Innovation strategy beyond the COVID-19 pandemic: the role of trust under disruptive technology

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Abstract

Purpose – *This paper aims to understand how firms promote innovation under disruptive technology by exploring the role of trust and risk-taking behaviour in enhancing product development towards competitive advantage.*

Design/methodology/approach – *This study proposes a structural equation model that entails seven hypotheses for the constructs and their relationship with support from the previous literature. The empirical analysis involves a survey of the 390 small firms in Indonesia to generate four scenarios following the COVID-19 pandemic.*

Findings – *The evidence indicates that trust allows the firms to take a risk for new product development, which is, in turn, help to achieve their competitive advantage. However, the impact of product development on competitive advantage varies depending on the capability of the firms to deal with the information technological turbulence.*

Research limitations/implications – *This study adopted the concept of trust at the organisational level and did not cover the concept of trust at the family and community levels. Secondly, this study focusses on small and medium-sized enterprises as unit analysis during the COVID-19 pandemic. The results depend on the subject of study, which could be different from the normal condition.*

Practical implications – *This study provides four scenarios of foresight innovation strategy, which allow the firms to deal with various plausible futures. The proposed model devise strategies to prepare a strategy in the face of uncertainty. The findings encourage the firms to cultivate trust from their business partners to create innovation.*

Originality/value – *This study extends the discussion on how innovativeness leads to firm competitive advantage by examining the role of trust and risk-taking behaviour in product development under information technological turbulence. The results confirm the integration between social capital theory and the contingency approach.*

Keywords *Innovation, Competitive advantage, Risk management, Scenario planning, Information technological turbulence*

Paper type *Research paper*

1. Introduction

COVID-19 pandemic continues to bring uncertainty by forcing small businesses to embrace information technology (IT). Undoubtedly, innovation during the crisis is crucial for organisational resilience and competitiveness through forming valuable resources and taking risks (Cefis *et al.*, 2020; Hipp and Binz, 2020). However, many small businesses reported struggle to adopt the IT changes due to various barriers, including lack of confidence, poor IT strategy and the pressure of other commitments (Chouki *et al.*, 2020). On the other hand, other businesses respond to the current crisis and make the necessary changes to survive and even thrive by developing their product and services to seize opportunities through social media or cold calling customers (Sheth, 2020).

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The innovation that entails product development requires trust-based support from the business partners (Sheth, 2020). Therefore, there is critical to examine the complicated role of disruptive technologies and other elements that enhance the initiative to generate new products in the market towards a highly competitive advantage (Shepherd *et al.*, 2018). For small and medium-sized enterprises (SMEs), the concept of competitive advantage differs from the large companies that focus on acquiring the most valuable resources (O'Donnell *et al.*, 2002). In contrast, small businesses rely on a solid personal relationship with their stakeholders, posing a risk of coordination failure (Wang *et al.*, 2020). Moreover, the heterogeneity of small businesses entails complicated elements for policymakers to understand the decision-making process (Karoui, 2017). Hence, the research gap arises from a coopetition strategy to help small businesses survive the pandemic crisis (Crick and Crick, 2020).

This study seeks to understand product development during the COVID-19 pandemic under information technological turbulence, which involves risk-taking behaviour and trust with the business partners. This article integrates concepts from social capital theory and contingency theory to propose a conceptual framework that explores the role of trust and risk-taking behaviour on product development under information technological turbulence. The results attempt to extend the discussion on the intersection between social capital theory and contingency approach to understand the role of trust in entrepreneurial risk-taking behaviour and competitive advantage under information technological turbulence.

The article falls into six sections. It begins with the research gap and purposes in the introduction. After the introduction, Section 2 discusses the literature review, which consists of the social capital theory, contingency approach and hypothesis development. Hence, the research method explains how this study gathers evidence in Section 3. Section 4 provides empirical results that offer supporting evidence with various scenarios that broadly support the adaptive strategies under uncertainty. Section 5 lays emphasis on research implications, which holds firmly to the belief that dynamic IT is inevitable. Section 6 concludes the paper.

2. Literature review

2.1 Competitive advantage in small and medium-sized enterprises

Competitive advantage refers to superior position upon customer value, market share, efficiency and profitability performance. Competitive advantage corroborates the capability of the firms to attain performance more excellent than competitors (Porter, 1998). The literature shows that the concept of competitive advantage in SMEs is different from the prescribed concept for large companies. SMEs tend to focus on low overhead costs to provide low prices, which implies a lack of added value and poor quality. On the contrary, SMEs serve a specific market that large companies avoid for an economic-scale reason. Hence, the perception of owner-managers plays a pivotal role in identifying the competitors and the business partners (O'Donnell *et al.*, 2002). It is critical to understand the relationship between product development and the social capital that help the firms to develop new services and products, which involves process innovations simultaneously (Shepherd *et al.*, 2018).

The emerging concept of resource-based theory encourages managers to understand the nature of competitive advantages extensively (Sigalas, 2015). Hence, knowledge-creation capacity allows firms to enhance their competitive alliances (Zhao *et al.*, 2018). The mainstream of classical economics concern with the decision-making process of product development. SMEs practically dive straight into selling activities and alliances, directly adapted to business environment turbulence (Sarasvathy, 2001). Technological turbulence generates entrepreneurial opportunities and challenges the established relationship, representing socio-political legitimacy (Hall and Rosson, 2006), what Schumpeter (1934)

called creative destruction. Under business environmental turbulence, exploring entrepreneurial behaviour requires understanding the capability to seize the business opportunity and achieve remarkable performance whilst other firms suffer from poor performance (Covin and Lumpkin, 2011).

Entrepreneurship is a continual experimental process that includes introducing new products, followed by market failure, enter another industry, then exit and take over the subsidiaries then divest them to find the best effort in the institutional context (Foss *et al.*, 2018). Creating a new product in the SME context requires many interdependent choices that raise the boundedly rational risk (Baumann *et al.*, 2018). Firms take a risk to manage a large set of projects to gain trust (Levinthal, 2017). The process may involve co-innovation to deal with a lack of resources at a relatively low level. Hence, co-evolution failure occurs when there is not enough resource allocation for a partnership strategy (Zhao *et al.*, 2018).

2.2 Risk-taking behaviour and competitive advantage

Risk-taking behaviour drives the firm to seize business opportunities under uncertainty and gain a competitive advantage, especially when other firms may avoid them. Successful firms demonstrate proper risk management to achieve competitive advantage (Elahi, 2013; Saedi *et al.*, 2019; Pratono *et al.*, 2020). Risk-taking behaviour is a propensity to engage in entrepreneurial activities that may harm the business organisation. Traditionally, decision-makers consider risk as a source of avoidable and costly evil (Elahi, 2013). The modern perspective believes that a risk-averse strategy implies lower performance (Zhao and Zhu, 2017). The contemporary view of risk management becomes a strategic role, providing business organisations opportunities to achieve competitive advantage (Elahi, 2013). The decision-making process under information asymmetry carries an element of risk, especially when the competitors have more relevant information (Keszey, 2018).

SMEs face enormous risks from acquiring networks and resources (Grant *et al.*, 2014). Instead of starting with an assumption of the targeted market and investing money in designing the best business model, SMEs start their business by bringing the idea to market with as close to zero resources as possible (Sarasvathy, 2001). The core mechanism through which performance affects the decision changes the propensity to take risks (Sengul and Obloj, 2017). When the decision-makers consider the various consequences of innovation, the policy reform needs to examine the relationship between risk and reward for long-run growth. On the other hand, distrust allows firms to overcome opportunistic behaviour by raising awareness of the unexpected behaviour of a partner. Distrust provokes firms to conduct the necessary controls to opportunism risks, implying competition intensity and relationship performance (Raza-Ullah and Kostis, 2020):

H1. Risk-taking behaviour has a positive impact on competitive advantage.

2.3 Risk-taking behaviour and product development

SME innovation is risky because firms need to deploy valuable resources but no guarantee that they will help them achieve more remarkable performance. The risk and uncertainty become apparent during the innovation process (Williams *et al.*, 2020). Accordingly, the innovation capability demonstrates how firms successfully minimise the negative impact of innovation implementation by targeting predominant risk at different innovation processes (Games and Rendi, 2019). An unknown risk is a crucial element that leads to failure in product development (Salavati *et al.*, 2016). Due to limited resources, firms may change only their product design and retain the customer-service dimension may suffer from decreasing performance (Baumann *et al.*, 2018).

Product development commonly involves suppliers in the SME context, but not all collaborations adequately support the firms to enhance their productivity. To secure the

partnership, firms avoid the contractual rigidity that hinders resources by establishing a flexible strategy with the general contractual structure, which is more adaptable than the contractual rigidity that hampers resources (Bao *et al.*, 2017). Though knowledge creation carries an element of risk, the collaborative improvement of capacity heavily relies on knowledge (Zhao *et al.*, 2018). Therefore, risk and resources need to evaluation the approach concerning affordable loss versus expected return (Pellegrini *et al.*, 2018). In addition, the risk-averse behaviour that springs from distrust is essential for firms to prevent undesired behaviours that can destroy value (Raza-Ullah and Kostis, 2020).

During the early stages of venture formation, the intention to take a risk comes from non-economic motivation by managing the traditional sources (Shepherd *et al.*, 2018). The social network extension will influence their competitive advantage, such that firms take a risk to enhance the network ties to sustain growth and to survive (Liu, 2018). Firms need to manage the new interaction with customers who provide insightful information for product development by stimulating creativity and innovation (Caputo, 2019). An online mechanism may allow the partner to behave opportunistically. Thus, firms need to be aware of risk-reduction and trust-building signals (Kozlenkova *et al.*, 2017). Trust plays a pivotal role in promoting product development by strengthening the network structure. Social interactions and mutual trust allow firms to increase the efficiency level of innovation activities (Liu, 2018):

H2. Risk-taking behaviour has a positive impact on product development.

2.4 Trust and competitive advantage

Trust refers to a high confidence level that allows firms to become reliant on their business partners, which entails an expectation of trustworthiness of business partners to go beyond transactional relationships (Sharma *et al.*, 2020). Trust is a critical element of social capital, which helps firms deal with organisational boundaries by developing a coherent strategy that encourages various stakeholders to convergence their interests (Olieveira and Lumineau, 2018; Caputo, 2019). Trust is an essential resource to firm survival under turbulent times. The impulse towards risk-taking behaviour may spring from the risk structure, especially during the dynamic environment (Stein and Wiedemann, 2016). Slack resources make firms reluctant to take risks or change strategic posture (Acar *et al.*, 2018).

In the SME context, social capital plays a pivotal role in promoting financial performance through interpersonal relationships with key stakeholders, e.g. bank managers, government leaders, association managers and cultural institutions (Dar and Mishra, 2020). The reciprocal relationship is an essential element of competitive advantage that SMEs strive for by promoting relationship formation and encouraging positive behaviour (Kozlenkova *et al.*, 2017). Moreover, applying knowledge and skills through the partnership allows firms to generate values to drive a competitive advantage (Gnyawali and Charleton, 2018) through valuable communication with stakeholders, who interpret the information about the signals of organisational behaviour (Wood and Ogbonnaya, 2016).

The trust allows the firm to gain a competitive advantage by acquiring valuable resources beyond organisational boundaries (Keszey, 2018). A trust-based relationship is a key resource of firm competitive advantage because it is valuable, rare, imperfectly imitable and often non-substitutable. The role of social networks on firm performance positively demonstrates affective trust (Dong *et al.*, 2020). A trust-based relationship with business partners is a precondition for competitive advantage through promoting creativity in human resource management practices (Lee *et al.*, 2019). Commitment and sharing of vision demonstrate the role of trust in knowledge creation (Ernawati and Hamid, 2021):

H3. Trust provides a positive impact on competitive advantage

2.5 Trust and product development

Product development requires systematic processes that generate an atmosphere of trust to balance mitigating uncertainty and inspiring creativity (Brattström *et al.*, 2012). Trust in the product development process is essential for competitive advantages allowing the firm to increase barriers to entry and barriers to exit (Franklin and Marshall, 2018). Adopting new production methods is more reliable than increasing the workers' satisfaction to increase organisational involvement (Wood and Ogbonnaya, 2016). Product development with support from suppliers requires trust to integrate resources, which shows the supply chain's contribution (Bao *et al.*, 2017). A collaborative co-creation approach involves sharing resources from both organisations, which requires trust-building to avoid co-creating exploitation (Franklin and Marshall, 2018).

SMEs face challenging issues of mutual reinforcing regarding standard product design and customer self-service (Baumann *et al.*, 2018). The partnership strategy involves in external partnership is a dominant tool to achieve competitive advantage. The relationship becomes a valuable resource to the management of foreign relations (Pellegrini *et al.*, 2018). Through strengthening the trust-based interactions, firms impose new product development, which further allows them to outcompete other business organisations in the industry (Raza-Ullah and Kostis, 2020). Trust plays a pivotal role in open innovation activities by facilitating collaborative efficiency through information relation governance (Brockman *et al.*, 2018). Product development gains support from the knowledge resources rooted in transactional cost economics (Wang *et al.*, 2020):

H4. Trust has a positive impact on product development.

2.6 Trust and risk-taking behaviour

Trust-based contracts demonstrate the inter-firm relationship that features high uncertainty and risks (Bao *et al.*, 2017). One reason partnerships lead to trust comes from the level of confidence to offset the risk by sharing information resources (Franklin and Marshall, 2018). The increased risk tolerance which is in line with the higher intention to take a high-risk project may become inefficient during the decision-making process (Sengul and Obloj, 2017). Trust is an essential element of social capital, which help a firm to increase the corporate value by enhancing collective capability (Chuang *et al.*, 2016) and promoting entrepreneurial behaviour to address resource constraints (Bauernschuster *et al.*, 2010). Trust violations occur at the beginning of the inter-organisational relationship as there is a great sense of betrayal (Olieveira and Lumineau, 2018). The interaction with partners generates specific trust development, which is critical for the relationships (Cao and Galinsky, 2020).

Co-creation innovation that entails information uncertainty and appropriability risk requires a societal trust to reduce opportunism during collaborations (Brockman *et al.*, 2018). The connection to trust creation will remove risk and encourage the co-creative partnership (Franklin and Marshall, 2018). The dark-side experiences in the past may change organisations link operational and strategic activities, which determines the propensity to take risks (Olieveira and Lumineau, 2018). The reciprocation step is a critical signal in relationship formation for both parties to increase mutual trust and commitment (Kozlenkova *et al.*, 2017). In complicated business channels, transaction costs may spring from intermediaries who persuade clients to settle payments offline that demonstrate risk transactions as the firms may lose control over the middlemen (Du and Mao, 2018).

H5. Trust has a positive impact on risk-taking behaviour.

2.7 Product development and competitive advantage

Product development is the process of generating a new product or improving an existing one. Firms generate novel strategies to pursue entrepreneurial opportunities by developing

new products or business models (Baumann *et al.*, 2018). Traditionally, the literature argues the universally positive effect of product development on competitive advantage (Shepherd *et al.*, 2018). New product development demonstrates the strategic significance to achieve a competitive advantage (Nadeau and Casselman, 2008). Firms with solid research and development (R&D) orientation tend to enhance their capability to generate product innovation capability, which positively leads to competitive advantage (Hsiao and Hsu, 2018).

Creativity and innovation become the primary driver for SMEs to achieve competitive advantage. However, the resource limitation and disruptive business environment may hamper creativity and innovation (Acar *et al.*, 2018). SMEs prefer to undertake the new product development by adopting open innovation that involves stakeholders than searching by oneself that seems to be effective under low complexity (Baumann *et al.*, 2018). The knowledge transfer between firms and suppliers, universities or other organisations for new product development ultimately leads to improved competitive advantage (Distanont and Khongmalai, 2018):

H6. Product development has a positive effect on competitive advantage.

2.8 Contingency theory and information technological turbulence

Information technological turbulence refers to changes in IT that imply a hostile business environment within an industry. The changing technology poses various levels of competitive advantage and hence calls for strategic-level attention (Elahi, 2013). Business environmental turbulence brings a revolution of the paradigms by influencing the organisational capacity to seize entrepreneurial opportunities (Schilke, 2014; Pellegrini and Ciappei, 2015). Information technological turbulence provides incentives to enhance trust in their network to seize entrepreneurial opportunities (Liu, 2018; Pratono, 2018). Furthermore, the information technological turbulence allows firms to learn the successful eco-innovation process from their partners by conducting co-production to promote sustainable competitive advantage (Ch'ng *et al.*, 2021).

On the contrary, the high information technological turbulence leads to the information disparity between decision-makers, expert members and the stakeholders, implying misinterpretation in the decision-making process (Chen *et al.*, 2018). The high environmental turbulence reduces the dynamic capabilities of firms' competitive advantage (Schilke, 2014). Firms struggle to deal with disruptive technology and market dynamics, but they can rely on social network extension, which helps them achieve a competitive advantage. Under a high information technological turbulence, firms are concerned about designing high-risk decisions, especially when they attempt to develop a new product (Li *et al.*, 2017).

The contingency theory premises that firms should develop their ability to achieve the best performance by allocating their valuable resource with all possible contingencies (Donaldson, 1995; Homburg *et al.*, 2012). Innovation during turbulence demonstrates risk-taking behaviour that firms attempt to survive under high uncertainty (Pratono, 2020). The ability to manage information under the technological information turbulence shows that the success of product development demonstrates the capability to deal with the information technological changes (Caputo *et al.*, 2016). The wait-and-see approach becomes a particular strategy when the decision-making process involves significant resource deployment during the product development project (Gnyawali and Charleton, 2018):

H7. Product development provides a more substantial influence on competitive advantage under moderate information technological turbulence than under high information technological turbulence.

3. Research method

3.1 The research designs

The initial stages of the research focus on developing a structural equation model (SEM) that explains how to trust risk-taking behaviour influences competitive advantage. The model illustrates the research hypotheses and explores the variable relationship from the previous literature, which concerns the constructs and relationship between the constructs representing the hypotheses from the literature review. This study also examines the mediating effect of product development to understand why risk-taking behaviour influences competitive advantage. In addition, this study also highlights the moderating role of information technological turbulence, which explains the relationship between competitive advantage and risk-taking behaviour in various business environments.

This study proposes four scenarios to establish the foremost strategy by identifying a variety of futures. This study uses an independent and moderating variable to develop four scenarios, which involve the exogenous variables as the main driving forces. The scenario does not predict the future but helps the firms identify multiple futures that enable them to sense and adapt to the new business environment. This scenario extends the literature, which attempts to understand how firms gain competitive advantage through innovation strategy under disruptive technology by exploring the role of trust and risk-taking behaviour.

3.2 The measures

The second step examines the measurement models that explain the relationship between the corresponding indicator variables and the construct based on the measurement theory (Hair *et al.*, 2014). This study concerns five established measurements: risk-taking behaviour, trust, product development, information technological turbulence and competitive advantage. Using the Likert scale from 1 to 7, 1 refers to disagree totally and 7 shows that respondents fully agree following the respondents' evaluation of the statement, which was adapted from previous studies. This study adopts a subjective measure that allows the respondents to share their perspectives informally following the suggestion of Garengo *et al.* (2005).

This study adopts the measures of competitive advantage from Schilke (2014) encourages the respondents to evaluate the following statements: "Our ROA (return on asset) is continuously above the industry average", "Our ROI (return on investment) is consistently above the industry average", "Our ROS (return on sales) is consistently above the industry average" and "Overall, we are more successful than our major competitors". The construct of competitive advantage is the latent variable, which is measured indirectly by the four indicator variables.

The measures of risk-taking behaviour rely on two indicator variables in which the respondents evaluate the reversed statements: "[. . .] my firm typically adopts a cautious, 'wait-and-see' posture to minimise the risk" and "The managers of my firm prefer to study a problem thoroughly before deploying resources to solve it". The measures were adapted from Lumpkin *et al.* (2009). The measures of product development adopt a set of stages tradition, which involves "capability to manage new products", "launches new products to exploit R&D investment", "test marketing of new products" and "responsive to customer needs" (Trez and Luce, 2012).

The construct of trust consists of six measure variables, which were adapted from Keszey (2018). The respondents evaluate the statements: "high reciprocity amongst the colleagues", "[. . .] share organisation vision", "mutual respect amongst the partners" and "personal friendship amongst the partners". This study adopts the constructs of information technological turbulence from (Zhang and Duan, 2012). The measures consist of four items: "The information technology [in our industry] is changing rapidly", "Information

technological changes [in our industry] provide big opportunities in our business", "A large number of new product ideas have been made possible through technological breakthroughs [in our industry]" and "Information technological changes in our industry generate new ideas for product supply".

3.3 The data collection

This study concerns firms with SMEs in the Indonesian context. There are three main reasons to select SMEs. Firstly, 97% of domestic employment in this country work in this type of business. Secondly, the development of the SME strategy has become an essential instrument to improve overall national goals in most developing countries (OECD, 2018). Last, the pandemic hit most small businesses in Indonesia and many may not survive (UNDP, 2020).

In the first step, we identify firms from the SMEs directory that the Indonesian Ministry of Cooperative and SMEs provides, which indicates that one of the criteria for a small and medium-sized enterprise is their asset, which should vary from IDR 50m to IDR 10bn, as well as sales between IDR 300m and IDR 50bn. After distributing the questionnaires to the randomly selected respondents and removing the missing data, the total observed firms included in the sample were, thus, reduced to 390.

Table 1 shows the respondent profile, which indicates that the level of risk-taking behaviour varies in both assets and sales. Based on their asset, 62% of respondents claim that their annual sales go from IDR 500m to IDR 10bn. The data collection was conducted between February and June 2020, where the COVID-19 pandemic hits the country. In total, 62% of firms claim that their annual sales range IDR 300m and IDR 2.5bn per annum based on their sales. Nearly 70% of respondents claim that their level of trust is higher than the median value (4) and 17% of them believe that their level of trust is less than 4, whilst the rests belong to the median level.

This study uses collected data from 390 owner-managers, who represent their business organisation. The measures of competitive advantage adopt a subjective approach, which allows the respondents to provide information on financial performance based on their perspective. This approach may imply data bias, as the owner-managers may attempt to show their great performance. Hence, this study uses a non-respond bias test to identify whether the collected data from the owner-managers and the stakeholders remain consistent. We invite 50 respondents, who were different from the previous 390 samples. They answered a similar questionnaire. The results show that there is no significant bias between the owner-managers and the stakeholders (Table 2).

Table 1 Profile of respondents based on the trust level

Firm-sized criteria	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Total*
Asset								
Less than IDR 50m	0	0	2	3	10	10	3	28
Between IDR 50m and IDR 500m	3	8	13	24	36	31	5	120
Between IDR 500m and IDR 10bn	4	16	15	31	73	94	9	242
	7	24	30	58	119	135	17	390
Annual sales								
Less than IDR 300m	2	3	6	18	25	19	3	76
Between IDR 300m and IDR 2.5bn	5	20	21	30	73	102	11	262
Between IDR 2.5bn and IDR 50bn	0	1	3	10	21	14	3	52
	7	24	30	58	119	135	17	390

Table 2 Common method bias

Constructs	*Mean difference*	*Sign*	*Conclusion*
Competitive advantage	−0.024	0.368	Similar
Trust	−0.385	0.034	Similar
Risk-taking behaviour	−0.414	0.579	Similar
Product development	−0.142	0.664	Similar
IT turbulence	0.652	0.653	Similar

3.4 The analysis

This study uses a partial least square to test the hypothesis of the SEM. The estimation process of parameters falls into two main steps. The first step is to analyse the measurement models that adopt an iterative algorithm approach to generate values for the relationship between construct and the measure variables (Benitez *et al.*, 2020). The following step concerns minimising the measurement error of each construct by removing some items that do not meet the threshold value. This step involves assessing the indicator loading, internal consistency reliability, convergent validity and discriminant validity of each measurement variable.

The literature suggests that the reliability values of exploratory studies should be 0.6 or higher. The loading value of each item should be above 0.708, which means that the variance of each item explains the construct at least 70% (Hair *et al.*, 2019). Internal consistency reliability: Cronbach Alpha Reflective measurement model assessment focusses to address the convergent validity: AVE. The next step is to assess discriminant validity: Fornell Larcker criterion does not perform well when the indicator loadings lay between 0.65 and 0.85. The heterotrait-monotrait (HTMT) ratio shows the mean value of the item correlation relative to the mean of the average correlation. Discriminant validity does not present when an HTMT value is above 0.90.

The second step is hypothesis testing. The partial least squares PLS-SEM relies on bootstrapping of a non-parametric resampling procedure to test the hypothesis. This approach focusses on examining the sample variability than assessing the variability of the sample data statistic rather assess the precision of the estimated coefficients (Streukens and Leroi-Werelds, 2016). Hence, the PLS adopts an algorithm approach to calculate the path coefficient. The algorithm approach for obtaining the path coefficient is not based on minimising the divergence between observed and estimated covariance matrices. Consequently, the concept of Chi-square-based model fit measures is not applicable (Hair *et al.*, 2019).

4. Results

The hypothesis test involves an algorithm approach to estimate the coefficients of the path and other parameters of the constructs through optimising the explained variance. The outer loadings indicate the particular indicators of the single regression in reflective measurement models. The first step concerns assessing the model with reflective measures. The analysis adopts the composite reliability (CR) and average variance extracted (AVE) to examine the convergent validity, whilst the discriminant validity uses the cross-loadings approach.

Table 3 shows that the models meet the criteria of convergence validity. The coefficients of outer loadings are higher than 0.730, indicating the commonality of the associated indicators in each construct. The results demonstrate that the variances shared between the constructs and the indicator variables are higher than the measurement error variance. The models meet the criteria of internal consistency reliability with the CR values are higher than

Table 3 Measures, composite reliability (CR) and average variance extracted (AVE)

Variables	*Loadings*	*AVE*	*CR*
Risk-taking behaviour (RB)			
To deal with uncertainty, my firm typically adopts a cautious, "wait-and-see" posture to minimise the risk (R)	0.834	0.769	0.707
The managers of my firm prefer to study a problem thoroughly before deploying resources to solve it (R)	0.918		
Trust (TR)			
Our firm is characterised by high reciprocity amongst colleagues	0.875	0.678	0.944
All the colleagues in our firm share organisation vision with each other	0.794		
There is a good understanding of our firm's partners	0.808		
Our strategic alliance is characterised by mutual respect amongst the partners	0.881		
The strategic partnership of our firm is marked by personal friendship amongst the partners	0.875		
The strategic partnership of our firm is marked by personal friendship amongst the partners	0.892		
Product development (PD)			
Our firm has the capability to manage new products	0.883	0.628	0.854
Our firm speedily develops and launches new products to exploit R&D investment	0.803		
Our firm carries out a test marketing of new product/services	0.737		
Our firm makes sure that product/service development efforts are responsive to customer needs	0.820		
Information technological turbulence (IT)			
The information technology in our industry changes rapidly following the COVID-19 pandemic	0.849	0.683	0.915
Information technological changes in our industry generate significant opportunities in our business after the COVID-19 pandemic	0.845		
A large number of new product ideas have been made possible through information technological breakthroughs in our industry in the near future	0.876		
Information technological changes in our industry generate new ideas for service supply in the near future	0831		
Competitive advantage (CA)			
Our ROA (return on asset) is continuously above the industry average	0.838	0.654	0.930
Our ROI (return on investment) is consistently above the industry average	0.858		
Our ROS (return on sales) is consistently above the industry average	0.875		
Overall, we are more successful than our major competitors	0.883		

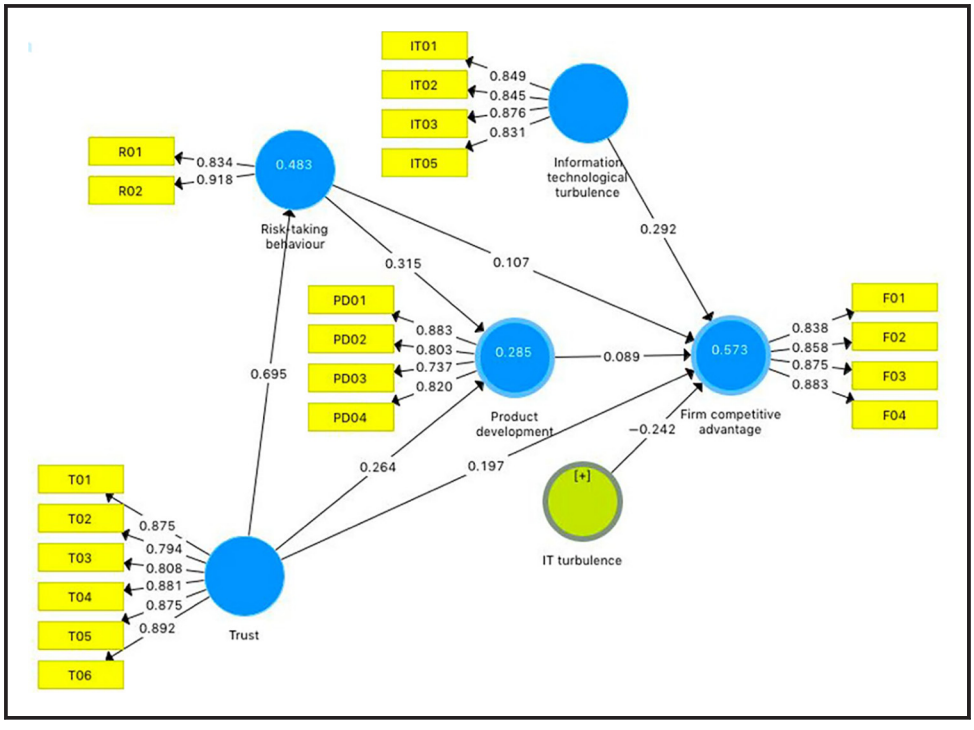
0.7. The model has excluded indicators with low outer loading to increase the composite reliability. The constructs meet the criteria of discriminant validity. Table 2 shows that the variance of indicator explains each construct with AVE values of more than 60%. The values indicate that the models meet the criterion with a high commonality of the constructs. Table 4 presents the results of the HTMT discriminant validity test with the value range between 0.267 and 0.817. A high HTMT value indicates a problem of discriminant validity with the threshold value of 0.90. The highest value occurs at the construct of information technological turbulence. The results show that discriminant validity does not present in the proposed structural model.

Figure 1 shows the path coefficients, which indicates that the endogenous latent variables serve as the dependent variables. In addition to the estimation, the R^2 values explain how variances in the construct explain the dependent variable. The R^2 value of 0.285 for product development indicates that the exogenous latent variables of trust and risk-taking behaviour explain 28% of the variance of the product development. The R^2 value of 0.573 for

Table 4 HTMT

Constructs	*CA*	*RB*	*Mo*	*TR*	*PD*
RB	0.712				
Mo	0.305	0.178			
TR	0.855	0.841	0.267		
PD	0.814	0.775	0.225	0.815	
IT	0.808	0.777	0.353	0.809	0.817

Figure 1 Algorithm path analysis



competitive advantage shows that all exogenous latent variables explain 0.57% of the variance of competitive advantage. The literature suggests the heuristic criteria to examine the capability of the SEM to predict the firm behaviour than applying the goodness of fit (Hair *et al.*, 2014).

H1: The bootstrapping approach for the path relationship between risk-taking behaviour and competitive advantage provides the empirical *t*-value of 2.704 with a standard deviation of 0.046. The results indicate that risk-taking behaviour significantly impacts the competitive advantage at an error level of 1%, which rejects the null *H1* (Table 4). The results confirm the previous studies, which argues that the impulse towards risk-taking behaviour allows the firms to achieve their competitive advantage (Elahi, 2013; Grant *et al.*, 2014; Zhao and Zhu, 2017; Pratono, 2020).

H2: The coefficient of risk-taking behaviour on product development has a standard deviation of 0.046 and a *t*-statistic value of 2.7 (Table 5). The results indicate the significant effect of risk-taking behaviour on product development with a *p*-value close to 1%, which

Table 5 Bootstrapping path analysis

Path	*Original sample (O)*	*Sample mean (M)*	*SD*	*t-statistics*	*p-values*
RB -> CA*	0.125	0.120	0.046	2.704	0.007
RB -> PD*	0.290	0.300	0.066	4.505	0.000
TR -> CA*	0.210	0.212	0.066	3.160	0.002
TR -> PD*	0.250	0.250	0.063	3.990	0.000
TR -> RB*	0.695	0.695	0.033	21.05	0.000
PD -> CA*	0.177	0.179	0.046	3.847	0.000
IT -> CA*	0.235	0.237	0.041	5.762	0.000
ME -> FP*	−0.198	−0.198	0.034	5.756	0.000

Note: * = significant at alpha 1%

confirms *H2*. The results gain support from the previous works, which argue that the decision-makers need to adopt risk-taking behaviour to develop a new product with expected values (Elahi, 2013; Baumann *et al.*, 2018; Zhao *et al.*, 2018).

H3: The impact of trust on competitive advantage has a standard deviation value of 0.066 and a *t*-statistic value of 3.16, which indicates that *H3* is acceptable with a *p*-value close to 1% (Table 5). The results broadly support the previous studies, which argue that competitive advantage requires trust, which provides fertile ground for the partnership effectiveness (Kozlenkova *et al.*, 2017; Du and Mao, 2018; Gnyawali and Charleton, 2018).

H4 is acceptable that the positive impact of trust on product development has a standard deviation of 0.25 and *t*-statistics of 3.99 (Table 5). The results confirm the previous studies, which argue that product development requires high trust in systematic processes to promote the integration of complementary profits (Brattström *et al.*, 2012; Bao *et al.*, 2017; Brockman *et al.*, 2018).

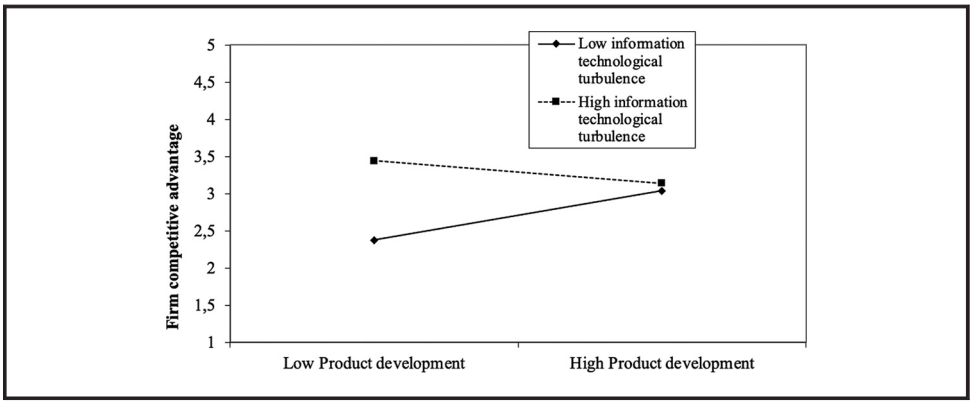
H5 is acceptable, as the impact of trust on risk-taking behaviour yields a standard deviation value of 0.033 and a *t*-statistic value of 21.054 (Table 5). The *p*-value of 1% confirms the previous studies, which argue that firms may adopt risk-taking behaviour requiring some confidence level after gaining trust from their partners by an open exchange of information (Levinthal, 2017; Sengul and Obloj, 2017; Franklin and Marshall, 2018).

H6: the yield *p*-value of 1% springs from a standard deviation value of 0.046 and a *t*-statistic value of 3.847, indicating that the path relationship between trust and risk-taking behaviour with a value of 0.177 is significant (Table 5). The results confirm the literature, which argues that product development contributes to the competitive advantage (Nadeau and Casselman, 2008; Shepherd *et al.*, 2018; Distanont and Khongmalai, 2018).

Figure 1 shows the results from the algorithm to estimate the path model. Based on their sizes, Figure 1 shows that the indirect effect of trust on competitive advantage through various steps: trust → risk-taking behaviour → product development → competitive advantage. The results confirm that trust allows firms to take a risk, which is essential to develop new products and competitive advantage. The effect of trust on risk-taking behaviour with a coefficient of 0.695 is the highest value, followed by the impact of risk-taking behaviour on product development with a coefficient of 0.315.

The moderating test involves the interaction variable, which explains the positive effect of information technological turbulence and the negative impact of the interaction variable (trust x information technological turbulence). The results are consistent in *H7* that information technological turbulence moderates the relationship between trust and competitive advantage. Hence, Figure 2 indicates that the slope of effect trust on

Figure 2 Moderating effect of information technological turbulence



competitive advantage is flatter under high information technological turbulence than under low information technological turbulence. The results suggest that disruptive technology reduces the positive impact of trust on competitive advantage.

Table 6 provide the *f* square to examine the impact of the removal of a selected construct on the R square value of the endogenous construct. The values of *f* square at Table 6 confirm the results of estimated coefficients in Figure 1, which shows that the impact of trust on product development has the highest value, following the impact of risk-taking behaviour on product development. The results confirm the literature, which argues that the effect size of *f*-square tends to be like the size of the path coefficient (Hair *et al.*, 2019).

Table 7 shows four scenarios of innovation strategy, which demonstrates the role of trust as an independent variable and information technological turbulence as moderating variable. Scenario I offers the best context in which firms enjoy high trust with the partners, who allow them to take a risk and following the intention to enhance their capability to create products. Low information technological turbulence allows product development to adapt to the change, which, in turn, help firms to achieve a great competitive advantage. The story of high trust is different when the information technological turbulence is high, brings the firms into a difficult situation in identifying effective innovation strategies to create new products (Scenario II).

Scenario III indicates that the firms struggle to create innovation when they distrusted their partner. A firm with a lack of trust tends to become reluctant to take a risk after undermining trust and commitment from the partners. The lack of firm innovation may spring from a personal problem. Firm competitive advantages depend on the capability to generate new solutions, which come from the social relationship. Scenario IV shows the worse situation when the firms experience overwhelmed the changing technology into some turbulence scenario. Innovation through product development creates a competitive advantage over time, but the information turbulence makes firms challenging to identify the most effective strategies.

Table 6 f square

Constructs	*CA*	*Risk-taking behaviour*	*Product development*
Risk taking behaviour	0.027		0.142
Moderating Effect	0.023		
Trust	0.044	1.12	0.263
Product development	0.124		
IT turbulence	0.127		

Table 7 Future scenario of innovation

Level of trust	*Low information technological turbulence*	*High information technological turbulence*
High trust	Scenario I	Scenario II
	- Risk-taking	- Risk-taking
	- High innovation	- High innovation
	- High competitiveness	- Poor competitiveness
Low trust	Scenario III	Scenario IV
	- Risk aversion	- Risk aversion
	- Poor Innovation	- Poor innovation
	- Poor competitiveness	- Very poor competitiveness

5. Discussion

5.1 Theoretical implication

This study argues that SMEs can afford a competitive advantage by generating a customised innovation that offers a business solution. The results show that small players need support from their partners by investing valuable resources to build trust. The process demonstrates risk-taking behaviour that explains the characteristic of a small business. The results confirm the previous study on trust-based support for product development (Sheth, 2020). The results also extend an explanation of why SMEs need to take a risk by relying upon a solid personal relationship with their stakeholders (Wang *et al.*, 2020).

This article extends the discussion on how small businesses conduct a coopetition strategy on product development during the pandemic crisis by responding to the previous literature (Crick and Crick, 2020). This study also addresses the research gap on how entrepreneurs are willing to take a risk under environmental turbulence (Shepherd *et al.*, 2018). The findings suggest that the competitive advantage requires internal resources and external resources beyond organisational boundaries by extending the comprehensive understanding of the trust in competitive advantage. This study adopts the concept of the competitive advantage, which demonstrates the firm capability to perform better than the competitors through generating superior values (Porter, 1998). The results provide evidence that competitive advantage is about how firms transform entrepreneurial risk-taking behaviour into product development that adapts the technological information turbulence (Caputo *et al.*, 2016).

This study confirms the previous research, which indicates that product development requires trust-based support from business partners (Sheth, 2020). The recent results also strengthen the argument that social capital determines increasing corporate value (Chuang *et al.*, 2016) by promoting entrepreneurial risk-taking behaviour to deal with resource constraints (Bauernschuster *et al.*, 2010). The results fill the research gap by explaining trust and risk-taking behaviour to explain the launching of new products in the market, which involves simultaneously process innovations (Shepherd *et al.*, 2018). The finding confirms that technological turbulence generates entrepreneurial opportunities and a challenge of the established network relationship, which may extend into the impulse towards risk-taking (Hall and Rosson, 2006; Stein and Wiedemann, 2016).

5.2 Managerial implication

The findings encourage the firms to cultivate trust from their business partners to create innovation. Firms require trust as valuable resources to stand up against the information technological turbulence. The practice of strategic foresight is essential to enhance the capability to sense and adapt to any disruption. The firms need to institutionalise scenario strategy to make it effective in the face of turbulence by developing the imagination to establish a dynamic plan and operation. The scenario does not predict the future but helps the firms identify multiple futures that enable them to sense and adapt to the new business environment.

Understanding entrepreneurial risk-taking behaviour is the first step for new product development. Firms should require mutual interaction to enhance the trust at work by encouraging employees to share their ambitions and vision and (Liu, 2018). Firms can trust by gathering their key personnel from different business areas, i.e. IT department, product division, finance, legal and compliance. They should stick together to identify various potential risks. Hence, sharing knowledge helps firms to deal with the risk of a particular network segment. Diversity may drive social uncertainty and positive valence allowing the firms to enhance the trust development process (Cao and Galinsky, 2020).

It is essential to address the disparity between expert members and other members to deal with the information technological turbulence that obsoletes knowledge by facilitating the

staff to develop a shared understanding in the technical environment (Chen *et al.*, 2018). For example, IT staff should go partnership with others to understand how the business might be put at risk by technical issues. The IT people may lack information on intellectual property theft, but a product development staff notice that the abuse of property could bring costly business consequences.

Secondly, the firms should consider the time horizons for adopting entrepreneurial risk-taking behaviour. Firms may focus on short-term strategies for risk management and exclude entrepreneurial risk-taking behaviours when the long-term effects of trust become crucial dimensions of a decision-making process. Hence, firms are encouraged to structure the decision-making processes for identifying the various implications of potential changes in information technological turbulence. Firms need to make decisions that take the proper longer-term product development process but concern about flexibility to deal with the inevitable turmoil due to the COVID-19 pandemic.

COVID-19 pandemic has firms may suffer a collapse from lack of understanding communication strategy due to information technological turbulence (Pellegrini *et al.*, 2018). Whilst there is a concern to entrepreneurial risk-taking behaviour, which is inherent in responding to the technological issue, firms may consider the high level of uncertainties in information technological turbulence as the primary barrier to generating a new product. Hence, firms should take a look at their capital investment processes. The business leaders are encouraged to take a look at information technological turbulence as a long-term structural change.

Thirdly, the most prominent effort for business organisations to take a risk is when they allocate valuable resources to develop new products. The entrepreneurial risk-taking behaviour should not result in stranded assets that spring from the initiative to generate new product development. The decision may involve recruiting helpful staff and acquiring valuable resources to bring forward new products that fit their business model. Hence, the role of top leaders is to promote product development by facilitating risk governance at the organisational structure and informal relationships at both individual and team levels (Lumpkin *et al.*, 2009; Pratono, 2018).

Last, many firms are not familiar with public disclosure on research and development processes due to risk from a commercial disadvantage. Firms may prefer to play safety by using only primary sources of information from reliable colleagues both within and outside the organisation (Keszey, 2018). It is an opportunity for firms, which already embedded in innovation processes, to demonstrate how their innovation can bring a positive impact on society and build the more sustainable companies of the future.

The public disclosure suggests firms should develop a corporate information strategy with solid knowledge and expertise from a long-term perspective. The companies that have been concerned the integrating social capital into their business strategies should take emphasise how much resources they have allocated in adopting the new information technologies. When the management comes into an investment decision, firms should fully understand the financial perspective and their operational, networks and social relationships. Hence, future research is encouraged to explore a more comprehensive understanding of how partnership in the business community responds to information technological turbulence.

5.3 Research limitation

This study adopts the measure at the organisational level because the unit analysis of this study is firm or organisational levels. It appears that the concept of trust has been emerging from personal and community levels that this study has not yet involved. Hence, future research should address various types of social capital that may lead the complex analysis from the interpersonal to the institutional level. Secondly, this study surveyed SMEs as a unit analysis and was carried out during the COVID-19 pandemic. The results depend on the respondents' perspective, which could be different from the normal condition after the

pandemic. Hence, future studies need to update the proposed scenario, which implies strategies in the face of uncertainty.

6. Conclusion

This study extends the discussion of entrepreneurship during the times of COVID-19 by examining the role of trust and risk-taking behaviour in product development information technological turbulence. The results confirm the integration between social capital theory and the contingency approach. Indeed, trust as a core element of social capital is essential for the survival of entrepreneurial firms concerned with product development. Examining entrepreneurial risk-taking behaviour as the conceptual lens help firms to be aware that innovation in product development requires social capital theory to deal with high uncertainty that springs from the information technological turbulence following the social distance policy.

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Editorial: Business disruptions and innovations beyond COVID-19

Muhammad Imran Qureshi, Nohman Khan

Fostering sustainability: reinventing SME strategy in the new normal

Meng Kui Hu, Daisy Mui Hung Kee

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Muhammad AsadUllah, Muhammad Adnan Bashir, Abdur Rahman Aleemi

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Nattaporn Thongsri, Pattaraporn Warintarawej, Santi Chotkaew, Jariya Seksan

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Bee Choo Yee, Abdullah Mohd Nawi, Tina Abdullah

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Halima Begum, Kashif Abbas, A.S.A. Ferdous Alam, Huaming Song, Mohammad Tayub Chowdhury, Ahmad Bashawir Abdul Ghani

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Mohammad Rashed Hasan Polas, Mosab I. Tabash, Asghar Afshar Jahanshahi, Bulbul Ahamed

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Demetris Vrontis, Hani El Chaarani, Zouhour El Abiad, Sam El Nemar, Alissar Yassine Haddad

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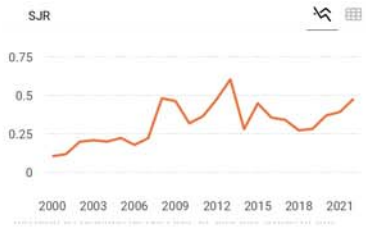

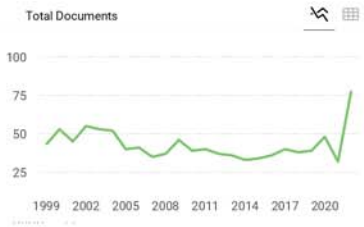

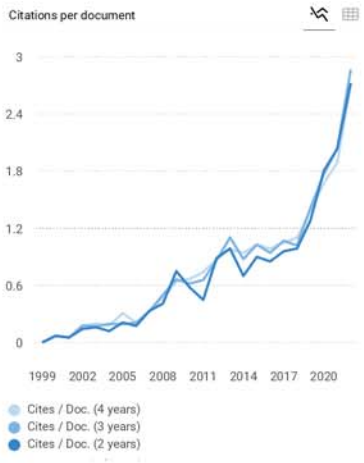

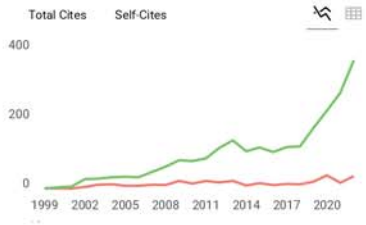

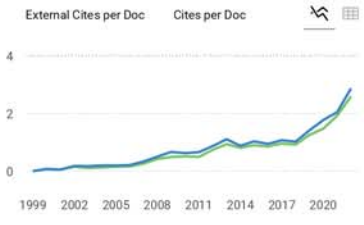

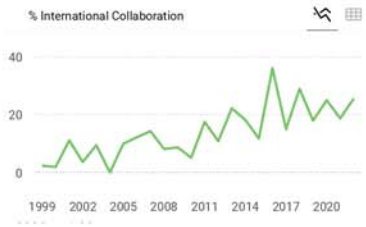

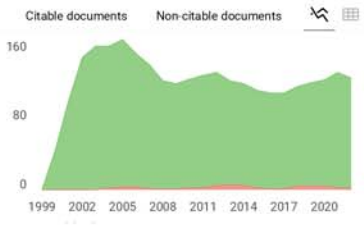

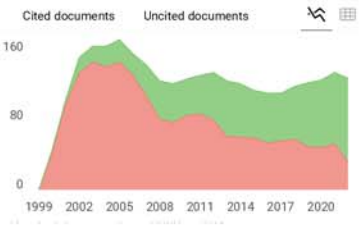

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