšmės nustatymą. Kanalo pasirinkimą pagrindžia jo sėkminga augimo dinamika, organiškas vystymasis ir pripažinimas oficialiu „Tsuburaya International“ partneriu. *Analizė.* Trianguliacija vykdoma lyginant stebėjimo duomenis su „YouTube“ pateikiama analitine informacija, prieinama vartotojams ir paskyrų valdytojams. Kadangi tyrėjas ir

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kanalo administratorius turi visapusišką prieigą prie duomenų analizės, tai leidžia pagerinti analizės tikslumą. Interpretacija atliekama refleksyviai, remiantis asmenine patirtimi socialiniuose tinkluose, siekiant gilesnio supratimo. *Rezultatai.* Duomenų analizė leidžia patikimiau suprasti auditorijos elgseną, nes geba efektyviai apdoroti didelius duomenų kiekius ir pateikti juos vizualiai, taip paspartindama ir tikslindama sprendimų priėmimą. Duomenų analizė svarbi visuose dizaino mąstymo etapuose – nuo empatijos kūrimo, idėjų generavimo, kūrimo iki sklaidos – kaip duomenų tiekėja, idėjų generavimo partnerė ir sprendimų priėmimo rekomendacijų teikėja. Tyrimo metu sukurtas konceptualus modelis parodo, kaip žmonės ir mašinos gali bendrai kurti socialinių tinklų kanalus natūraliai, etiškai ir atsakingai. *Išvados.* Iki šiol nėra atlikta tyrimų, kuriuose būtų analizuojamas duomenų analizės taikymas, ypač „YouTube“ platformoje, pasitelkiant dizaino mąstymo paradigmą. Tai atskleidžia mokslinių tyrimų spragą ir kartu suteikia vertingą galimybę gilinti supratimą apie tai, kaip dizaino mąstymas gali būti taikomas priimant strategiškai pagrįstus sprendimus dėl organiško kanalo augimo.

Pagrindiniai žodžiai: duomenų analizė; dizaino mąstymas; socialiniai tinklai; didieji duomenys; mašininis mokymasis.

Introduction

The growth of platforms and social media users today is impressive. The development since the advent of the era of *Facebook*, *Instagram*, *YouTube*, and *TikTok* has opened new opportunities in the business world. Social media is no longer just a platform for user interaction, but it has also been utilized as a medium for business and even politics, especially since China shut down *X* and *WhatsApp* services within its territory as an effort to secure the behavioral data of its citizens. Social media now features artificial intelligence and is capable of analyzing user behavior through a system known as machine learning, which has a 'brain' called an algorithm. Regardless of conflicts and geopolitical aspects, the effective use of social media can enhance the performance of an entity, whether an individual or an organization (Hasim & Sherlina, 2022; Hassani & Mosconi, 2022; Zachlod et al., 2022; Maulana & Sandyawati, 2023).

Social media is a highly effective marketing and brand-building machine for reaching large and global markets. This has positioned social media as part of current business strategies, and therefore its effective utilization can enhance the accuracy of business decision-making, particularly in branding and marketing activities. Most social media platforms offer free data analytics services for content creators or account owners who actively produce content in the form of static images or videos. This allows content creators to monitor the performance of their content in real time. So far, social media research tends to choose platforms like *Facebook*, *Twitter*, *LinkedIn*, and *StockTwits* due to the practical aspect of accessing the data analytics feature (Debreceny et al., 2019). Of all the currently existing social media platforms, *YouTube* is most detailed and comprehensive in providing an information dashboard, as well as managing big data with fairly accurate triangulation and a strict audit process. Unfortunately, amateur account managers often overlook the importance of design thinking, which is an effective methodology for discovering innovative ideas for social media development. *YouTube* provides data analytics facilities that can help in discovering solutions to problems for account development purposes. In addition, accessing *YouTube* analytics requires more effort because one must first become a content creator or an active channel manager to activate all the provided

analytics features. This point is the strength of the scope of this research data because the researcher has full access to analyze the data.

Stanford researcher David Kelley has developed and popularized the concept of *Design Thinking* (DT) which is a superior tool compared to its predecessors (Camacho, 2016). DT is dedicated to the needs of product design. However, over time, the concept was found to have relevance to various business innovations. Enthusiasm for DT in the field of *Innovation Management* (IM) then emerged in the 2000s, triggered by the works of Brown, 2008, Brown, 2009 and his collaborator Martin (2009), who established it as an umbrella construct (Dunne & Martin, 2006; Micheli et al., 2019). Design thinking became an accepted term in the discourse of IM as an approach to creativity and innovation based on design practice (Brown, 2008; Magistretti et al., 2020; Martin, 2009). People often conceptualize DT as a process or a series of activities that integrate various methods (Beckman & Barry, 2007; Elsbach & Stigliani, 2018; Seidel & Fixson, 2013).

Scientifically, scholars criticize that DT in IM lacks a theoretical foundation despite having practical relevance (Johansson-Sköldberg et al., 2013; Micheli et al., 2019). This gap is produced due to the influence of the IDEO practice-based account (Kelley & Littman, 2004), which positions DT as an applied science. IDEO's practices are highly relevant, as a number of scholars state that these practices have become the center of the DT movement, and their models along with the relevant literature have been very influential in the IM discourse (Brown, 2008, 2009; Gruber et al., 2015; Johansson-Sköldberg et al., 2013; Liedtka, 2015; Micheli et al., 2019). These practices are closely related to the philosophy and design practices of Stanford because most of their methodologies, founders, and professional staff are involved in and originate from the *Joint Product Design* (JPD) program at Stanford. However, little has been published in the field of the IM discourse about the origins and evolution of these influential design philosophies and practices and how they have transformed into the IM approach.

Auernhammer & Roth (2021) have shown that the attributes of DT are not isolated phenomena but rather a comprehensive, creative, and humanistic philosophy and practice of design that leads to entrepreneurship, innovation, and growth. These findings show that DT can be used in many contexts as long as it is problem solving-focused. These findings serve as motivation for this research to explore the relevance and application of DT for content innovation and the development of YouTube social media channels. The design thinking paradigm has not yet yielded any research on the application of data analytics, particularly on YouTube. We need to fill this gap in knowledge and take advantage of this chance to learn more about the role of data analytics so that to enhance the design thinking process in developing social media channels. The main research question of this study is how to integrate the data analytic process in the design thinking process to develop more valuable social media contents. This research aims to build a conceptual model related to the integration of data analytics in the design thinking process for the management of social media channels and the creation of valuable content.

This research selects one *YouTube* channel named 'Calvin Channel', which is considered to have organic growth, which has been monetized, and which has achieved

recognition as a collaboration partner with *Tsuburaya Production, Int.*, an international company engaged in the field of intellectual property. To facilitate the data analysis process, the problem formulation is detailed in two research questions: *What was the growth of Calvin Channel since 2021*, and *What is the role of data analytics in the design thinking process to organically grow the YouTube channel*? From the findings of the answers to these questions, it is expected that this research will be practically beneficial for those entities which wish to develop social media platforms as part of branding and marketing activities based on modified design thinking with an analytics data foundation.

Method

The method used in this study is auto-netnography, which puts the process of figuring out what the data mean above all else. The data came from content analysis and active participant observation. Researchers have full access to the dashboard being studied. This facilitates the comprehensive acquisition of relevant data for the analysis and discussion process. The justification for choosing that channel is reinforced by its beneficial growth process and organic assurance. As a reflective qualitative study, this research carries the risk of subjectivity, but the discussion process will always be guided by the research questions and adequate literature justification. Additionally, the channel's selection as the official partner of *Tsuburaya International* adds a unique appeal. Researchers will be directly involved in observing direct interactions with the community within the context of social and cultural dynamics.

The content analysis process of this research adopts Lasswell's method (Janowitz, 1968), which states that content analysis is a research technique intended to systematically describe the content of communication. The aim is to identify patterns, themes, or meanings contained within texts, images, or other media and to find relationships among them by using interpretive techniques. In Lasswell's 5W Model approach in finding meaning, there are five main things that are talked about: *Who*, in this case, is the content creator or account owner who posts different kinds of content online; *What*, which is the information that is shared; in *Which* channel, which can be studied by looking at the media used; to *Whom*, which is the audience that Calvin Channel is trying to reach; and with *What effect*, which is the impact of the content that was broadcast, which can be studied and analyzed in the data analytics feature.

Data collection was done through the YouTube Studio application dashboard. Then, the researcher selected and documented the data by taking screenshots of the relevant data displays. The data was then grouped based on themes relevant to the research question in order to facilitate the coding process. The objects being analyzed include text, images, audio, video, or other elements displayed on the *YouTube* channel, as well as the data analytics facilities provided by examining all the relevant features. This digital document analysis is expected to confirm the results of participatory observations conducted over 4 years. Meanwhile, the triangulation process is carried out by confirming the data from observations as well as the analytics data provided for users and account managers

on *YouTube*. On the grounds of full access to data analytics, the researcher and channel manager will improve the data analysis accuracy. We carry out the interpretation process reflectively, drawing from personal experiences on social media to enhance the meaning. The observation phase was conducted over a period of 3 months, while data analysis was carried out from 2021 to early 2025.

Results and Discussion

This section describes and explains the findings related to the object of study, namely the YouTube channel called Calvin Channel, specifically, its development over the past four years. Next, this section will talk about some relevant discussions that are related to the research goals of finding logical reasons for incorporating data analytics roles into the design thinking process when it comes to *YouTube* platform governance and new ideas for creative content.

Channel Growth and the Role of Data Analytics

Calvin Channel is one of the channels that has maintained a consistent airing schedule from 2021 until now. The channel specifically discusses various merchandise, particularly, in the toys and hobby category, with the themes of *Ultraman* and monsters. The uniqueness of this channel lies in building a family persona, a relationship between a father and a child who both enjoy the world of Ultraman. This uniqueness has made Calvin Channel one of the partners of *Tsuburaya Production International* in communicating and disseminating their product content. The revenue for this channel comes from monetization through ads, online product sales affiliate programs, and collaborations with external parties through endorsement programs.

There are two types of branded social media communication, organic and paid. Organic social media prioritizes interactions and communication created by advertisers on social platforms. In contrast, the paid content is a communication model where the consumer pays to gain interactions. Being organic is an advantage that brings about honest interaction and connection (Fulgoni, 2015), without resorting to hacks like buying subscribers, sub4sub, or illegally or unethically re-uploading content owned by others. Chawla & Chodak (2021) have also demonstrated how organic interactions will drive business effectiveness. This is the reason why this research chose organic accounts for their development.

From the observation of the initial content, a variety of video topics were found, such as discussing Lego toys, Star Wars, Teenage Mutant Ninja Turtles, American Super Heroes, Ultraman, crafting content, and several gadget accessory reviews. After entering the market in mid-2021, this channel began to focus on content with the theme of Ultraman. This decision was made based on viewer data observed through the *YouTube* analytics feature. The viewer reaction data shows interest in the theme of toy and *Ultraman* hobby item reviews; therefore, since then, Calvin Channel has largely focused on this theme.

At the time this research was conducted, Calvin Channel had a total of 32,321 subscribers and was predicted to gain an average of 800 to 1,000 new subscriber accounts each month (following the trend cycle). This channel has an excellent engagement rate with an average of 250K viewers per month and 2.9K watch hours per month. The current viewership distribution of Calvin Channel is more concentrated in the Indonesian area, followed by Malaysia, Japan, Thailand, and Vietnam.

The growth of Calvin Channel is closely linked to the role of the data analytics feature provided by *YouTube* for channel owners, also known as content creators. *YouTube* is one of the social media platforms that provide this feature, and, based on observation, it is the most comprehensive and complex. The categorization of the analytics is Overview, Content, Audience, Revenue, and Trend. Creators are allowed to access all five analytics segments freely. Information in the data analytics feature serves as the foundation for channel development, particularly in deciding the scheduling of the content (video or photo) in the future. Research on the role of information in the innovation process has also been extensively conducted, and it has demonstrated how information is one of the main foundations in innovation planning (Akcigit & Liu, 2016; Mamonov & Peterson, 2021).

Ogwu and Naicker (2023) found how SMEs rely on various information technologies to manage and market their products and/or services. Various findings lead to the conclusion that information plays a vital role in decision-making. *YouTube* has implemented this feature as a value-added and mutually beneficial strategy. If a video has a large, widespread, and viral audience, then not only the creator enjoys the AdSense profits, but also *YouTube*, which enjoys the largest share of the profits. Consequently, *YouTube* grows itself by helping others grow (in this case, content creators). From the analysis conducted on the quality of information, the data analytics feature has met the essence of good information quality, namely, relevance, reliability, completeness, and timeliness. This relevance effort is supported by the feature of sending feedback to the *YouTube* management team when content creators encounter problems or find things that do not meet their needs, which are then used as the basis for improving *YouTube*'s features. Thus, with the completeness of the information provided, users can even modify the analytical attributes according to their preferences in real time. Content creators can freely access this facility and utilize it optimally, especially those creators who are not already popular entities known to the public. The first step in creating content is to look at the trend data. Looking at trends can already be categorized as simple data analysis; observing various types of videos that rise and fall or are currently not in demand can help determine how content creators will make their videos. In fact, *YouTube* analytics has provided a feature for recommending ideas that can be developed and have high popularity. YouTube data analytics also provides various detailed insights into the viewing behavior patterns of a channel's audience, which can serve as the best ammunition to streamline the ideation and production process for the subsequent content. In the next section, we will discuss how this data analytics becomes a key factor in the process of developing new content ideas through the design thinking paradigm.

Empathizing Through Data

Empathizing is the first stage in the design thinking process. A content creator must have the ability to know what their audience likes. An effective way to understand the audience is by positioning oneself as the audience, also known as the attitude of empathy. Ko et al. (2023) explored the role of empathy and psychological reactance as fundamental mechanisms in building engagement. Itani & Inyang (2015) also attempted to prove the effectiveness of empathy for salespeople in the banking industry. Similarly, the findings of Murray et al. (2019) show that empathy is more important in the context of service delivery than merely being responsive. Empathetic attitudes are something that is human, universal, and transcends the context. Such processes are also used behind the scenes in managing a *YouTube* channel. Understanding the behavior and interests or preferences of the audience is a form of empathy. Specifically, *YouTube* provides that data; consequently, before deciding to create some content, content creators should open and study the data and information about trends and historical patterns of their channel's viewers. Everything must be based on empirical data because the understanding and presenting content that aligns with the audience's interests can enhance bonding and social engagement (Duong et al., 2025).

In general, *YouTube* presents processed data information in visualizations or graphics. Data analytics provides detailed insights into viewer behavior, including demographic, geographic, and psychographic factors. Demographically, *YouTube* analytics provides visualizations of the audience profile in terms of age, gender, subscription status, and the type of device used to access *YouTube*. The dashboard shows that the age ranges of 25–34 and 35–44 years comprise the majority of Calvin Channel's viewers. This is an anomaly, considering that the target audience of Calvin Channel is children. However, after a more detailed investigation through sampling, it was found that most of the viewers are children who use their parents' accounts or even their devices. That age is also the age of parents who have children in the average young age range.

In a geographical context, *YouTube* provides analytics about viewer areas, even down to analytics on the average watch time. The observed object reveals a concentration of viewers in Indonesia, with Malaysia and Japan following closely behind. Even as account owners, it is also possible to see a more specific picture related to the geography of the type of Videos or Shorts or details of the viewers' cities. Besides the location aspect, *YouTube* analytics also displays analysis results regarding the watch time. However, this feature will appear once the account or channel owner has installed the *TubeBuddy* plug-in, which is compatible with *YouTube*. This feature allows account owners to observe the distribution of viewing times.

The final element is related to psychographics or behavioral psychology. Psychographics can be defined as the study of consumer lifestyles, activities, interests, and opinions, which are subsequently identified with psychological characteristics (Schiffman & Kanuk, 1987). *YouTube Analytics* provides extensive of information related to this. We will explain this part in more depth considering that the features displayed in the analytics are also

dominated by aspects of behavioral psychology. The first aspect pertains to how viewers discover channels or video content. In the original theory of the Technology Acceptance Model (Davis, 1989), it is mentioned how Perceived Ease of Use becomes an important element in how someone uses technology or accesses data/information through technology.

The *YouTube* home page starts with the 'Search' feature. The position of this feature is at the very top, as if welcoming visitors. Indirectly, *YouTube* provides ease or framing to visitors who indeed want to search for content on a specific topic. At the bottom of the search feature, *YouTube* offers several tabs that may be predicted as the favorite topics of the visitor's account, and thus the visitors do not have to spend time aimlessly exploring. An algorithm system generates this offer by mapping or discovering interest patterns and visitor account behavior. Similarly, the menu on the left side contains information about channels that have been subscribed to, as well as the watch history and the liked content. All these features are offered to facilitate searches while also identifying the interest patterns of visitor accounts.

To better understand viewer behavior, and especially the behavior of subscribers, *YouTube* analytics provides other important data analyses, such as visualizations of how viewers find a specific channel and/or its video content. Related to the viewers of Calvin Channel, it was found that viewers discovered this channel through the 'Search' feature in 43% of the cases, followed by the Short feed that appears on the viewer's page and through the feed offered through browsing activity. *YouTube* even offers advanced analytics to pinpoint the most frequently searched keywords that visitors use to find our channel. Based on this information, we can conclude that the viewers of Calvin Channel have a preference for video topics about Monster Ultraman over Ultraman itself.

Analytics can also define the persona of channel visitors from the aspect of the time span or the average duration that the viewers stay there. The analytics example shows viewer behavior and where the retention drop-off point or saturation point begins to occur, and also where the highest interest point occurs. The analytics shows that the content quality is above average in terms of retention, up to the point of the highest peak (spike) and the lowest valley (dip). Additionally, *YouTube* also provides the average watch duration or retention for video content. *YouTube* even provides information about the contribution of a piece of content to the increase in subscriber numbers, which is known as the content value.

In the context of *YouTube*, it was found that retention is not only related to watch duration but also to the likelihood of the same viewers returning to watch the same content, as well as information about the effectiveness of Videos and Shorts. We can study the analytics from the types of viewers – new viewers, returning viewers, or subscribers – related to their response to Videos and Shorts. Analysts can determine which content is most popular, and how long the audiences stay.

Regarding other psychographics, such as interests or preferences, YouTube analytics visualizes the top content that is favored and contributes to the growth in numbers and viewer retention. As part of the same analytics, one can see which other channels their subscribers visit most often, which can help youtubers plan their subsequent content. One can also see detailed images of the keywords which people use most frequently

along with the thumbnail design styles they like. Knowing the audience's preferences is a crucial part of developing a channel. When the preferences of social media users align with those of many other viewers, we refer to it as a trend. The empathizing process is the only way to gain knowledge about the audience preferences, which forms the core of content innovation. Through *YouTube*, content creators are greatly facilitated in obtaining data on specific audience behavior patterns.

Developing Ideas, Producing Videos

The stage after empathizing is the thinking of innovative product development ideas, which, in this case, is the subsequent video content. The discussed visualizations can serve as the foundation for developing content ideas. In developing the next video, Calvin Channel considers information from data analytics alongside the element of idealism. However, based on the viewership history, video content built on idealism rarely receives a high response from viewers. It can be learned that, in developing content on social media, it is not advisable to create ideas outside the analysis provided by the platform, or, in other words, *YouTube* analytics can be claimed to have good accuracy.

The next idea development needs to consider data analytics thoroughly, such as the keywords searched by visitors according to the target segment, the style of titles and thumbnail designs that attract the channel's audience persona, the viewer activity times, and the duration and views that become points of spike and dip. All considerations need to take into account demographic, geographic, and especially psychographic aspects, which contain the most complex data in the context of YouTube. At a certain point, content creators can also try new things in terms of filming concepts, songs, and topics discussed, but, once again, this needs to be monitored through *YouTube* analytics, observing the audience reactions and future prospects. If it does not bring beneficial progress, then youtubers are expected to leave it.

Since 2025, *YouTube* has provided a new feature for the ideation to pre-production process in the Inspiration menu. This feature allows content creators to brainstorm or discuss with AI through text prompting. With its algorithm, *YouTube* will generate all relevant data to provide answers or responses to the commands the content creators give. *YouTube* will present several selected ideas with predictions of the audience interest. In this case, *YouTube* is capable of not only performing descriptive and diagnostic functions but also predictive and prescriptive analysis as the highest functions of big data management.

Selvaraj and Marudappa (2016) explain how this analysis is capable of reaching conclusions for the best decision-making. Prescriptive analysis looks at how to take advantage of chances or lower future risks, as well as what each choice will mean. This function is an extension of the previous predictive analysis process. Similarly, in the brainstorming process within the Calvin Channel dashboard, four alternative innovative ideas were generated, each scored on a Likert scale ranging from Very low interest to Very high interest. *YouTube* mitigates the risk of uninteresting content through that scoring.

This feature also provides pre-production processes such as titles, outline descriptions, and ready-to-use thumbnail designs. These components are crucial in determining whether visitors will click on the video or not. Such a process will increase the efficiency of the work time. Users have the option to utilize it in its current form or refine it further through thorough justification and data analysis. Some of the main things that a platform will do in prescriptive analysis are machine learning, statistical logic, operations research, natural language processing (NLP), signal processing, pattern recognition, computer vision, image processing, and speech recognition (Selvaraj & Marudappa, 2016).

In addition to analytics and *YouTube* features, TubeBuddy also provides a supporting feature called *Search Engine Optimization* (SEO). However, *YouTube*'s internal platform SEO is different from the widely used term SEO. Good content will have an SEO score of 100. The TubeBuddy plug-in will guide channel owners in the video upload process and inform them of the SEO score obtained, while even providing corrections if the score has not yet reached 100. This score will determine how one's content will be recommended by *YouTube*. A low score will struggle to attract attention and be recommended by *YouTube* to other users. TubeBuddy's SEO involves building text consistency so that one's videos are considered quality content, which means that they have a high level of consistency in what is conveyed according to the channel's persona and the targeted audience.

Socialize

The final stage in design thinking is testing (Dam, 2024). As shown by Patria et al. (2024) in their classroom action research using the design thinking approach, testing is done by hand in the non-data-based innovation process. *YouTube* has provided advanced machine learning to perform testing functions along with pivoting functions simultaneously and in real time. After the video upload process is completed, account owners can monitor audience interactions through analytics and can immediately make corrections by using the Edit Video Details feature. This feature allows content creators to make improvements at any time without restrictions, such as changing the title, description, hashtags, airing time, and even the thumbnail. In this process, the only limitation is that you cannot change the video file that has already been aired.

In social media interactions, the testing process does not stop at the point of product release, or, in this case, video content release. At all times, channel owners need to conduct observation and maintenance, especially within one to three days after the content has been uploaded. We call this stage the socialization stage, a stage that begins from the moment the content is uploaded and continues until it has reached a saturation point or performance stagnation. McMillan (2016) shows the emergence of interactivity at three levels of communication, namely, among humans, media users; between individuals and texts; and between humans and machines. The second type of textual interactivity is currently manifested by expressing 'Like', commenting, or in the blog domain (Kleut & Drašković, 2014). Content creators will observe and test every interaction or, even in the absence of interaction, then take steps by taking actions such as asking questions and

inviting audience interaction in the comments feature, responding to audience comments, giving 'Likes' or sharing the video on other social media platforms. This is an important socialization stage to build engagement.

Interaction satisfaction and interaction engagement will create value for a brand. Furthermore, it positively affects the customer lifetime value and the customer influencer value (Hamilton et al., 2016). According to its function, as a social media platform, *YouTube* requires interaction traffic between account users to achieve a high crowd, which leads to revenue streams. In sociology theory, interaction relations are one of the components of the social capital because they can enhance value and benefits for the interested parties, as revealed by the pioneer of this term, see Bourdieu (1989). In the digital context, Saxton and Guo (2020) revealed that the key to any benefits from engagement on social media is a specific form of social capital also referred to as the social media capital. The presence of *YouTube* as a big data analytics-based platform will clearly support various forms of communication and interaction that underlie social capital (Carmichael et al., 2015). In the context of social media, social capital is not only about the number of subscribers or views but also about the aspects of interactivity that occur between viewers and viewers, viewers and creators, viewers and machines, and creators and machines.

Reactions and interactions will emerge when the content offered aligns with the audience's preferences. In other words, if we expect good interaction and traffic, then providing videos that offer value to the audience segment is the only effective way. The most passive reaction on *YouTube* is a one-way View. The next higher level of interaction is giving a 'Like', leaving a comment, and sharing the video. The channel owner must respond to each and every reaction. Thus, engagement will increase, and the role of social media as a place for socializing can function as it should. This becomes a challenge for each channel manager to maintain socialization well, intensively, and consistently. Next, all data extracted from the interactions will serve as a feed for the learning process, whether conducted by smart algorithms or by humans. The more data (interactions) emerge, the more valid the analysis of the audience behavior towards the channel will be.

Learning (Machine x Human)

The final part of channel management is studying the responses given by the viewers. Analysis of this data is crucial, especially for content creators who are just starting their journey in the world of social media. Next, the interaction and behavior data of the audience will become input or feed for YouTube's machine learning. Machine learning is a self-learning mechanism based on algorithms that evolves from its own experiences. Generally, machine learning is built on statistical logic that trains and develops itself without human assistance. Behavioral analysis is what machine learning does by creating algorithms from smaller groups of data that can use different sets of features and weights that are based on basic ideas (Krishan, 2023). In principle, the more active the channel owner is in uploading videos and managing interactions, the more valid the analysis conducted by machine learning will be.

The process of programming and machine learning is what produces various information visualizations and data analyses in the *YouTube* analytics feature that has been described in the previous section. The *YouTube* algorithm can respond to, manage, and validate poorly structured big data to generate information. For example, there is the *Click Through Rate* (CTR) feature provided, which shows the quality of content consistency from various perspectives of the components that build that content. CTR is the result of analyzing existing unstructured big data with specific algorithms to identify the content quality. For example, in *YouTube* analytics, a good CTR is mentioned to be between 2% and 10%. Machine learning analysis methods have evolved through descriptive, diagnostic, predictive, and prescriptive stages. *YouTube* not only provides historical information about viewer behavior patterns from demographic, geographic, and psychographic aspects, but it also offers information on trend analysis and recommendations for the next video content development ideas. Pembelajaran mesin *YouTube* enables users to conduct brainstorming processes within a framework that aligns with design thinking, starting from understanding or empathizing with the audience.

These valuable visualizations will only add value if we study them carefully. Humans, as one of the important components in the information system (Romney et al., 2021) play a significant role in utilizing information from *YouTube* analysis into knowledge, intelligence, and wisdom. Liew (2013) modified the conceptual diagram of the DIKW hierarchy into the DIKIW hierarchy by adding the element of intelligence between Knowledge and Wisdom. In its development, *YouTube* data not only display information and knowledge but have even increasingly approached the role of artificial intelligence (AI) that replicates human cognitive processes.

Liew (2013) summarized the definition of intelligence into the following keywords: learning (pattern recognition, memorization, recall, error correction, meaning-making); conceptualization (modeling, prioritizing, categorizing); analytical thinking (analyzing, interpreting, understanding, scenario playing, evaluating); critical thinking (logic, reasoning); creative thinking (imagining, envisioning, hypothesizing, simulating); quick thinking; doing (reading, speaking, music, physical activities, etc.); problem-solving, decision-making, assessment; affective thinking (emotion handling). Of all these functions, *YouTube*'s machine learning has been able to model them, except for the function of affective thinking, which is inherent to the emotional or psychological aspects of humans. Machine prescriptive analysis has not yet reached the stage of considering the deepest human aspects, such as feelings, morals, values, and spiritual aspects, and therefore the role of human learning is highly needed in social media channel management so that to balance artificial intelligence and move towards the stage of wisdom.

Sternberg (2001) conveyed that wise people recognize the need to balance intelligence and creativity in order to achieve both stability and change in the context of social life. This balance can manifest in the form of a dialectical process where "intelligence represents the thesis, creativity the antithesis, and wisdom the synthesis". The convergent view of intelligence is "the ability to adapt to the environment", or the acquisition of skills that enable a person to align with the existing environment. Wisdom can be defined as profound

understanding of universal and transcendental truths, characterized by judgment and accepted as appropriate execution (Liew, 2013). The world of social media is characterized by its wildness and unpredictable nature. Channel managers will face both positive and negative reactions, building and destroying. Emotional intelligence and wisdom are greatly needed in such conditions. Here is an example of a comment that could potentially have a negative impact if not responded to well. Negative comments that have the potential to cause conflict can arise unexpectedly. Here is where emotional intelligence and wisdom play a crucial role as the foundation for a positive, responsive attitude, preventing the dilution of hateful elements. The consideration to maintain harmony in digital social life and prioritize ethical values and universal goodness is key to becoming a good content creator.

Implication

Observations on Calvin Channel provide new insights into the role of data analytics in the content innovation process through design thinking methodology. Data analytics is capable of enhancing the reliability of data on audience behavior due to its ability to optimally process big data and present big data in the form of visualizations, thereby increasing the speed and accuracy of decision making. Data analytics plays a role in all stages of design thinking – as a data provider, brainstorming partner, and decision-making recommender or alternative – from empathizing, ideating, creating, to socializing. This data support will ultimately generate new data that will serve as a feed or input for the machine learning platform to analyze and visualize it to the channel owner through the *YouTube* Studio dashboard. This visualization will subsequently serve as a reference in the empathizing process, which must also consider the aspect of human learning to achieve a more emotionally mature and wise decision.

Specifically, the data feed generated from the interaction process with the audience can serve as inspiration for optimizing the previous stages. The conceptual model illustrates brief explanations.

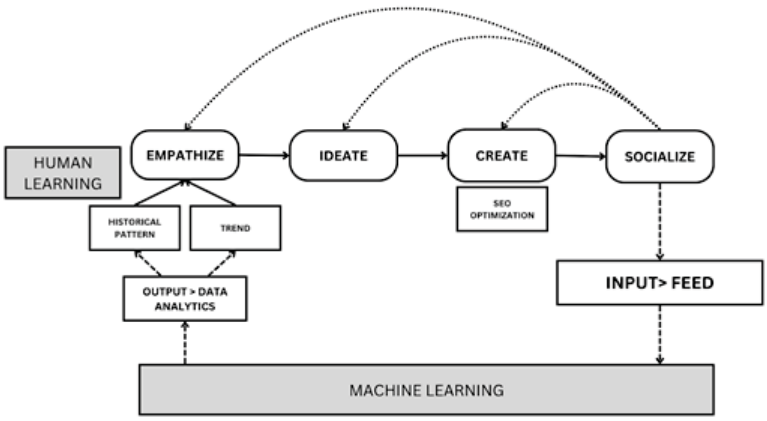

Figure 1. **Conceptual model of data analytics-based design thinking**

The resulting conceptual model prioritizes simple and easily understandable visualizations with the hope of becoming a useful reference for all readers and content creators worldwide. As the basis for the design thinking process in the natural and responsible growth of social media channels, the conceptual model shows how people and machines can work together to make things better. Machines process big data and provide users with rich and valid information up to the level of knowledge and intelligence. The role of humans is to provide a human touch to achieve responses and manage channels effectively and ethically.

These findings also contribute to the development of theoretical concepts. This research enriches the scope of the design thinking concept integrated with data analytics to effectively and efficiently drive social media content creation. Data analytics plays a significant role in every stage of design thinking.

Conclusion

We conclude that the social media development through design thinking will only become more efficient and effective if supported by accountable data analytics process. Engagement between viewers and content creators will naturally develop through interactions starting from views, likes, comments, and sharing videos. Growing a channel organically is not an effortless task, nor is it something that happens instantly. The presence of data analytics has helped the design thinking steps to be faster and more accurate through visualizations that facilitate further human analysis to make ideation decisions in the future. Data analytics can enhance every stage of design thinking, from empathizing, ideating, creating, to socializing. And, in the end, the limitations of data analytics, which only reach the level of partial intelligence processing, still require the human learning process that can achieve wisdom by considering moral aspects and universal values. The findings of this research also inspire the movement for the organic and ethical development of social media channels.

Author contributions

Bonnie Soeherman: conceptualization, methodology, investigation, formal analysis, writing – original draft, writing – review and editing, visualization.

Calvin Leonardo Soeherman: conceptualization, investigation, writing – original draft.

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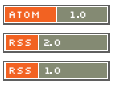

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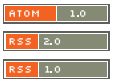

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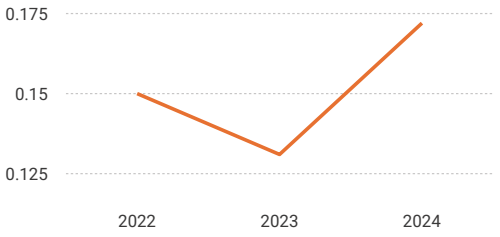

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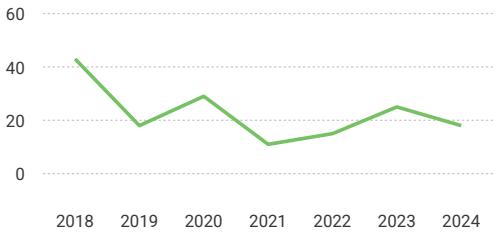

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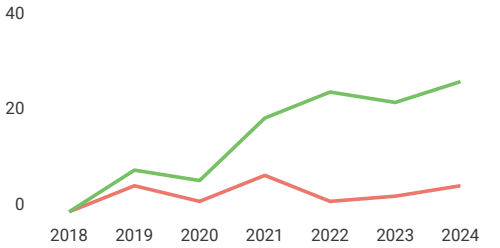

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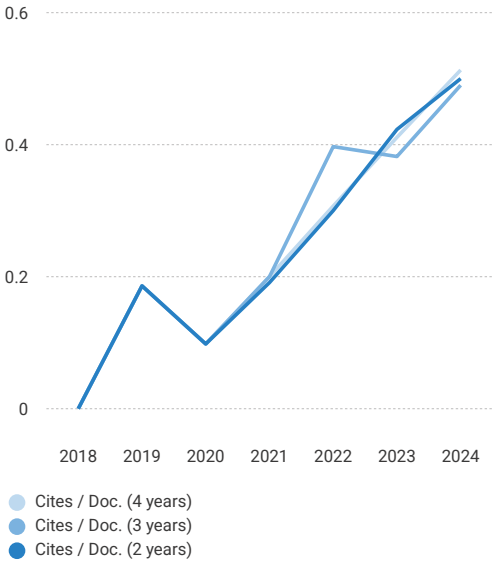

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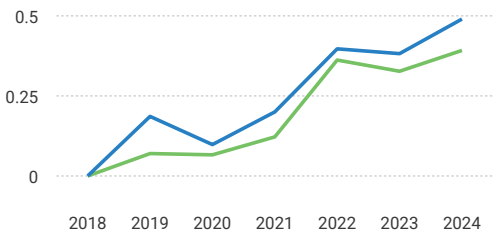

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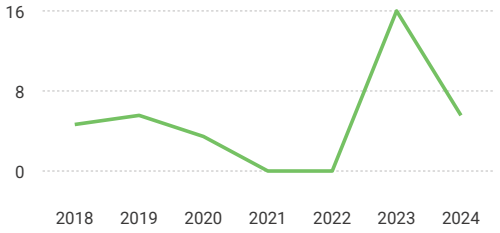

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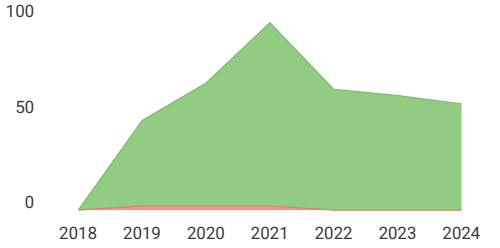

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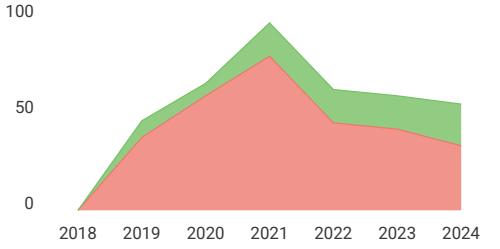

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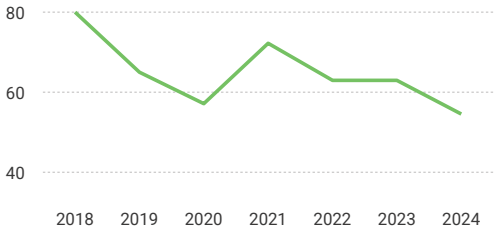

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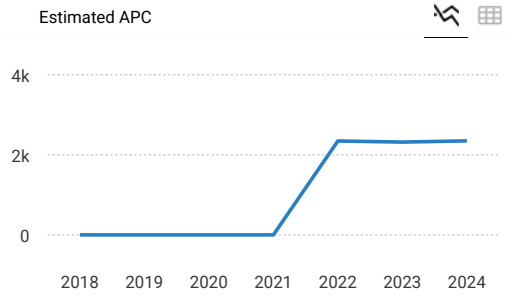

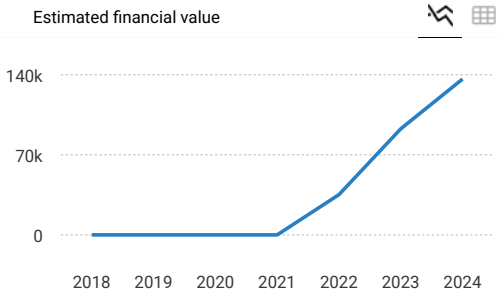

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