



TOPIC MODELLING APPLICATION FOR DETERMINING COMPETITIVENESS FACTORS OF THE SMALL BUSINESS FIRMS

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Abstract

The purpose of this study is to identify the most important competitive factors for small business development. The Mallet software topic modelling tool was used to select the ten most important topics. Three major external factors contributed most to this competitiveness, namely industry conditions and learning organisations (topic 5), the market environment in terms of local and international opportunities (topic 7), and the understanding of entrepreneurship and entrepreneurial networks (topic 4).

Keywords: competitiveness, small business firm, Mallet topic modelling tool

INTRODUCTION

It is indisputable that small business firms or small medium-sized enterprises play a vital role all over the world. This type of business has created 60 percent of job and contributes about 40 percent of gross domestic product (GDP), especially in developing countries (World Bank, 2019). Nevertheless, this type of business faces many obstacles including availability of finance, management problems, fast changing environment, market competition, government support and all in all it can be said that it depends on external and internal factors (Guevara & Thiagarajan, 2019; Rand et al., 2019; Singh et al., 2019). In shorts, these challenges and problems are related to the competitiveness of a firm (Hove-Sibanda et al., 2017). Therefore, many scholars and businessmen are trying to find out the essential factors that make this type of small business competitive to achieve sustainable economic growth in a country.

This study aims to find out the major competitive factors for small business development by using Mallet topic modelling software which can analyse a large number of journal publications that contain the topics of competitiveness and small business (Graham et al., 2012; Sukhija et al., 2016).

METHOD

Data Pre-processing

Before creating a "corpus" for Mallet topic modelling, the keyword topic "small business competitiveness" is used. The search for this keyword began by entering it into the EBSCO Discovery Services (EDS) of the Web Library and yielded 358,181 hits (as of March 31, 2020). To narrow the results, multiple screenings and philtres of the related topic were performed by applying strict limiting criteria, including only "full-text and peer-reviewed journal publications," "publication date between January 2000 and March 2020," "English-language publications only," "academic journal types," and "Business Source Premier and Elsevier publishers." As a result, it can narrow down the results to 157,591, 10,352, 2,643 and finally 122 hits. From the final and satisfactory 122 related publications,

the abstract was extracted and formatted into .txt files before being entered into the Mallet topic modelling tool.

Generating topic models

A Mallet topic modelling tool was downloaded following the instructions provided by Graham et al. (2012) in the Getting started with topic modelling and Mallet guide. Then, the summary of the 122 selected topics was executed under the following conditions:

- Number of iterations : 122
- Total number of words printed : 20
- Total number of topics: 10

After the Mallet processing was completed, the extracted 10 topics were generated (Table 1). However, as noted by (Graham et al., 2012), the Mallet topic modelling programme cannot provide the meaning of the words in a text. In order to make sense of the ten themes identified, they can be analysed using approaches such as word association, text clustering, text categorisation, text summary or text term analysis, which are considered appropriate. Then, the proposed topic name can be given for each of the 10 Mallet modelling results.

Topic Identification and Interpretation

Topic 1 *strategic managers framework sustainability social issues actions action managerial show actors rivalry role findings engage making decision process movement responses*

Suggested topic name: **Strategic decision making process in management.**

This topic is an essential factor related to the ability and capability of the leadership of a small business to run its business more competitively by choosing and deciding a strategic management process. In other words, this topic has a lot to do with the internal factors of small businesses that are competitive through strong leadership in conducting strategic business for the company (Byers & Slack, 2001; Hauser et al., 2019; Liberman-Yaconi et al., 2010).

Topic 2 *firms competitive knowledge relationships theory network stakeholder policy ownership benefits success trust argue potential alliance influence members alliances direct high*

Suggested topic name: **Firms competitiveness and stakeholder political alliances.**

This topic is related to the external factors that small firms need to be competitive when facing competition. According to Lenssen et al. (2011), in order to be competitive, companies should develop better and lasting alliances with stakeholders, that is, they need to form better and reliable partnerships by working with other parties related to their business.

Table 1. Mallet Ten Selected Topics

	Mallet 10 results topics words	Suggested Topic Name
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1	<i>strategic managers framework sustainability social issues actions action managerial show actors rivalry role findings engage making decision process movement responses</i>	Strategic decision making process in management
2	<i>firms competitive knowledge relationships theory network stakeholder policy ownership benefits success trust argue potential alliance influence members alliances direct high</i>	Firms competitiveness and stakeholder political alliances
3	<i>research theory change behaviour work analysis view time organizational article theoretical ambidexterity studies empirical practices management mwb context unique processes</i>	Organisation of work behaviour and empirical management practises
4	<i>entrepreneurs entrepreneurial entrepreneurship institutional social examine ventures institutions create networks insights growth propose understand temporal evidence life perspective differ highly</i>	Understanding entrepreneurship and entrepreneurial networks
5	<i>organizations organizational conditions industry learning experience field resources resource study number findings critical process power mechanisms impact students Dubai survival</i>	Industry conditions and learning organisations
6	<i>innovation governance public technology corporate institutions private activities support provide agency risk ties organization uncertainty company family collective focus development</i>	Innovation and technology support activities
7	<i>capital firms market human foreign environments relational opportunities countries internationalization local argentine markets central state act minority developing recent including</i>	Local and international opportunities of the market environment
8	<i>firm performance study find management results effect corporate investment ceo strategic positive success ceos relations Japanese relationship positively based data</i>	Corporate performance and strategic management
9	<i>business international political emerging institutional economic global economy companies economies government environmental strategies attention firms transition major multinational firm's increasing</i>	Emerging economies and government strategies attention
10	<i>strategy research capabilities literature discuss management paper key develop dynamic understanding factors explain firm-level important model implications question organizational legitimacy</i>	Understanding dynamic firms and organisational capabilities

Topic 3 *research theory change behavior work analysis view time organizational article theoretical ambidexterity studies empirical practices management mwb context unique processes*

Suggested topic name: **Organisation of work behaviour and empirical management practises.**

Appropriate and conducive work organisation and best management practises are among the internal factors in small businesses to be competitive. This is because, as De Jong & Den Hartog (2010) argue, the application of conducive work behaviour within the organisation can increase innovation and productivity of employees in the companies. Moreover, implementing the best leadership and management practises can improve not only the work behaviour of the company but also the overall company culture and practises to be competitive (Nguyen, 2010).

Topic 4 *entrepreneurs entrepreneurial entrepreneurship institutional social examine ventures institutions create networks insights growth propose to understand temporal evidence life perspective differ highly*

Suggested topic name: **Understanding entrepreneurship and entrepreneurial networks.**

Entrepreneurial networks are one of the most important factors in the competitiveness of small businesses. Because they are relatively small firms, they need to build and maintain a network with other parties to form a robust and cohesive network, as the saying goes, "If you want to go faster, you can go alone; but if you want to go farther, you have to go together." In other words, a growing and

sustainable small business cannot be achieved without building and maintaining an entrepreneurial network with others (Hansen, 1995).

Topic 5 *organizations organizational conditions industry learning experience field resources resource study number findings critical process power mechanisms impact students Dubai survival*

Suggested topic name: **Industry conditions and learning organisations**

A learning organisation is a process in which all stakeholders within an organisation or business acquire knowledge by adapting and using that knowledge to improve the competitiveness of a business/organisation. This process can be fostered by a better understanding of the conditions in the industry and, if successful, will improve the effectiveness and innovation of the companies (Martensen & Dahlgard, 1999). This issue is part of the external factor of small business and should be understood by all stakeholders.

Topic 6 *innovation governance public technology corporate institutions private activities support provide agency risk ties organization uncertainty company family collective focus development*

Suggested topic name: **Innovation and technology support activities**

To innovate and compete, every small business should be supported by technology, especially technology related to the Internet of Things (IoT). In other words, connectivity and innovative technology can improve business performance and is therefore a critical factor for competitive small businesses (Bell, 2011; Huang et al., 2016).

Topic 7 *capital firms market human foreign environments relational opportunities countries internationalization local argentine markets central state act minority developing recent including*

Suggested topic name: **Local and international opportunities of the market environment**

To be a competitive business, a current and future organisation should take advantage of the opportunities in the market environment, whether domestic or international. For such companies, it is important to mobilise the skills and abilities of their resources to capture the external market (Vatne, 1995). This is one of the necessary external factors that should be measured by small businesses..

Topic 8 *firm performance study find management results effect corporate investment ceo strategic positive success ceos relations Japanese relationship positively based data*

Suggested topic name: **Corporate performance and strategic management**

This issue belongs to the internal factors and is important for the sustainability of the company in the future. Improving the performance of a company depends on the best strategic management guidance that is applied (Carmeli et al., 2010; Daily et al., 2002; Vera & Crossan, 2004).

Topic 9 *business international political emerging institutional economic global economy companies economies government environmental strategies attention firms transition major multinational firm's increasing*

Suggested topic name: **Emerging economies and government strategies attention**

The development of small business competitiveness cannot be viewed in isolation from the role of government strategies, especially in promoting the economies of emerging markets. In other words, there is a need for strong and vigorous government support in implementing appropriate strategic conditions to improve and enhance small business competitiveness (Guevara & Thiagarajan, 2019; Pergelova & Angulo-Ruiz, 2014; Porter, 2001; Wang et al., 2012)

Topic 10 *strategy research capabilities literature discuss management paper key develop dynamic understanding factors explain firm-level important model implications question organizational legitimacy*

Suggested topic name: **Understanding dynamic firms and organisational capabilities**

Dynamic and organisational capabilities refer to the ability of organisations to reintegrate and rebuild their capabilities in the application of internal and external resources to adapt to a changing and advancing environment so that they can exist in the future as competitive organisations by improving knowledge management, and this is a long and continuous development step (Barde & Bainwad, 2017; Inan & Bititci, 2015; Nielsen, 2006). This process should involve not only top management but also all employees and is considered as an internal factor of the organisation.

RESULTS AND DISCUSSIONS

From the preceding explanations of the issues, it is possible to summarise broadly two important internal and external factors that may affect the competitiveness of small businesses in the future. (Table 2):

Table 2. Two Major Competitiveness Factors for Small Business Firms

Internal Factors	External Factors
Topic 1. Strategic decision managerial process	Topic 2. Firms competitiveness and stakeholders' policy alliances
Topic 3. Working behavioural organisation and empirical management practices	Topic 4. Understanding the entrepreneurship and entrepreneurial networks
Topic 6. Innovation and technology support activities	Topic 5. Industry conditions and learning organisations
Topic 8. Firms performance and management leadership strategic	Topic 7. Market environments related to local and internationalisation opportunities
Topic 10. Understanding dynamic firms and organisational capabilities	Topic 9. Emerging economics and government strategies attention

Table 2 also shows the ten issues that are equally among the most important factors influencing small business competitiveness. The next question is which issues from the list of ten issues have the most and least factors. Fortunately, the Mallet topic modelling tool can bring this result into the so-

called "result composition" by showing the highest contribution of the corpus topic, which is characterised by the highest contribution value of each topic, which can be summarised in Figure 1.

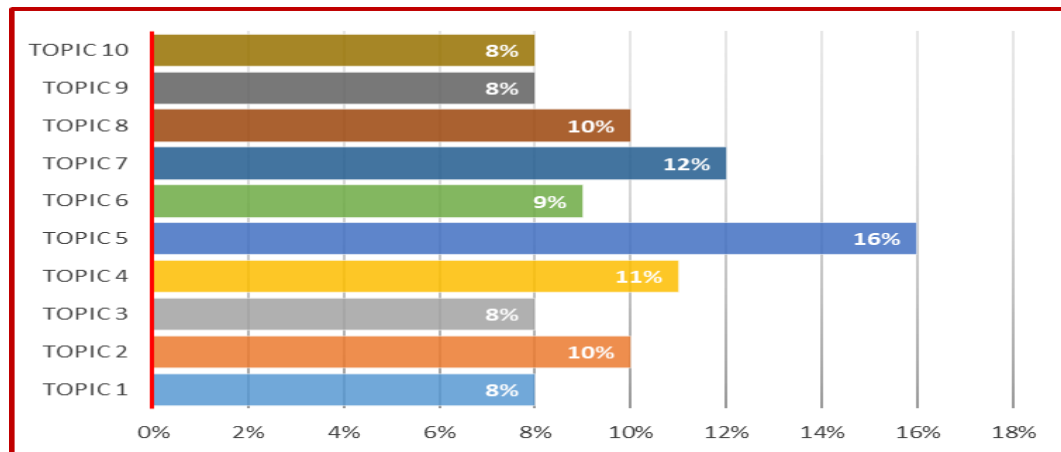


Figure 1. The corpus percentage with the highest proportion values (from 122 abstract files)

Figure 1 shows that topic 5, namely "Industrial conditions and learning organisations" has the highest share in the total corpus with 16% (consisting of 19 abstract files), followed by topic 7, i.e. "Market environments related to local and internationalisation opportunities" with 12% (15 abstract files), and then topic 4, i.e. "Understanding entrepreneurship and entrepreneurial networks" with 11% (13 abstract files). Interestingly, the top three themes are from the external factors domain, which suggests that external factors are more important than internal factors in determining small business competitiveness.

CONCLUSION

It has discussed the key factors that determine the competitiveness of small businesses. Of the ten topics selected, there are three important external factors that have the highest value in analysing small business competitiveness: Industry conditions and learning organisations, market environment in terms of local and international opportunities, and understanding entrepreneurship and entrepreneurial networks. It has also been shown that the Mallet topic modelling tool can help and facilitate researchers in finding appropriate topics.

Nevertheless, this study has a limitation in that it only reflects the competitiveness factors from the journal articles without supporting them with empirical results. Therefore, future empirical research is needed to verify it.

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