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Examining the success of *women of color*-owned small and medium-sized enterprises in the United States: A system dynamics perspective

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Abstract
The objective of this study was to unravel the challenges confronting women of color (WoC)-owned small and medium-sized enterprises (SMEs) in the United States. This is based on findings that most WoC-owned SMEs fail within the first few years of establishment. The impact of the global financial crisis resulting from the COVID-19 pandemic on WoC-owned SMEs was also explored. System Dynamics (SD) is a computational modeling approach useful for understanding changes in a system over time and is applied in this study to illustrate WoC entrepreneurs' navigation through the startup and maturation of SMEs. The authors calibrated and validated the model with publicly available data. Findings revealed that more emphasis should be placed on failure reduction in the early years of establishment of these businesses. Also, there is the need for early intervention rather than focusing on the improvement of the successful business exit from the system. Results indicated that the creation of new businesses by WoC after the failure of existing businesses produced an increase in the number of failed enterprises. The authors assert that attention must be paid at the individual level through support to the entrepreneur. This study contributes to the extant literature by providing the first known SD model useful in depicting the SME system for WoC entrepreneurs in the US. The model serves as a potentially useful tool for informing effective policy making, education, and programmatic approaches to support the success of WoC entrepreneurs in the US.

Keywords Women of color · Small business · Entrepreneurship · Simulation · System dynamics · Computational modeling

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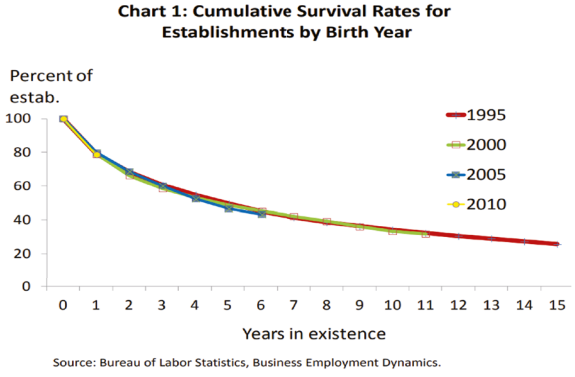
Introduction

Statistics show that the odds of success for entrepreneurs are against them from the outset. This is evidenced by a staggering failure rate (see Fig. 1). 67% of small and medium-sized enterprises (SMEs) in the United States fail by the tenth year since their launch (US Bureau of Labor Statistics, 2021; Shepherd, 2020). In this study, SMEs are defined as businesses with fewer than 500 employees (US Small Business Administration, 2020).

With one entrepreneur per each of the 31 million US-based SMEs, approximately 31 million Americans drive 66% of job growth and account for 44% of gross domestic product (GDP) (Small Biz Trends, 2021; US Small Business Administration, 2020). Improving the chances of SME owners' success would, in turn, provide positive impacts on the US economy in terms of job growth and increases in GDP. In this pool of 31 million SME entrepreneurs, there are 13.1 million women of which nearly half (6.4 million) are women of color (WoC) (Women Business Enterprise National Council, 2021).

The original definition of "Women of Color", as described by Loretta J. Scott, surfaced in the late seventies to unify all women experiencing marginalisation with race and ethnicity as common issues (Women of Color Network, n.d.; Catalyst: Workplaces that Work for Women, n.d.). Emily Fetsch of the Kauffman Research (2015) shows that women and "people of color" are underrepresented in US entrepreneurship. In her book, '*The First, The Few, The Only: How Women of Color Can Redefine Power in Corporate America*' based on 500 original interviews in corporate America, Purushothaman (2022), defines WoC "as a term used in solidarity - as a word of power - unifying experiences with shared challenges to innovate and achieve change" in a meritocracy setup.



Note: **Figure available from: https://www.sba.gov/sites/default/files/Business-Survival.pdf**

Fig. 1 Survival rates of SMEs (data source: US Bureau Labor Statistics, 2021)

Most women-owned firms are sole proprietorships and tend to produce less revenue than men-owned firms (Kauffman Research, 2015), reducing their economic impact. While women are making gains in business ownership (Women Business Enterprise National Council, 2021), they face many challenges, especially in creating high-grossing businesses employing many people. As a result, they are underrepresented in revenue, receipts, and numbers of businesses. Researchers suggest that policymakers should aim to enhance the economic impact of women entrepreneurs (Kauffman Research, 2015).

This study aims to unravel the challenges confronting the WoC-owned SMEs in the US. This is based on data that most WoC-owned SMEs fail within the first few years of establishment.

Background

Women of color entrepreneurs in the US

The underrepresentation of certain groups of people in various sectors is on the rise, bringing to fore the need for research on this subject. It has been observed that people of color are oftentimes underrepresented in a number of sectors, such as in the science, technology, engineering and mathematics (STEM) fields, businesses and leading organisations (Yadav & Unni, 2016). It has been noted that the underrepresentation of WoC is both an economic and a social justice issue (Alfred et al., 2019).

This rapidly growing category of entrepreneurs could significantly contribute to job increase, innovation, and economic development (Kelley et al., 2021). The review of existing literature by Cardella and colleagues (2020), showed that the field of study on women entrepreneurs is multidisciplinary and has been gradually expanding since 2006. Yet, there exists limited understanding of the female perspective to the field of entrepreneurship, including the existence of obstacles and gender gap (Hernandez-Sánchez et al., 2021). Furthermore, Kelley et al. (2021) stated that a larger proportion of Black women start and run businesses at a higher rate than white women and men. However, regardless of the higher rate, most of these businesses do not grow to maturity.

Globally, a study conducted by Botha (2020) explored the differences between male and female entrepreneurs in South Africa, while Solesvik et al. (2019) studied female entrepreneurs in Norway, Russia and Ukraine. Nevertheless, there are limited studies on WoC entrepreneurs in developed countries. Hence, the relevance of this study.

In its Characteristics of Business Owners (CBO) surveys, US Census Bureau (USCB, 2020) catalogues minority-owned business enterprises based on three factors: economic, demographic, and sociological data. The CBO details the features of business owners (i.e., "education, work experience, marital status, age, weeks and hours worked, personal income, and how the business was acquired") and the traits of their businesses (i.e., "closure, profits, sales, employment, industry, startup capital, types of customers, health plans, and exports"). The CBO records data on factors such as "business inheritances, business ownership among family

members, prior work experience in a family member's business, and prior work experience in a business whose goods/services were like those provided by the owner's business", thus allowing detailed analyses of the business outcomes such as "closure rates, sales, profits, and employment size". Further, CBO reports that Black-owned firms have "lower profits and sales, have fewer employees, and have higher closure rates than white-owned firms (Robb, 2000; USCB, 2020). While minority business development policies (such as "set-asides and loan assistance programs") are available, they do not encourage, facilitate, or incentivise training in operating small businesses. However, Fairlie and Robb (2007) recommend expanding apprenticeship-type entrepreneurial training programs to directly address these SME experience deficiencies. Furthermore, access to capital funding among entrepreneurs is a significant factor that determines entrepreneurial success, as demonstrated by the study by Anton and Bostan (2017). Their study established a positive relationship between entrepreneurial activities and financial accessibility.

Renzulli et al. (2000) report that the number of women entrepreneurs grows proportionally compared to men. Loscocco and Smith-Hunter (2004) indicate that home-based employment (HBE) grows bigger than home-based business ownership (HBB). They observed that despite similarities in "race, personal background, motivation, experience, and family situation," HBE and HBB differ in two specific aspects, namely, "work/family conflict" and "economic success".

Walker and Brown (2004) used "financial and non-financial" criteria to visualise business success. They found that "personal satisfaction and achievement, pride in the job, and a flexible lifestyle" were valued higher than wealth creation. Solesvik et al. (2019), instead of focusing on traditional business outcomes (growth or profit), prefers pursuing business opportunities to fulfil social needs such as access to education, healthcare, care of local communities, and self-realisation for employees. However, there is a lack of consensus in the literature if women and men entrepreneurs behave differently from one another. The research states that "women entrepreneurs behave differently from men entrepreneurs" and includes factors unique to women that determine their success or failure. One such factor is known as the "feminine" leadership style. "Feminine" leadership style focuses on stakeholders versus shareholders, empathy towards employee needs, and motivation by fulfilling unmet social needs (*ibid*). Others argue that women's and men's entrepreneurial behaviour is similar because they face similar challenges, problems, and opportunities, and both respond similarly (Chaganti, 1986).

Nevertheless, Kelley and colleagues (2021), in their global research on entrepreneurship, proffer some reasons for the challenges confronting Black women entrepreneurs. These include the type of businesses they start, often small, have small profit margins, and are difficult to sustain. Another challenge they identified is the difficulty in accessing capital by this category of entrepreneurs. They also identified an uneven distribution of important entrepreneurial resources in the US.

Yang and del Carmen Triana (2019) sampled US entrepreneurial firms from 2005 to 2011 and showed that "male-led businesses are more likely to survive than female-led businesses". Their results suggest that gender beliefs may perpetuate women's disadvantages in leading their businesses. Ladge et al. (2019) propose a

framework that disrupts gendered norms and facilitates women entrepreneurs' positive identity development and self-efficacy. Ahl (2006) revealed that women view themselves as secondary to men and that their businesses were either of less significance than men's or complement men's businesses. The author used discourse analysis to identify such beliefs and suggested new approaches to capture richer aspects of women's entrepreneurship.

While the number of SMEs is generally accepted as the unit of measure for determining success, this paper focuses on SME entrepreneurs' success and, in particular, WoC entrepreneurs. Accordingly, success is defined as either continuation of an entrepreneur's firm or a rewarding monetisation event, or a possible exit, including the sale of the SME or going public.

In the following System Dynamics (SD) model, attention is paid to the personal experiences of WoC at the individual level and the level of support that is available to the SME owner – in this case, to the WoC in their SME endeavours.

System dynamics application in SMEs

SD methodology is an approach that leverages the system thinking concept, such that problems are studied by modelling them in the form of systems. It focuses on the relationship between causes and effects, in order to explain the reasons for observed behaviour in a system (Forrester, 1969; Sterman, 2000). Some of the benefits of the application of SD in the study of varied systems include its ability to model and depict systems under study. It also serves as a flexible tool for capturing large information about any system under study. In addition to its ability to model policy options and thus proffer probable and lasting solutions.

There have been some notable applications of SD in the study of SMEs and entrepreneurship. Bianchi and Bivona (2002) analysed SMEs' processes for pursuing e-commerce strategies to foster business growth through a generic SD model. They illustrated that by promptly recognising 'weak signals of changes', an SME can augment its investments in a website and promotional activities, eventually leading to more customer visits and, in turn, a rise in orders and cash flows. They recommend two policy levers – first, to devote specific employees to deal with visitors' queries, focusing on converting the queries into firm orders, and secondly, the product scope visible to the customers.

Mitchelmore and Rowley (2013) studied female entrepreneurs who longed to grow their businesses across the UK. While the preferred growth strategies included improvements in existing products or services offered and expansion of advertising and promotion; over one-fourth of the female entrepreneurs interviewed were anticipating growth strategies related to "seeking new domestic markets, selling over the Internet, adding a new product or service, and hiring new employees". In other research, Fadil confirmed that viral marketing is a dominant marketing communications tool for SMEs ready to adopt innovative approaches (Fadil, 2015).

Several approaches to the "Business Model" concept have been explored (Bianchi, 2002, 2016). Business Models complement inherent organisational attributes and support innovation processes and correlated growth patterns by developing desired

strategic capabilities. SMEs require a customised approach to design, experiment, and flexibility to innovate their Business Models and design specific value creation processes. Cosenz and Bivona (2021) used the SD approach to develop a Business Model for SME entrepreneurs, enabling them to meet customer expectations and compete for business successfully. In another study, Cosenz and Noto (2015) combined traditional accounting-based systems (generally termed "management control" in SMEs) with SD to identify and respond to weak business signals of change or possible crisis symptoms.

D'Espallier and Guariglia (2015) conducted a study from 2002–to 2008 on 5,999 Belgian SMEs to understand the various investment prospects for unlisted firms, and the findings reflected that all the investment opportunities are not dependent on the investment-cash flow sensitivities of SMEs. Simpson and colleagues (2012) conducted interviews with SME managers and developed a theoretical framework to recognise success factors related to SME success. The authors posited that the strategic or tactical behaviour of the SME could be modified through feedback on performance. Vojtko et al. (2019) combined "perspectives of SD, company life cycles, crisis management, resilience, and business continuity management" from SMEs and emphasised the inner dynamics of crises in SMEs. Using data from 554 crises collected from 183 companies, the resulting SD model for a manufacturing company helped to explain the cause to avoid several identified SME crises. Rojas-Lema and colleagues (2021) researched the evolution of performance measurement (PM) in manufacturing SMEs. Findings revealed that clusters and supply chains received a smaller amount of attention. Another study by Oladimeji et al. (2020) investigated the SD models for measuring organisational performance using bibliometric analysis. The literature review in ten indexing platforms and 97 included publications revealed that SD applications are limited to the design phase and exploratory methods, indicating the research to be in an early stage of development. Further, over 50% of the causal models were not validated.

While SD and the SME ecosystem have been studied, they are available in disparate segments. The extant available SD research on SMEs is limited in scope, generic in nature, of a case study type, exploratory in methods, early in development, and not validated. Furthermore, no publications related to SD application to WoC entrepreneurs could be traced. Thus, a crucial methodological gap exists in this research area.

In the present study, the first known system dynamics (SD) model of its kind was created to simulate the systematic challenges confronting and impacting the success rate of WoC-owned entrepreneurs in the US. SD is a useful tool for modelling the behaviour of a system over a period of time with an emphasis on within-system balancing and reinforcing feedback dynamics. The aim of this study was to identify where the emphasis should be placed on reducing business failure across the lifespan of WoC-owned SMEs and the recovery trajectory of SMEs amid the economic downturn resulting from COVID-19.

Methodology

This study focuses on specific subgroup: *WoC-owned SMEs based in the US*. Instead of focusing on businesses' success (the number of entities), the attention is on entrepreneurs' success (the number of people). People's success is defined as either continuation of an entrepreneur's SME or a lucrative monetisation event and exit by the entrepreneur.

System dynamics model description

SD is applied in this study to illustrate WoC entrepreneurs' navigation through the startup and maturation of their SMEs. The model developed in Vensim software is calibrated and validated based on existing data. It, therefore, describes the WoC entrepreneurial landscape as a system and facilitates explaining the causes and effects of the observed behaviour. The model is a departure from the conventional approach of modeling numbers of businesses rather than the people who own them. The ultimate objective is to develop a model that describes the multitude of factors that influence the desired success of WoC entrepreneurs. Moreover, the introduction of system-wide shocks, such as the 2008 economic crisis, and the model's resulting behaviour are observed and analysed. The analysis is further applied to the COVID-19 pandemic and its impact on the overall success of WoC SMEs.

The model's structure (Fig. 1) depicts a population of aspiring WoC entrepreneurs as they start up their businesses. The population of entrepreneurs flows through a succession of stages where they may proceed to one of three states: the continuation, successful exit, or failure of the WoC owner. Figure 1 also shows WoC entrepreneurs in both the successful exit and failed situations can return to start up another SME. This loop is appropriate as serial entrepreneurs exist who continue launching new businesses regardless of their past ventures' success or failure.

In addition to the startup's flow, two other populations contribute to the stock of Entrepreneurs newly entering the market–entrepreneurs re-entering the market after a previously successful venture and those who re-enter after an unsuccessful venture (Fig. 2). Before WoC entrepreneurs enter the market, WoC in the general population must first decide to potentially become an entrepreneur. This outflow from the general WoC populace to the population stock of Aspiring WoC Entrepreneurs is defined by two factors: the *OPPORTUNITY RATE* and *NECESSITY RATE*. The flow for *OPPORTUNITY RATE* is a simple constant that defines the number of WoC in the general populace who become aspirant entrepreneurs. The population of Aspiring WoC Entrepreneurs then enter the market with the startup's flow, defined by the Aspiring WoC Entrepreneur population stock, Financing Rate, as illustrated in Fig. 3.

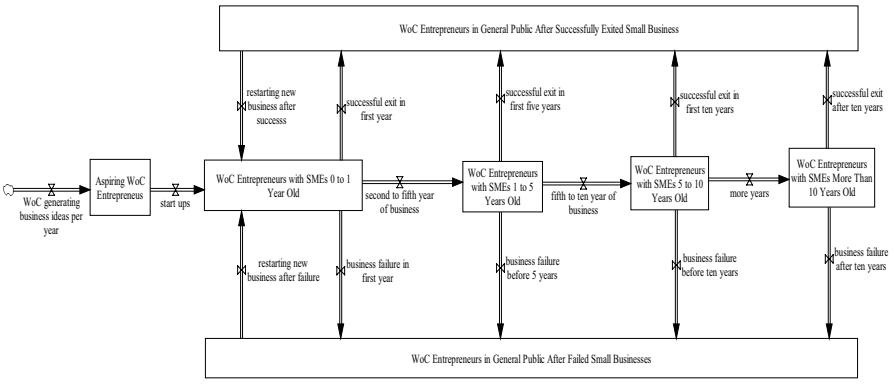


Fig. 2 Overall structure of the WoC SME model

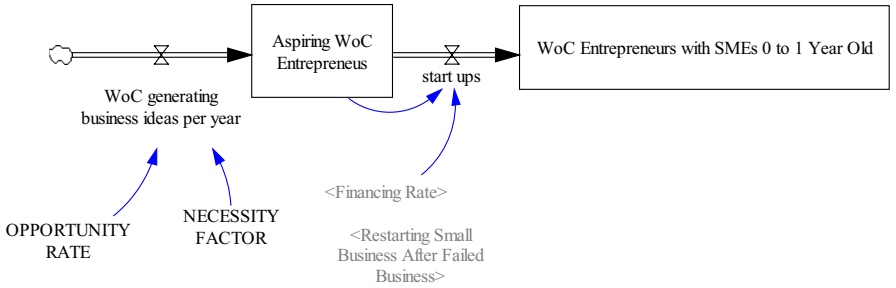


Fig. 3 Members of the aspiring WoC population go to market per startup rate

The *OPPORTUNITY RATE* is a simple constant that defines the number of WoC in the general populace who become aspiring entrepreneurs. *NECESSITY FACTOR* accounts for WoC entrepreneurs that startup out of need rather than an opportunity. The *startups* flow is defined by a simple calculation of the product between the source stock (Aspiring WoC Entrepreneurs) and the flow rate (Financing Rate) associated with the stock (Eq. 1). Also, all rates in the model follow the same fundamental equation structure. A generic flow rate, the unit being *people/(person*year)*, is modeled as stock in a sub-module with an initial value obtained through the model calibration process. The *desired flow rate* is established as the target as a goal-gap modeling archetype and fed into a *change in flow rate,* the unit being *people/(person*year)/year,* as illustrated by the Financing Rate as an example in Fig. 4.

Equation 1

WoC generating business ideas per year = OPPORTUNITY RATE * NECESSITY FACTOR
Unit: people/year
Annual number of WoC in the general populace who have the opportunity to become entrepreneurs

OPPORTUNITY RATE = CONSTANT
Unit: people/year
Constant value defining the flow of WoC generating business ideas per year

NECESSITY FACTOR = CONSTANT
Unit: Dimensionless
A factor that takes into account WoC entrepreneurs that start businesses out of necessity rather than opportunity

Aspiring WoC Entrepreneurs = INTEG (WoC generating business ideas per year - startups, INITIAL ASPIRING WoC ENTREPRENEURS
Unit: people
The stock of WoC entrepreneur hopefuls with the potential to enter the market

startups = Aspiring WoC Entrepreneurs * Financing Rate
Unit: people/year
The rate of the number of aspiring WoC entrepreneurs that enter the market

The *change in flow rate* will continuously adjust the rate stock until the difference (gap) between the current and desired rate is zero. The time-delay in which the change occurs are constants for all rates. As every flow rate value has unique initial

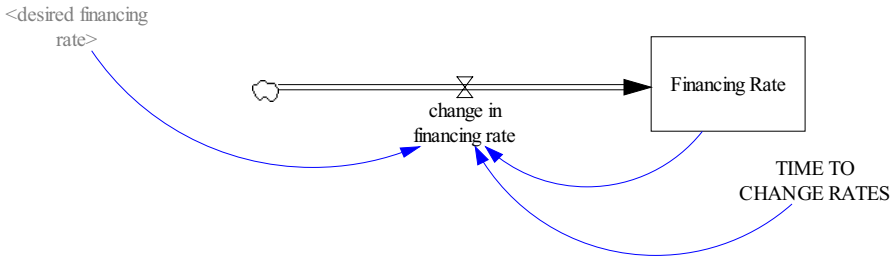


Fig. 4 The sub-module of Financing Rate applied in the model

rates and desired rates, a dynamic behavior emerges in the model through their interactions. The generic flow rate calculation is described in Eq. 2.

Equation 2
TIME TO CHANGE FLOW RATE = CONSTANT Unit: Year The time delay in which the flow rate calculation responds to the gap between the target and actual flow rate: change in flow rate = (desired flow rate – Flow Rate) / TIME TO CHANGE FLOW RATE Unit: people/(person*year)/year The *goal-gap* mechanism with which the net change in the annual flow rate Flow Rate = INTEG (change in flow rate, INITIAL FLOW RATE) Unit: people/(person*year) The actual annual flow rate of WoC Entrepreneurs

The *desired flow rate* is determined by a further sub-module whose purpose is to introduce disequilibrium to the system, such as the economic crisis and the COVID-19 pandemic. By using a series of *if–then-else* statements, various desired flow rates are introduced, which affects the *goal-gap* mechanism described in Eq. 2. Specifically, during the years of the economic crisis, the rates of success are suppressed while the rates of failure and continuation increase.

After the crisis is passed, the *desired flow rate* returns to the original rate, and the model adjusts accordingly through the goal-gap mechanism. However, for the year 2020, the authors introduced a shock to simulate the COVID-19 pandemic. Additionally, it should be noted all rates after the COVID-19 crisis have multiplier factors as levers for policy analysis, as discussed in the scenario analysis section. The sub-module structure and equations are described in Figs. 5 and 6, Eq. 3.

Once WoC entrepreneurs enter the market, the WoC entrepreneurs enter a *continue-succeed-fail* loop. The rate at which the WoC-owned SMEs flow into one of three directions is determined by rate-factors individually defined. Moreover, the three flow paths are replicated at every defined stage with their own unique set of three flow rate factors, as shown in Fig. 5.

Equation 3

desired rate = IF THEN ELSE (Time <= FINANCIAL CRISIS START
, NORMAL RATE
, IF THEN ELSE (FINANCIAL CRISIS START < Time <= FINANCIAL CRISIS END
, RATE DURING CRISIS
, IF THEN ELSE (FINANCIAL CRISIS END < Time <= COVID CRISIS START
, NORMAL RATE
, IF THEN ELSE (COVID CRISIS START < Time <= COVID CRISIS END
, RATE DURING CRISIS
, rate after COVID crisis))))
Unit: people/(person*year)/year
Variable desired (goal) rate before, during, and after the economic crisis and COVID crisis

NORMAL RATE = CONSTANT
Unit: people/(person*year)/year
The desired rate for all non-crisis years

RATE DURING CRISIS = CONSTANT
Unit: people/(person*year)/year
The altered rate during the economic crisis

rate after COVID crisis = NORMAL RATE * RATE AFTER COVID CRISIS MULTIPLIER
Unit: people/(person*year)/year
The altered rate introduces economic shock to simulate the COVID-19 pandemic

RATE AFTER 2023 MULTIPLIER = CONSTANT
Unit: dimensionless
The multiplier with which the NORMAL RATE is scaled to simulate the economic crisis from COVID-19.
The baseline value is 1.

FINANCIAL CRISIS START = 2007
Unit: year
The start year of the 2008 economic crisis

FINANCIAL CRISIS END = 2010
Unit: year
The estimated year at which the economy recovered from the 2008 crisis

COVID CRISIS START = 2020
Unit: year
The start year of the COVID pandemic

COVID CRISIS END = 2022
Unit: year
The estimated year at which the economy will have recovered from the COVID pandemic

Data sources for validation and calibration of the model

The SD model developed was validated and calibrated. First, time-series data on small businesses were obtained from the US Bureau of Labor Statistics based on the year the businesses opened as at Annexure-1. The data were for all small businesses, so they needed to be scaled down because only 40% of new businesses are owned by women, and only 47% of those are owned by WoC. Then the data was used to validate and calibrate the model. Finally, the initial values that were not derived

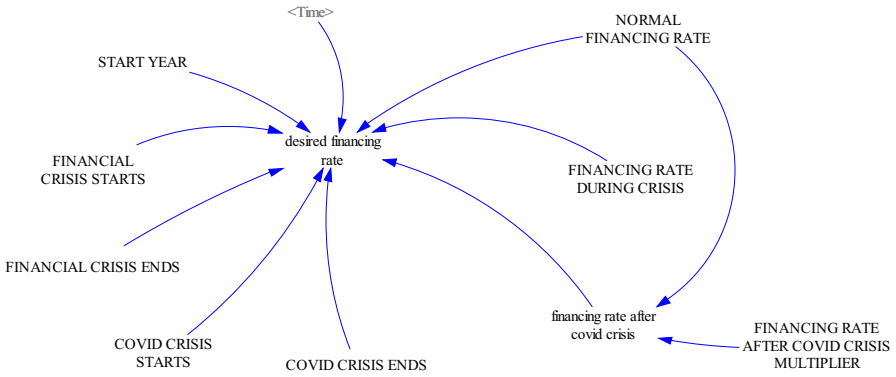


Fig. 5 Structure for the desired before, during, and after economic crises

from the Bureau of Labor Statistics were estimated to allow the calibration process to begin in an equilibrium state (Table 1).

An approach based on minimising the sum of squared errors between the historical time-series data and the model back-fit was used to calibrate the model and estimate the flow rates (Fig. 7a, b, c and d). The values in Table 2 show the estimated rate parameters that were found using this calibration process. As mentioned in the Model Description section, estimating different rates to handle the financial crisis in 2008 compared to those in the normal situation helped improve the fit of the model to the time-series data. It was assumed that the financial crisis lasted three years. These values were used to project the impact of the COVID-19

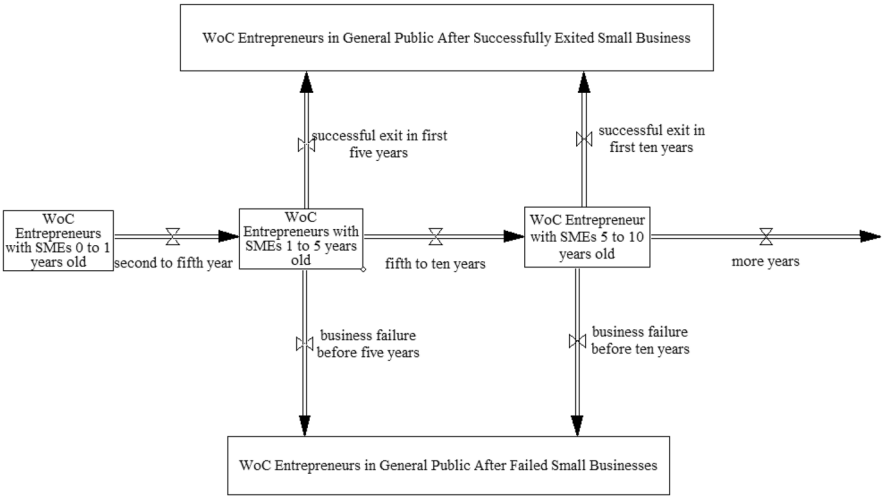


Fig. 6 Model showing the three paths available at the 1 to 5-year-old and 5 to 10-old year stages of SME maturity

Table 1 Initial values of the SD model

Name of the Stock	Initial Value (Numbers)
Aspiring WoC Entrepreneurs	120,000
WoC Entrepreneurs of Failed Businesses	200,000
WoC Entrepreneurs of Successfully Exited Businesses	80,000
WoC Entrepreneurs with Businesses Less than One Year in Operation	110,000
WoC Entrepreneurs with Businesses Between Two and Five Years in Operation	280,000
WoC Entrepreneurs with Businesses Between Six and Ten Years in Operation	215,000
WoC Entrepreneurs with Businesses Greater than Ten Years in Operation	635,000

crisis on WoC entrepreneurs and predict how the economic recovery might unfold. In this model experiment, the baseline duration of the COVID-19 economic crisis was three years.

The rates in Table 2 pass a face validity test. The startup rate during the crisis is lower than in normal times. Entrepreneurs who exit successfully were much more likely to start a new business than entrepreneurs who have exited after a business failure. The failure rates tend to be higher than the success rates overall. And the failure rates during the crisis are higher than in normal times. The success rates during the crisis are lower than in normal times. The continuation rates were higher during the crisis than in normal times. This might seem counter-intuitive, but a possible explanation is that alternative forms of income were harder to obtain during

Table 2 Calibrated rates in the model

Rate	Normal Value	Crisis Value
Start-Up	0.96	0.92
Starting New Business After Failed Exit	0.01[a]	0.01
Starting New Business After Successful Exit	0.48	0.50
Failed Exit in First Year of Operation	0.40	0.59
Successful Exit in First Year of Operation	0.16	0.15
Transition to Second Year of Operation	0.94	1.15
Failed Exit Before Fifth Year of Operation	0.16	0.23
Successful Exit Before Fifth Year of Operation	0.07	0.01
Transition to Sixth Year of Operation	0.11	0.20
Failed Exit Before Tenth Year of Operation	0.01	0.07
Successful Exit Before Tenth Year of Operation	0.01	0.01
Transition to More Than Ten Years of Operation	0.13	0.19
Failed Exit After More Than Ten Years of Operation	0.02	0.01
Successful After More Than Ten Years of Operation	0.02	0.01

[a]The minimum rate was an assumed 0.01

the crisis. So, entrepreneurs who were struggling might be inclined to persevere and try to ride out the crisis rather than exiting unsuccessfully during the crisis.

The COVID-19 pandemic has had a significant effect on the viability of small businesses. Therefore, it was found useful to begin by modeling the impact of the crisis by using the experience of the 2008 financial crisis as a basis for the dynamics of the shock to the system that had occurred. Also, the possible economic recovery from the COVID-19 pandemic was modeled based on the duration of the financial crisis in 2008 which was found to be three years in the model calibration.

Then in 2023, it was possible to consider the transition back to normal rates of business success and failure and project towards 2030. A sensitivity analysis concerning this assumption of the length of time it would take before the recovery starts was conducted (as discussed in the next section). Also, a sensitivity analysis of the rates of flow was conducted. This analysis highlights places of leverage in the system where the greatest positive impact can be obtained. Then the focus becomes on what policies might be implemented to change the parameters at these leverage points to affect best the likelihood of achieving more successful WoC entrepreneurs.

Results

Running the model with the baseline parameters outlined in Tables 1 and 2 in the validation section shows that during the two crisis periods, the number of active WoC-owned SMEs continues in an otherwise consistent upward trend (Fig. 8). There is a reduction in the number of WoC-owned SMEs in the 0 to 1 year and 1 to 5-year-old population. However, the number of WoC who own businesses between 5 to 10-years old appears to be largely shielded from the economic fallout. And there is a slight increase in the number of 5 to 10-year WoC-owned SMEs. This is due to the inflow into this situation, the *Five-Year Continuation Rate* being greater than the *Ten-Year Continuation Rate.* While continuation rates decline rapidly during the crises, the outflow from the 5 to 10-year-old WoC-owned SMES is slightly outpaced by the inflow. This is similar to the position of Kelley et al. (2021). Which also affirmed the high rate of starting and running businesses among Black female entrepreneurs. Although, these businesses fail to grow to maturity, as they revealed that only about three per cent of Black women are managing mature businesses.

There is a counter-intuitive increase in the number of mature WoC-owned businesses (more than 10-years-old) during the two economic crises. This is due to the spike in the inflow of WoC-owned businesses that mature (become older than ten years) during economic crisis years. During the non-crisis years, the success and failure rates were comparable, but the gap widened dramatically, starting in 2008 and 2020. This can be attributed to the spike in continuation rates from the 5- to 10-year-old WoC-owned SMEs (Fig. 9).

The general observation of the results is that most businesses fail. Comparing the accumulation of WoC-owned businesses that successfully exit and fail since the model illustrates this (Fig. 10).

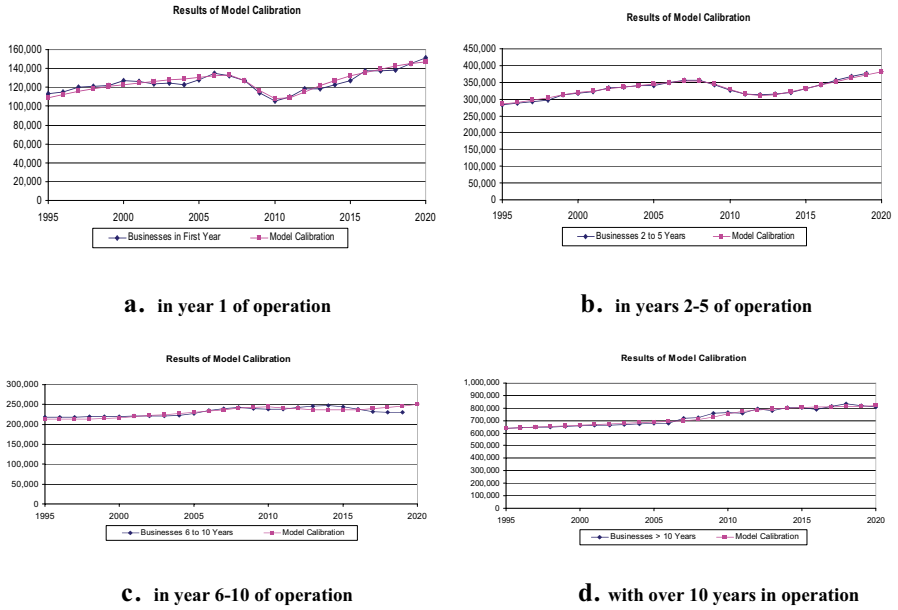


Fig. 7 (**a**, **b**, **c**, **d**) Model calibration for WoC-owned SMEs

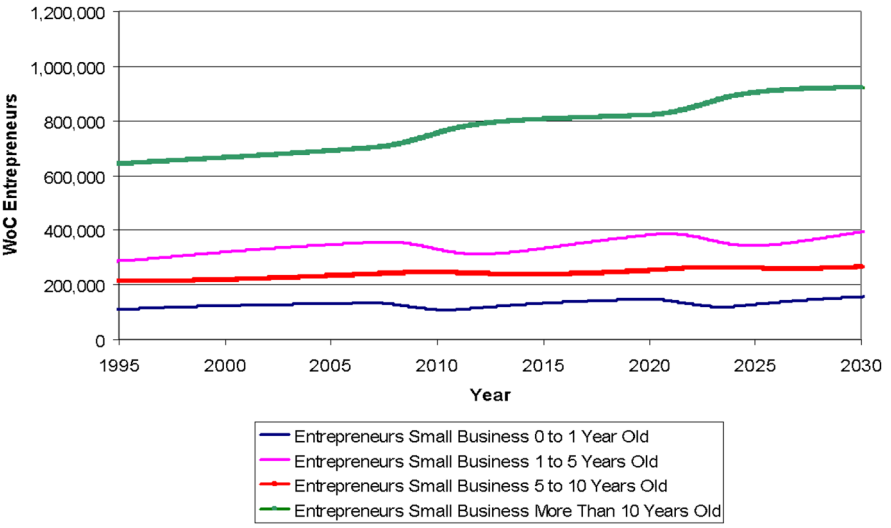


Fig. 8 Population of WoC entrepreneurs at various stages of business maturity, as well as the total number of active WoC entrepreneurs

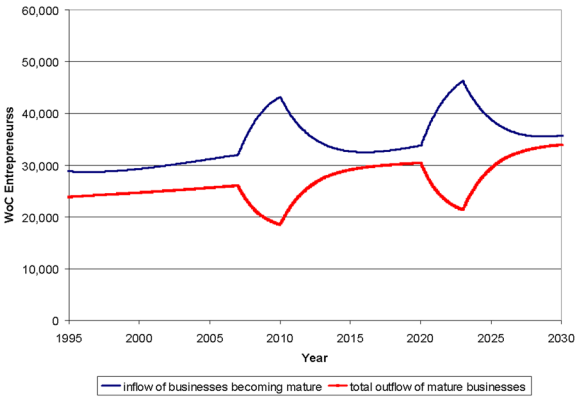


Fig. 9 Inflow and outflow of mature businesses

Sensitivity analyses

Analysing individual parameters

In the sensitivity analysis, the desired rate multipliers, discussed in Eq. 3, were individually modified to increase and decrease the desired rate. Note that the multipliers are applied at the beginning of the COVID-19 pandemic, which is assumed to be a baseline for 2020. Therefore, all scenario comparisons are displayed beginning from 2015 and compared against the baseline in the year 2030.

Each desired rate multiplier, referenced in Eq. 3, was modified from the baseline in two ways: high and low. The baseline value for all of the multipliers is 1. In the high scenario, this value was doubled to 2; in the low scenario, it was halved to 0.5. All of the WoC entrepreneur populations are assessed for per cent differences from the baseline in the year 2030 (Table 3).

Increasing the rate of financing ultimately leads to an overall increase in the number of active WoC businesses. While younger businesse are strongly influenced by this rate, more mature businesses are less sensitive to the change. As the effect cascades through the system, the increased startup rate's impact diminishes, as

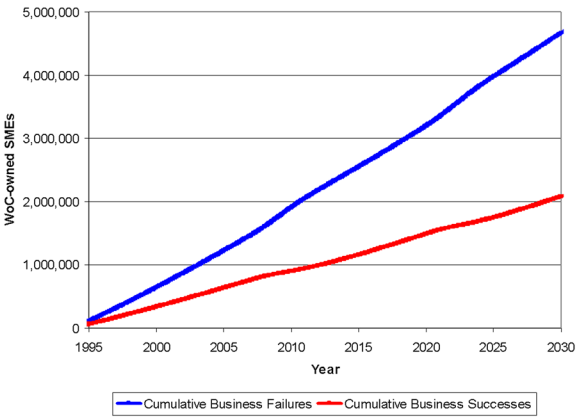


Fig. 10 Accumulation of businesses successfully exiting and the total accumulation of WoC-owned business failures since start year of model

seen in Table 3. Similarly, increasing the re-entry rate of both entrepreneurs with previously successful and failed businesses leads to an overall increase in the number of active businesses. Generally, increasing the overall flow of entrepreneurial startups results in high numbers of active WoC owned businesses (Fig. 11).

Not only is encouraging WoC entrepreneurs to startup important, but lending support to active businesses to minimise failure is important, as shown in Table 3. According to the sensitivity analysis, it is more impactful to *minimise failure* than *increase success* (Fig. 12). Moreover, it is more impactful to intervene in the early stages of business rather than later, as seen in Table 3.

Analysing a combination of parameters

Having assessed the sensitivity of individual parameters, multiple parameters were modified together. The selected parameters for this analysis are multipliers that demonstrate a marked influence on the overall number of active WoC businesses. In addition, these variations demonstrate whether or not multiple parameters modified together would result in an additive effect, where the overall number of active businesses is further enhanced, or other unexpected dynamics occur within the model.

Four scenarios are identified as particularly impactful to the overall number of active WoC businesses:

- Starting a new small business after failed exit (high)
- Starting a new small business after a successful exit (high)
- 1st year-failure (low scenario)
- 5th year-failure (low scenario)

In addition to individual scenario runs, all of the parameters involved were entered into the model simultaneously to observe whether they lead to an additive effect of unknown dynamics leading to unpredicted results. Figure 13 shows that the combined scenario leads to an additive benefit that contributes to the overall number of WoC businesses.

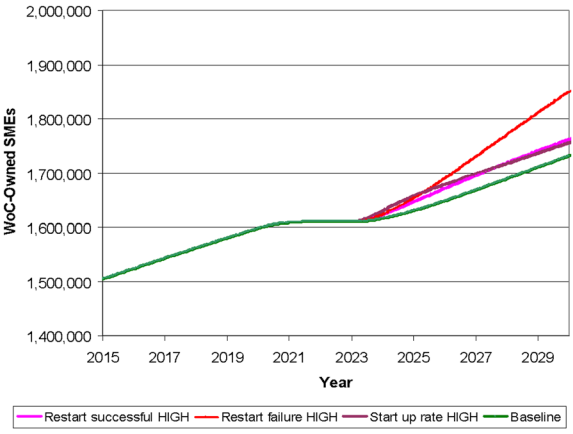


Fig. 11 Total number of WoC SMEs for baseline and three start-up rate scenarios

Table 3 Percent differences between the baseline, high, and low scenarios applied to multipliers in 2020

Parameter	Value	Entrepreneurs' Status						
		Aspiring	Failed	Successful Exit	SME 0 to 1 Years Old	SME 1 to 5 Years Old	SME to 10 Years Old	SME < 10 Years Old
Financing Rate	Low	22.23%	-0.18%	-1.42%	-8.58%	-2.61%	-0.29%	-0.01%
	High	-30.42%	0.27%	2.11%	9.86%	3.84%	0.49%	0.01%
Restart New SME after Failed Exit	Low	0.00%	0.34%	-0.71%	-5.05%	-1.32%	-0.14%	0.00%
	High	0.00%	-0.69%	1.42%	10.03%	2.62%	0.27%	0.01%
Restart New SME after Successful Exit	Low	0.00%	-0.08%	12.45%	-4.38%	-1.24%	-0.13%	0.00%
	High	0.00%	0.14%	-20.20%	6.55%	2.10%	0.24%	0.01%
1st Year Stay in Business	Low	0.00%	0.12%	1.15%	15.23%	-6.49%	-0.87%	-0.02%
	High	0.00%	-0.19%	-1.88%	-22.48%	9.71%	1.44%	0.04%
1st Year Fail	Low	0.00%	-0.41%	0.83%	6.05%	1.54%	0.16%	0.00%
	High	0.00%	0.73%	-1.53%	-10.62%	-2.83%	-0.29%	-0.01%
1st Year Success	Low	0.00%	0.03%	-4.55%	1.58%	0.45%	0.05%	0.00%
	High	0.00%	-0.06%	8.79%	-3.04%	-0.88%	-0.10%	0.00%
5th Year Stay in Business	Low	0.00%	0.03%	0.22%	0.03%	3.20%	-4.33%	-0.14%
	High	0.00%	-0.07%	-0.42%	-0.06%	-6.07%	8.21%	0.27%
5th Year Fail	Low	0.00%	-0.51%	0.42%	-0.01%	4.59%	0.58%	0.01%
	High	0.00%	0.94%	-0.79%	0.02%	-8.51%	-1.11%	-0.03%
5th Year Success	Low	0.00%	0.02%	-5.93%	-0.90%	1.80%	0.24%	0.01%
	High	0.00%	-0.03%	11.49%	1.76%	-3.48%	-0.47%	-0.01%
10th Year Stay in Business	Low	0.00%	0.00%	-0.04%	0.00%	0.00%	4.31%	-1.25%
	High	0.00%	-0.01%	0.09%	0.01%	0.00%	-8.06%	2.33%
10th Year Fail	Low	0.00%	-0.03%	0.00%	0.00%	0.00%	0.31%	0.01%
	High	0.00%	0.05%	-0.01%	0.00%	0.00%	-0.62%	-0.02%

Table 3 (continued)

Parameter	Value	Entrepreneurs' Status						
		Aspiring	**Failed**	**Successful Exit**	**SME 0 to 1 Years Old**	**SME 1 to 5 Years Old**	**SME to 10 Years Old**	**SME < 10 Years Old**
10th Year Success	Low	0.00%	0.00%	-0.65%	-0.10%	-0.02%	0.31%	0.01%
	High	0.00%	0.00%	1.30%	0.20%	0.04%	-0.62%	-0.02%
Long-Term Failure	Low	0.00%	-0.14%	0.04%	-0.01%	0.00%	0.00%	0.53%
	High	0.00%	0.27%	-0.08%	0.02%	0.00%	0.00%	-1.05%
Long-Term Success	Low	0.00%	-0.01%	-4.85%	-0.73%	-0.14%	-0.01%	0.75%
	High	0.00%	0.01%	9.58%	1.45%	0.28%	0.02%	-1.49%

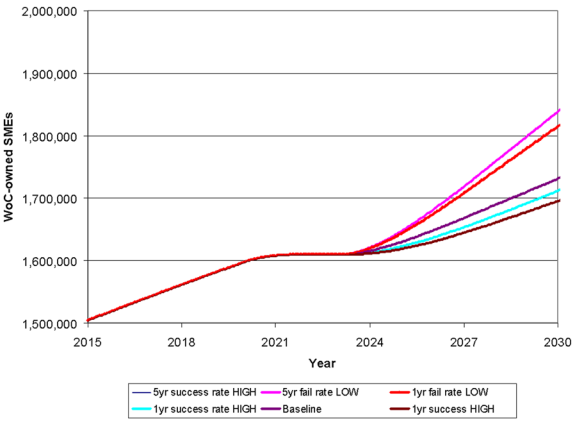


Fig. 12 Total number of active WoC entrepreneurs in scenarios with high success and low failure rates compared with the baseline scenario

It was assumed that the economic fallout from the COVID-19 pandemic would recover in 3 years (baseline). However, as the world is still amidst a crisis, it is not certain whether this is a reasonable assumption. As more vaccines roll out globally, the recovery may take as little as two years. Alternatively, unknown virus variants may threaten the current trend, and the recovery may take as long as four years—or possibly beyond. Thus, the 3-year assumption was considered a *baseline*, and the 2-year and 4-year recovery times were analysed as *low* and *high* scenarios, respectively (Fig. 14).

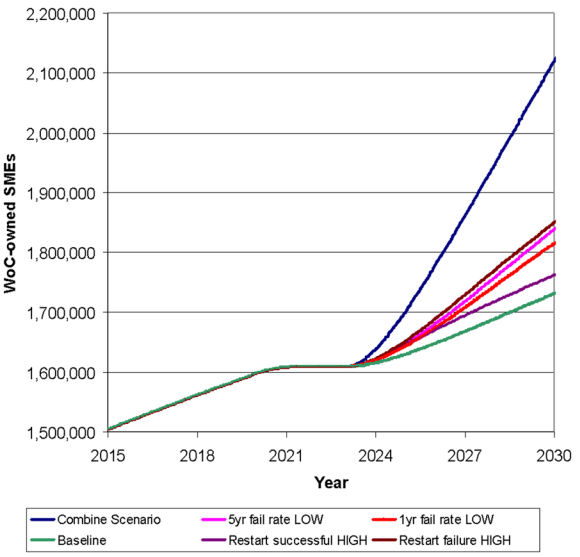


Fig. 13 WoC SMEs in individual and combined scenarios compared with baseline

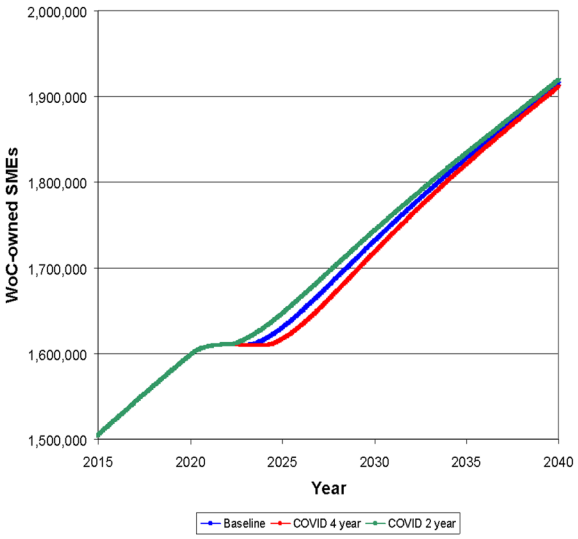


Fig. 14 WoC SMEs at 2, 3, and 4 years until economic recovery from COVID

Policy implications

Three performance measures were considered to determine the policy implications of this model. These were based on the difference between the 2022 values and the 2030 values for additional successful buyouts, additional business failures, and additional ongoing businesses for WoC entrepreneurs. Recall in Fig. 5 that there were exogenous variables referred to as *multipliers*. These multipliers can be considered to be proxies for the potential effort to change the parameters in the model after 2022. For example, the effort might be expended to increase the opportunities for a potential WoC entrepreneur to obtain financing for a startup or increase the rate that WoC entrepreneurs who have successfully or unsuccessfully exited the market reenter the market. Or effort might be expended to reduce the failure rate the WoC entrepreneurs experience when their businesses are less than one-year-old or increase the potential successful exits of the market by a WoC entrepreneur.

A series of constrained optimisation exercises were completed which utilised the three performance measures. The baseline case was when all of the multipliers were set to one. This represented the status quo in which no extra effort is expended to improve the performance of the WoC entrepreneurs' businesses. Then the situation in which the effort is doubled to improve the performance measures was considered. This extra effort was evenly distributed over all aspects of the model. There are 14 aspects in the model where effort can be applied, all with a baseline multiplier value of one. So when the effort was doubled, the total effort applied was increased from 14 to 28. This resulted in a considerable improvement in the performance of the WoC entrepreneurs' business success (Table 4). The number of WoC entrepreneurs successfully exiting the market more than doubled. The number of

Table 4 Application of the model to obtain improved performance in the future

Parameter	Scenarios				
	Baseline	**Doubling of Effort**	**Minimise the Cumulative Failures**	**Maximise the Number of Active Businesses**	**Maximise the Cumulative Successful Exits**
Financing Rate Multiplier	1	2	1	1	1
Restarting Rate After a Business Failure Multiplier	1	2	1	11.32	4.28
Restarting Rate After a Successful Exit Multiplier	1	2	1	1.52	2.19
First Year Continuation Rate Multiplier	1	2	3.89	1.74	1
First Year Failure Rate Multiplier	1	2	3.04	1.88	1.55
First Year Successful Exit Rate Multiplier	1	2	1	1	6.78
Second to Fifth Year Continuation Rate Multiplier	1	2	4.21	1	1
Second to Fifth Year Failure Rate Multiplier	1	2	4.80	2.54	1
Second to Fifth Year Successful Exit Rate Multiplier	1	2	1	1	4.20
Sixth to Tenth Year Continuation Rate Multiplier	1	2	1	1	1
Sixth to Tenth Year Failure Rate Multiplier	1	2	1.52	1	1
Sixth to Tenth Year Successful Exit Rate Multiplier	1	2	1	1	1
Long-term Failure Rate Multiplier	1	2	2.54	1	1
Long-term Successful Exit Rate Multiplier	1	2	1	1	1
Successful Exits by WoC Entrepreneurs	520,304	1,103,415	464,230	952,270	2,616,599
Business Failures Experienced by WoC Entrepreneurs	1,146,686	842,581	489,218	1,326,070	1,275,229
Ongoing Businesses Run by WoC Entrepreneurs	133,406	685,476	782,083	1,838,035	450,776

WoC entrepreneurs suffering business failures was reduced by 27%, and the number of continuing businesses run by WoC entrepreneurs was more than quadrupled.

Then focused effort was examined. The first policy was to minimise the additional business failures suffered by WoC entrepreneurs between 2022 and 2030 (Fig. 15). The total effort applied was 28 units, as was used when the effort was doubled, but in this case, the effort was distributed optimally among the 14 parameters in the model to minimise the number of WoC entrepreneurs suffering a business failure. It can be seen in Table 4 that effort was expended on supporting the WoC entrepreneurs in ways that reduce the failure rates. Priority was placed on WoC entrepreneurs in their first few years of business.

This effort reduced the number of WoC entrepreneurs who suffered a business failure by 42% compared to doubling the effort across the board (Fig. 15). It also increased the number of WoC entrepreneurs with ongoing businesses by 14% (Fig. 16) but it reduced the number of WoC entrepreneurs who successfully exit the market by 58% (Fig. 17). This is because no extra effort was assigned to financing WoC entrepreneurs starting new businesses or supporting the WoC entrepreneurs who want to start another business after a previous successful or failed exit (Table 4).

Next, the allocation of effort was optimally assigned to the model parameters to maximise the WoC entrepreneurs with ongoing businesses in 2030 (Fig. 16). In this case, the effort was concentrated on encouraging WoC entrepreneurs to start new businesses after a previous business failure (Table 4). Less priority was placed on supporting WoC entrepreneurs to start a new business after a successful exit because in general there are many fewer of this type of WoC entrepreneur. Also, there was substantial effort assigned to supporting WoC entrepreneurs in ways to reduce the possibility of a business failure at the early stages of the business life cycle. This allocation of effort increased the number of WoC entrepreneurs who successfully exit the market by 105% compared to the previous case when business failures were minimised (Fig. 17). The number of WoC entrepreneurs with ongoing businesses increased by 135% over the previous case (Fig. 16). However, the number of failing WoC entrepreneurs increased by 171% (Fig. 15).

Comparing this allocation to the doubled effort, we can see from Table 4 that the number of WoC entrepreneurs successfully exiting is 14% less than when the number of WoC entrepreneurs with ongoing businesses was maximised. The number

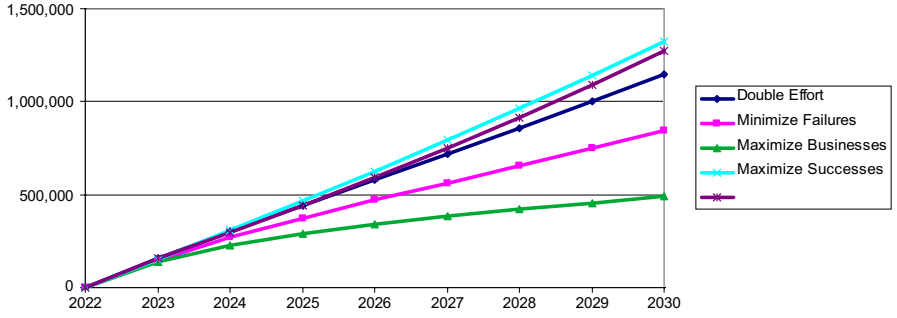


Fig. 15 Business failures between 2022 and 2030 for the five scenarios

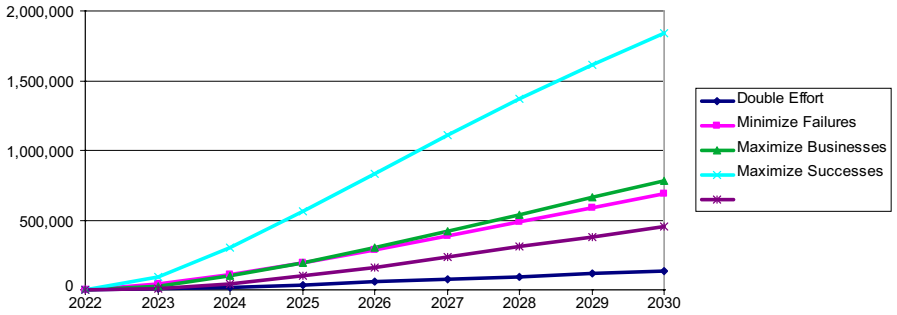


Fig. 16 Ongoing businesses between 2022 and 2030 for the five scenarios

of WoC entrepreneurs experiencing failures 57% higher while the number of WoC entrepreneurs with ongoing businesses is 168% larger. Finally, the scenario where the number of WoC entrepreneurs successfully exiting the market was maximised was considered (Fig. 17). This resulted in a large increase in the number of WoC entrepreneurs successfully exiting the market compared to the other cases (Fig. 17) but also a much larger number of WoC entrepreneurs suffering a business failure (Fig. 15) and many fewer ongoing businesses (Fig. 16).

After examining the results for these five scenarios, it has been seen that there are trade-offs when the optimisation of effort is applied in a simplified manner. It could be argued that simply doubling the effort across all 14 parameters produced reasonable results and is quite simple to apply. On the other hand, maximising the number of WoC entrepreneurs with ongoing businesses has substantial advantages because it can increase the number of WoC entrepreneurs with ongoing businesses by 168% compared to doubling effort across the board. In this case, most of the effort is expended supporting WoC entrepreneurs starting a business after a business failure. This suggests that policies that support a quick recovery from a previous bankruptcy would be highly beneficial WoC entrepreneurs.

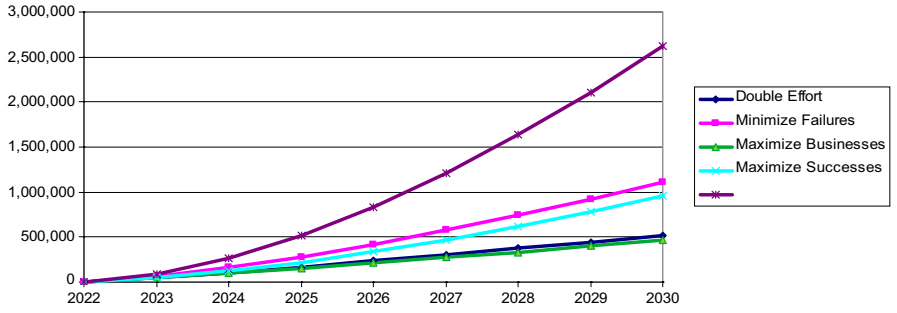


Fig. 17 Successful buy-outs between 2022 and 2030 for the five scenarios

Conclusion, Implications, Limitations and Future Research

Several insights can be drawn about of the success of WoC-owned SMEs from the validated and calibrated SD model reported here. The SD model reflected current data reporting most WoC-owned SMEs fail and do so within their first few years (US Bureau of Labor Statistics, 2021; Shepherd, 2020). This evidenced a well validated model that can be used to carry out simulations with accurate results.

The model results emphasised the need for early intervention. The model demonstrated that encouraging WoC to consider starting up a new SME created more failed businesses if no complementary effort was made to support these new WoC entrepreneurs after they start their business. Although many of the WoC who exited successfully would start up another SME, the number of active WoC-owned SMEs is not materially increased unless the WoC who exited the system after a failed business are encouraged to launch another business. Reducing rates of failed WoC SMEs would need additional support during the early years of an established SME to bolster its success. Such efforts could include government supports, formal education, resources, networking opportunities, customer discovery, mentorship, and peer support.

Additionally, the authors varied the time to recover from the COVID-19 shock to the WoC SME system. The model simulated the economic downturn with durations of two, three, and four years shifted turnaround time and estimated time to reach pre-COVID-19 levels of active WoC SME entrepreneurs. Surprisingly, the number of these businesses appear to eventually converge, representing recovery back to the original trajectory, albeit 18 years from the time of the writing of this paper (2022). Additional public and government support in spurring the development of WoC SMEs during the economic recovery from the COVID-19 pandemic would reduce the recovery time.

This study showcases SD as an excellent tool for examining behavior of a system over time. In this computational model, the nature of maturing WoC businesses was examined using a population aging-chain approach and, time-varying transition rates were used via a goal-gap approach. The ability to shock the system when an economic crisis occurred was also implemented in the model using if–then-else statements based on the periods being considered. It was possible to validate and calibrate the model with extant historical data to build confidence in its ability to make projections into the system behavior in the future.

Implications for practitioners and policy makers

This research builds on existing studies of WoC entrepreneurs and SMEs by presenting the first known simulation model of WoC entrepreneurship. Efforts to reduce the failure rates in the first few years of an SME startup and ensure more WoC-owned SMEs mature and thrive may be more important than improving the chances of a successful exit from the system of an already mature SME.

According to Hammond et al. (2020), computational modeling of real-world phenomena can be used as a virtual laboratory to experiment with various policy approaches for changing system behavior and improving outcomes. As such, the study has proposed policy approaches which can be used to change and improve the WoC entrepreneurial system and survival rates of these enterprises. Also, this validated model can be used to explore potential policy approaches for supporting WoC entrepreneurial success and can be used to elucidate policies most likely to be feasible and effective if implemented. From a practice standpoint, the study highlighted the first five years as the most critical to the success of the SME and ability of a WoC entrepreneur to have a successful exit. This study additionally highlighted the role of System Dynamicists in developing and broadly disseminating robust intersectional models to help reduce structural oppression and make societal change.

Limitations and areas for future research

A limitation of the current model is that the population of WoC entrepreneurs is homogeneous. The model does not distinguish characteristics among the individual WoC entrepreneur in the area of business acumen. The current model does not consider the possibility that the WoC entrepreneur learned from the previous failure and would therefore be more likely to succeed in the future. Results here are therefore conservative estimates the authors believe are more representative of the current difficult economic times. Future iterations of the model could incorporate learning among the simulation WoC entrepreneurs.

Due to a lack of data availability, the current SD model does not provide stratified results by specific race or of female-born gender non-binary entrepreneurs, lesbian, gay, bisexual, pansexual, transgender, genderqueer, queer, intersex, agender, asexual and other queer-identifying (LGBTQIA +) entrepreneurs, or women with invisible and/or visible disabilities.

Extrinsic (external) and intrinsic (internal) bias and systematic oppression WoC may be facing due to their dual marginalised identities should be further considered in future modeling. SD studies exist which analyse this phenomenon in other contexts (Rua-Gomez et al., 2020) of which the framework of this study is well equipped to incorporate. Supporting WoC-owned SMEs would provide positive impacts on the US economy in terms of job growth with increases in GDP, and it would promote justice for a population currently and historically experiencing marginalisation.

Determining specific controllable influencers of the model is worth pursuing. Controllability can occur at the individual WoC level, at the national policy level, and at any level in between. For example, key influencers for early access to capital and finance rates include the entrepreneur's personal credit score, a commercial bank's loan origination requirements, and the US Small Business Administration's programs for under-represented and disadvantaged small business owners (Galli et al., 2020). Incorporating these factors into the SD model will highlight additional levers that will be most effective in improving the success of WoC entrepreneurs

in their SMEs. Some of the possible interventions to support WoC entrepreneurs might have a prohibitively high deployment cost. Therefore, decision support tools might be worth investigating to consider the trade-offs between investment in one intervention versus another in terms of costs and benefits.

Conclusion

From the foregoing, this study proposes that individual and governmental efforts should be geared toward a reduction in the failure rates of the enterprises in the early years to enhance SME survival. Furthermore, supports would be helpful in bolstering the success of new WoC entrepreneurs at the start of their businesses. It is advisable that WoC entrepreneurs leverage the positive lessons taken from their failed enterprises for the creation of new and possibly more sustainable businesses. Stochastic events such as pandemics, though rare, are inevitable and could have long-lasting effects on different aspects of an economy including businesses, hence recovery of WoC entrepreneurs from the impact of simultaneous financial and health crises may take nearly two decades.

Annexure 1

From these time-series, it was possible to derive data from 1994 to 2020 for the number of businesses in their first year of operation (in green), the number of businesses in operation for 2–5 years (in yellow), the number of businesses in operation for 6–10 years (in red), and the number of businesses in operation for more than 10 years (in white in this Table 5)

Table 5 Raw time-series data obtained from the US Bureau of Labor Statistics. (created from date accessed from https://www.bls.gov/ accessed December 2021)

1994	569,419																							
1995	453,134	604,415																						
1996	387,868	476,551	609,638																					
1997	345,155	410,336	476,797	639,114																				
1998	309,084	361,618	408,018	501,944	643,070																			
1999	282,484	326,825	363,990	436,505	515,330	658,730																		
2000	257,488	295,171	325,701	384,435	440,788	514,914	674,644																	
2001	236,094	268,145	293,298	338,998	383,515	436,181	528,894	671,393																
2002	218,171	246,242	267,339	304,458	340,826	380,967	445,193	508,376	659,236															
2003	203,484	229,526	246,995	279,205	309,183	342,763	392,621	434,349	516,525	662,543														
2004	191,428	215,477	230,620	258,919	285,445	313,589	356,118	386,793	444,555	525,244	653,887													
2005	180,909	201,976	215,735	240,821	264,980	289,762	326,423	351,455	395,686	453,130	516,225	679,925												
2006	172,805	191,065	203,290	227,775	248,721	269,710	301,694	322,909	360,997	406,991	451,591	544,317	715,734											
2007	163,477	180,774	191,924	213,568	233,012	251,399	280,436	297,039	330,348	366,143	400,022	467,307	560,199	703,834										
2008	154,939	171,477	181,330	201,591	218,611	234,614	260,349	274,484	302,780	330,963	356,540	409,023	474,184	544,014	678,095									
2009	145,109	160,618	170,442	187,304	202,644	216,177	239,407	250,787	275,267	296,504	316,548	357,373	405,474	450,670	510,240	638,769								
2010	136,978	151,822	160,473	176,231	189,933	201,749	221,788	231,551	253,255	271,042	286,06	318,534	356,437	390,550	428,956	466,678	560,589							
2011	130,986	145,015	153,003	167,587	180,855	191,474	210,503	217,340	237,710	252,322	265,011	293,767	325,123	353,443	382,843	404,363	440,431	582,569						
2012	125,354	139,196	146,723	160,498	172,719	183,486	200,746	207,292	225,244	238,688	249,901	275,621	302,965	326,364	350,653	364,658	384,642	462,749	631,817					
2013	120,593	133,907	140,708	154,081	165,417	175,427	192,750	198,021	214,273	226,659	236,285	259,986	283,623	303,237	324,092	333,536	345,504	403,725	500,642	629,078				
2014	115,619	128,768	135,496	148,017	158,591	168,151	184,355	188,498	203,175	214,060	222,163	243,856	265,596	282,373	299,467	305,186	313,915	360,707	433,844	500,620	652,780			
2015	111,183	123,537	129,930	141,865	151,953	160,952	177,268	180,045	193,637	203,464	209,874	229,707	249,101	263,441	277,982	283,855	286,201	326,173	386,701	433,681	520,294	678,135		
2016	106,785	118,660	124,433	136,289	145,945	153,968	169,451	171,366	185,336	192,827	199,005	216,894	234,472	247,023	259,619	260,219	263,309	296,601	349,688	386,033	451,988	539,885		
2017	102,384	113,860	119,546	130,158	140,253	147,397	162,353	163,593	176,097	183,224	188,518	205,301	221,911	232,179	243,531	241,940	240,945	271,165	316,769	347,789	403,418	468,409		
2018	98,046	109,128	114,335	124,308	133,741	140,327	154,461	155,100	167,159	173,983	178,709	194,313	209,397	218,228	227,931	226,584	226,812	252,242	292,884	318,384	364,335	416,505		
2019	94,357	104,719	109,579	119,317	128,151	134,279	147,461	148,097	160,204	165,872	169,223	183,944	197,927	205,890	214,969	212,646	212,624	235,407	271,212	293,418	331,393	375,875		
2020	89,876	99,930	104,407	113,501	122,249	127,646	140,302	139,974	151,035	156,307	158,897	172,383	185,109	191,824	199,857	195,927	192,239	214,164	246,618	265,834	302,651	339,136		

The data were for all small businesses, so they needed to be scaled down because only 40%

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