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Resilience Measurement – Financial Survival Bag Concept Using Rough Fuzzy Set Approach

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Abstract

The current Covid-19 pandemic has starkly revealed the importance of being resilient to enable an organization to stay in business. A resilient performance measurement model to constantly measure an organization's financial resilience is thus necessary to ensure the continued survivability of the organization. The purpose of this research is to develop a resilience measurement model to measure and unify various metrics into a single unit-less index. This paper is an extension of work on the financial survival bag concept and the measures and metrics from [1]. The financial resilience measurement model was developed using the rough fuzzy set method for any participating SME manufacturer. This model intends to solve the research gaps from previous research conducted on resilience measurement to estimate the duration an organization can survive based on its current resilience result and to gauge the interaction of risk/ disruption with resilience capabilities. A case study was conducted and the evaluation concurred with the findings of the proposed model as the results reflected their current resilience level. In essence, this research has managed to offer a new way of measurement for resilience to evaluate the financial resilience of any SME manufacturer in Malaysia.

Keyword: financial resilience; organization resilience; resilience performance measurement; rough fuzzy set.

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1. Introduction

Ever since the Covid-19 pandemic engulfed the world in 2019, there is an elevated interest by researchers in the field of resilience [2] evaluated one million firms across 16 European countries and found that up to 50% of SME will face some cash flow problems if there is continuous lockdown for more than 7 months. Resilience become an important indicator to ensure business continuity [2]. However, the challenge in this research is the unprecedented and some perplexing paradigms used in this research field [3–6]. Thus, this research is at a stage of vital importance in the exploitation and utilization of organizational financial resilience.

This paper opens a new perspective in designing a resilient financial performance measurement. The objective of this paper is to develop a resilience measurement to measure and unify various metrics into a single unit-less index. This paper only focuses on measuring the financial resiliency of a Malaysian SME Manufacturer. The model could provide an estimated survival period for an organization from the resilience measurement result. This could help the organization to design policies and strategies to improve their organizational financial resilience. The resilience index is very important for any business long-term growth [7].

This remainder of this paper structured as follow: Section 2 is an extensive review of literature on the related topics, concepts and issues. Previous works and researches along with the resilience concepts and mathematical modeling on resilience measurement were provided. Section 3 is the development of resilience measurement model and the consideration in using the model. Section 4 is the application of the resilience measurement model in a case study. Section 5 Result and discussion. Finally, section 6 contains the conclusions and recommendations.

2. Literature Review

Since the Covid-19 pandemic, the supply chain resilience has once again become the research target for practitioners and academia. The main reason for the birth of resilience is disruption [8] . Resilience is a multidiscipline field of knowledge and it refers to the recovery capacity and ability of an element to return to a stable state after disruption [9–14].

This paper is an extension of [1] using the financial survival bag concept to measure financial resiliency. Resilience in this paper is defined as the ability to survive during a disruption or overcoming any lack in the specific given time to achieving the objective sustainably. Majority of the researchers agreed that the definitions of resilience should consist the “capability/ ability” of the system to “absorb”, “maintain”, “adapt” and “cope” with the “disruption/ risk/ crisis” and “recover”. Because of the common use of these words in definition, it has become a critical key factor for resilience. This critical key factor should be used in measuring resilience.

A few researchers proposed a few resilience concept frameworks that are more widely accepted, currently being set as the cornerstone of supply chain resilience research. The first cornerstone is to build resilience from the vulnerability based on the risk management concept. The second cornerstone is to build resilience by developing redundancy and flexibility. The third cornerstone is the formation of resilience based on balancing capability and vulnerability. The fourth cornerstone is the resilience triangle from the graph of performance against time.

The first cornerstone is the resilience as one of the core elements of supply chain risk management [15–20]. In this concept, resilience was further investigated into "pre-disaster" and "post-disaster" which relate into mitigation, preparedness, response and recovery processes [21]. Whenever risk involved it implicates vulnerability [3,22–28] . In this concept, it has proven the cruciality of "risk/vulnerability/disruptions" in the understanding of resilience.

The second cornerstone of resilience concept is the actual problem encountered by practitioners. Details of resilience strategies used for recovery from disruptions can be referred to[29]. This concept conjure more enabler for resilience, such as being redundant is to be "responsive" in reacting to the disruption [30,31] ,"to buy time" for recovery which created a new and crucial factor -- "time" [32] . Flexibility leads to agility [3,30,33-35] and "quick" reaction to the uncertainties [36] . The pivotal key of this concept is "timely recovery". It strongly reflects relationship between time and resilience.

The third cornerstone of resilience concept was developed by [37]. His research brings a major breakthrough by establishing the relationship between vulnerability and capability (the relationship between the first and second concept). The key implication drawn from his research is that resilience is the balance between capability and vulnerability [3,38,39] . Resilience is proportionate to capability and inversely proportionate to the vulnerability, however this is not always true. Thus, they proposed that in order to measure resilience, one must first measure vulnerability and capability to identify the supply chain's resilience level.

The fourth cornerstone of resilience concept is the resilience triangle. This concept was developed by [40]. It is based on intuitive plotting of the quality of infrastructure before and after an earthquake over time. Later on, [41] adopted the plotting into performance of an enterprise before and after disruption. Subsequently [30], adopted this concept and re-designed resilience into supply chain and performed a simulation to calculate lead time and total cost before and after disruption. This concept draws a clear picture of how resilience take place comparing before and after disruption in the form of time and organization performance. All four resilience concepts make it clear that resilience must include "risk/ vulnerability/ disruption", "ability/ capability" and "time" to recover. This paper only focusses on the mathematical modeling of organizational financial resilience performance measurement. Table 2.1 shows summary of the previous research on resilience measurement in general.

From the past research in resilience performance measurement, there is a lacking of mathematical model for resiliency measurement. [18]considered measuring the capability of resilience as more important than measuring resiliency, but without the "resiliency" measurement, it is very hard to know the actual state of an organization. From the literature, the measuring of capability of resilience does not include the "risk/ disruption". Measuring the resiliency must include "risk/ disruption" or vulnerability [12,42,43]. From the past research, measurement that involved the "risk/ disruption" does not provide for the interaction of the "risk/ disruption" with the "capability/ ability". It is important to know the interaction as it could provide the strategies to be used in different severity of the risk.

The second research gap from the past research is the lack of logical construct to relate capability, criterions/ condition and risk/ vulnerability to describe resilience performance measurement. This paper intends to provide a solution for the listed research's gap using the financial survival bag concept [1] and rough fuzzy set approach. The survival bag concept is to provide a better understanding of resilience and also provide a guide on how to select the "measures and metrics" to build resilience. Rough fuzzy set was selected for this paper because of the knowledge discovery in database (KDD). Resilience is known to be subjective and vague in nature. Rough set and fuzzy set are commonly used for uncertainty. Rough set are used for limited information/knowledge available for a concept while fuzzy set are used for imprecision of meaning of a concept [44]. Rough set do not handle quantitative data and fuzzy set do not handle qualitative data. Although rough and fuzzy set are two different approaches in handling uncertainty data, they complement each other [45–51].

In the early days when the organizational/ supply chain resilience concept was not clearly established [52], measured resilience based on stress- strain plots which is a concept adopted from engineering resilience in material science. This approach fails to take "timely recovery" and "risk/ disruption" factors into account. The model is only limited to adaptability as the "ability/ capability" factor does not sufficiently reflect resilience. On the other hand [53], used genetic algorithms in resilience measurement. The weakness of their research is that it is intended to measure the "optimum resilience network" it does not show the potential "capability/ ability" of the network structure.

Reference [54] research used multiple criteria decision-making method, Analytic Hierarchy Process (AHP) to measure resilience by assigning weight to each resilience capability. The limitation of this model is that it does not take "recovery time" and "risk/ disruption" into account. According to [55]research, Interpretive Structural modeling (ISM) is measuring the relationship among the measures of resilience capability. This model requires the experts intrinsic to generate the relationship among the variables which is subjective. Reference [56] use Cox-PH model to measure resilience in the system. This model could not provide a way to help the organization to be more resilient. Reference [57]proposed resilience measurement using multi-product, multi- period Mixed Integer Linear Programming to design and plan decisions. The model was improved by considering the probability of demand and disruption uncertainty to measure the resilience. However, the "time for recovery" were not considered in the model. They also highlighted that extra redundancy does increase the resilience.

Authors [58] applied the classical fuzzy set to measure resilience. In the proposed model, However, the model does not take the "risk/disruption" and "recovery time" into account. Reference [59]applied GTA in resilience measurement. They were able to calculate the resilience performance measure in a single unit, but they do not consider the "recovery time". Authors [60] proposed a fuzzy network DEA model to measure resilience. This model only considered organizational resilience. However, the "recovery time" factor was not considered in the model. Reference [61] incorporated sustainability and resilience in the measurement using quality function deployment and decision-making trial and evaluation laboratory (QFD-DEMATEL) to select the factors for the DNDEA model. The model focuses on the resilience capability measurement. The "recovery time" and "risk / disruption" were not considered.

Authors [62]applied Bayesian network approach in sulfuric acid manufacturing to measure resilience. In his model, resilience is equal to the ratio of recovery over loss. His model doesn't include the "recovery time" or for how long the resilience can last. Reference [63] use Bayesian Belief Network (BBN) to measure resilience. His model is intended to avoid experts' opinions, therefore he uses machine learning/ historical data to calculate the performance. This model is acyclic. It can only do temporal or spatial dynamics for selected time. For instance, inflation may happen but the results will not reveal that.

3. Proposed Resilience Measurement Model

The proposed resilience measurement model can be divided into three major sections (figure 1). Firstly, it is to obtain the 'financial survival bag' score by using the rough fuzzy set methodology. Secondly, from the 'financial survival bag' score, the resilience index is established. Lastly, it is to generate the resilience level from the resilience index and to present the final result in percentage.

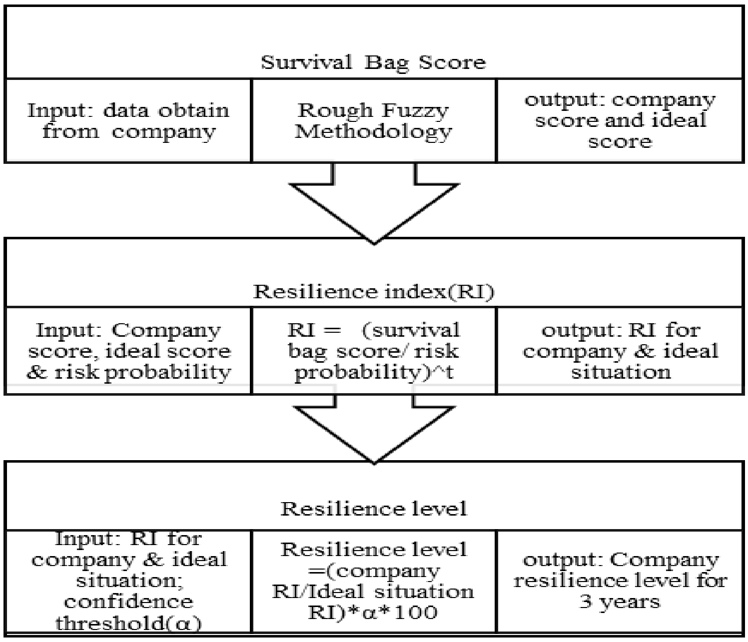

Figure 1: Methodology of resilience measurement model

3.1. Survival Bag Score

The comprehensive list of performance measures and metrics as stated in [1] were used as the measure and metrics for the 'financial survival bag'. An organization would probably select the measures that are considered as "best fit" for them. Bearing this in mind, the rough fuzzy set methodology was selected as it would aptly assist an organization to make an informed and wise choice to select the measures needed to create a fitting and unique 'financial survival bag' just for their own use.

The rough fuzzy set methodology was adopted from [44]. For the simplicity of this paper and case studies, the conditional attributes (C1, C2 and C3) and the decision attribute (D) with three decision class (FH, FM and FL) were used. Lastly, λ-cut is used to determine which measures/metrics are to be selected/focused. The importance of the weightage of each metrics was calculated based on the data collected from [1].

In this section, the input data needed from an organization are a set of conditional attributes (C1=information/knowledge level, C2=experiences level, C3=available resources level), a set decision attributes (d1, d2, d3), decision(D) and λ-cut value. It consists of 5 steps to obtain the survival bag score for the organization and the ideal scores.

Step1 To generate the indiscernibility class from the conditional attributes, C with the decision D (1). This step allows the organization to know the numbers of condition/ situation may occur from the current available data.

$$\frac{U}{C} = I(x) = \{X1, X2, X3, X4, X5, X6, \ldots, Xn\} \tag{1}$$

Where,

U = Universe

C = Conditional attribute set C

$I(x)$ = Indiscernibility class

Xn =n number of condition/ situation available from data

Step 2 To generate decision class FX produced from the set decision attribute, d (2). this step helps the organization to classify which “items” should be used during different levels of the crisis.

$$\frac{U}{D} = FX = \{FH, FM, FL\} \tag{2}$$

Where,

U = Universe

D = Decision attribute set d

FX = Decision class

Step 3 To calculate the λ-cut set of every decision class and form fuzzy equivalence class FX_{λ}. Suppose fuzzy set $FX \subseteq U$, for $\forall\lambda \in (0,1]$; $FX_{\lambda} = \{x \in U | \mu_{FX}(x) \geq \lambda\}$ is the λ-cut set of FX, while λ is known as the level. Suppose λ = $\min\{\mu_1(x), \mu_2(x), \mu_3(x), \ldots \mu_n(x)\}, where\ n$ denote the number of elements contained in decision class. This step helps the organization to determine which “items” to be in the survival bag or preferred to focus with the different levels of crisis.

Step 4 To calculate membership function of every decision class, FX_{λ}. This step is to calculate the rough membership function (3). Then calculate the classification quality (4), select the highest classification quality for all different reduct combination and form a probabilistic decision rules table.

$$\mu_{FX_\lambda}(x) = \frac{|I(x) \cap FX_\lambda|}{|I(x)|} \tag{3}$$

Where,

$\mu_{FX_\lambda}(x)$ = the degree that x belongs to the set FX_λ

$|FX_\lambda|$ = the sum of the membership degree of all element in set FX_λ

$|I(x)|$ = the number of elements in the indiscernibility class

$$\gamma_C\,(D) = \frac{\left|\cup\left\{\frac{|I(x) \cap FX_\lambda|}{|I(x)|} \geq \beta\right\}\right|}{|U|} \tag{4}$$

Where,

$\gamma_C\,(D)$ = the classification quality for all sets of conditional attributes C

β = classification error;$0 \leq \beta < 0.5$

$|U|$ = the number of elements in the universe set

Step 5 To calculate the survival bag score for the company and for the ideal scores (5). The company survival bag score is the current capability of the organization to prepare for resilience. The ideal survival bag score is the full capability that the organization can reach.

$$Survival\ bag\ score\ (S) = Y \times w \tag{5}$$

Where,

Y =probabilistic decision rules

w= the weight calculated from the survey (adopt from [1])

3.2. Resilience index

This process is to convert the ‘financial survival bag’ score to a resilience index. According to [12] resilience is the balance between capability and vulnerability. From his concept resilience is equal to capability over vulnerability. In this resilience measurement model, the concept of a ‘financial survival bag’ score represents the capability of the organization and the risk probability is the vulnerability. Risk probability given to the organization ranges from 0 to 1, where 0 denote no risk at all and 1 denote 100% at risk.

In the resilience triangle [9,64], performance versus time plays an important role in resilience formulation. Assuming the time taken to grow is in the S curve path and the probability of the ‘financial survival bag’ risk is an independent variable. Thus, the ‘financial survival bag’ has to include time (t). Time in the resilience measurement model denotes the duration of how long the ‘financial survival bag’ can last. Assuming, the item in the financial survival bag is replaceable every year. In other words, it means that with the current capability how long can the organization survive. The organization resilience index denotes where the organization current survival state is at.

Confidence threshold is the totality of the confidence of the evaluator/ organization has to overcome in the financial crisis using the ‘financial survival bag’. Confidence threshold is used because according to [65]research, the proactive activities (preparedness) does not affect the reactive activities (responsiveness) of the supply chain to be more resilient. The “cut off” is the selection of items to be contained in the ‘financial survival bag’ or which items to be focused on. Further studies is required for this matter as selecting all items/measures may become too burdensome for the organization. On the other hand, selecting too few may cause them to be less prepared or inadequately prepared for the future (7). The assumption of the ideal ‘financial survival bag’ score risk is 0, as at the moment no data is able to support this matter, hence an ideal bag will carry no risk. Therefore, the formula for resilience index is as shown in formula (6). The resilience index decaying from year 1 to year 3, if no changes are made to the “current” evaluation situation.

$$Resilience\ Index\ (RI) = \left(\frac{Survival\ bag\ score, S}{Probability\ of\ Risk, R}\right)^{T} \quad (6)$$

Where,

S= Survival bag score

T=number of years the survival bag can last.

R =Probability of Risk

= (business risk + survival bag risk)/2

Probability of survival bag risk = 1- Confidence threshold (7)

3.3. Resilience level

The final step is to calculate the resilience level using the formula 8. According to [1] research, it is suggested to prepare reserve resources for not less than 3 years. Thus, to calculate the resilience level, for 3 years was used as a benchmark.

$$Resilience\ level = \frac{Company\ resilience\ index}{Ideal\ resilience\ index} \times confidence\ threshold \times 100 \quad (8)$$

4. Case Study

The second case study is denoted as Company B. Company B is a make-to order railroad equipment manufacturing which is part of the construction industry is located in Kuala Lumpur. Their company sales turnover is less than RM 50 mil. According to Mr. B (GM), their company was badly affected by the Covid-19 pandemic. Data collected from company B show in table I, with the β in 0.25, confidence threshold at 0.8 and probability of business risk as 0.25.

Table 1: Date Collected from Company B

	CONDITION ATTRIBUTE			**DECISION**	**DECISION ATTRIBUTE**			**WEIGHT**
U	**C1**	**C2**	**C3**	**D**	**d1=FH**	**d2=FM**	**d3=FL**	**W**
F2	M	H	H	H	0.20	0.30	0.50	0.2771
F3	M	M	L	L	0.00	0.00	0.00	0.2409
F4	H	H	H	H	0.20	0.30	0.50	0.2306
F5	H	H	H	H	0.30	0.30	0.40	0.2515
L1	H	H	M	H	0.50	0.40	0.10	0.3318
L2	M	M	M	H	0.50	0.30	0.20	0.3331
L3	H	H	H	H	0.50	0.30	0.20	0.3351
T1	H	H	H	H	0.33	0.33	0.34	0.3293
T2	H	H	H	H	0.33	0.33	0.34	0.3352
T3	M	M	L	L	0.20	0.30	0.50	0.3356
R1	H	H	H	H	0.50	0.30	0.20	0.3238
R2	M	M	M	H	0.33	0.33	0.34	0.3422
R3	H	H	M	H	0.50	0.30	0.20	0.3340
E1	M	M	M	M	0.20	0.30	0.50	0.3291
E2	M	M	M	M	0.33	0.33	0.34	0.3348
E3	M	M	M	M	0.50	0.30	0.20	0.3360
A1	M	M	M	H	0.50	0.30	0.20	0.3352
A2	M	M	M	M	0.50	0.30	0.20	0.3331
A3	H	H	H	H	0.50	0.30	0.20	0.3318
B1	H	H	H	H	0.50	0.30	0.20	0.3622
B2	M	M	M	M	0.20	0.30	0.50	0.3301
B3	M	L	M	M	0.33	0.33	0.34	0.3076

Note: H= High, M=Medium, L=Low

$$\frac{U}{C} = \{X1, X2, X3, X4, X5, X6\}$$

Where, $X1 = \{F2\}$, $X2 = \{F3, T3\}$, $X3 = \{F4, F5, L3, T1, T2, R1, A3, B1\}$, $X4 = \{L1, R3\}$, $X5 = \{L2, R2, E1, E2, E3, A1, A2, B2\}$, $X6 = \{B3\}$

$$\frac{U}{D} = \{FH, FM, FL\}$$

Where, $FH = \{F2, F4, F5, L1, L2, L3, T1, T2, R1, R2, R3, A1, A3, B1\}$,

$FM = \{E1, E2, E3, A2, B2, B3\}$, $FL = \{F3, T3\}$

Table 2: Membership Function of Every Decision Class, FX_{λ} For {C1, C2, C3}

No. of element		FH	FM	FL
1	X1:	0.0000	0.0000	0.5000
2	X2:	0.0000	0.0000	0.2500
8	X3:	0.3700	0.2700	0.2975
2	X4:	0.5000	0.3500	0.0000
8	X5:	0.3325	0.0000	0.3100
1	X6:	0.3300	0.3300	0.3400

Example of membership function of equivalence class $X5$ for FH_{λ} ,show in table 2.

$$\mu_{FH_{\lambda}}(X5) = \frac{|I(x) \cap FX_{\lambda}|}{|I(x)|} = \frac{|X5 \cap FH_{\lambda}|}{|X5|}$$

$$= \frac{0.5 + 0.33 + 0 + 0.33 + 0.5 + 0.5 + 0.5 + 0}{8} = 0.3325$$

Classification quality for condition attribute {C1, C2, C3}, β=0.25

$$\gamma_C\,(D) = \frac{\left|\cup\left\{\frac{|I(x)\cap FX_{\lambda}|}{|I(x)|} \geq \beta\right\}\right|}{|U|} = \frac{12}{22} = 54.55\%$$

Repeat step 1 to step 4 removing one of the conditions attribute each time to find the best classification quality. From all the different combination, found that the highest classification quality is for condition attribute {C1, C2, C3}. Thus, the data in table II were selected to calculate the survival bag score show in table 3.

Table 3: Company Survival Bag Score base on {C1, C2, C3}

CONDITION	**DECISION**		
	FH	**FM**	**FL**
X1: C1=Medium, C2= High, C3=High	0.00000	0.08312	0.13854
X2: C1=Medium, C2= Medium, C3=Low	0.00000	0.00000	0.14410
X3: C1=High, C2= High, C3=High	0.92480	0.76858	0.00000
X4: C1=High, C2= High, C3= Medium	0.33291	0.23303	0.00000
X5: C1=Medium, C2= Medium, C3=Medium	0.88898	0.82214	0.56146
X6: C1=Medium, C2= Low, C3=Medium	0.10152	0.10152	0.10459

Example of company survival bag score for condition attribute X2 which is {C1=Medium, C2=Medium,C3=Low} and decision is FL

Company survival bag score

= (0.25 x0.2409) + (0.25 x0.3356)

= 0.0602 + 0.0839 = 0.1441

Total Company survival bag score (grey colour cell in table 3)

= 0+0.1441+0.9248+0.33291+0.88898+0.82214+0.10152)

= 3.2145

Table 4: Resilience Index

	Total survival bag score, S	Probability of risk, R	Years (T)	Resilience Index, RI
Company	3.21450	0.225	1	14.29
	3.21450	0.225	2	204.11
	3.21450	0.225	3	2916.04
Ideal	7.00000	0.125	1	56.00
	7.00000	0.125	2	3136.00
	7.00000	0.125	3	175616.00

Table 5: Resilience Level

Years	Ratio RI	Confidence threshold	Resilience level
1	0.25512	0.8	20%
2	0.06509	0.8	5%
3	0.01660	0.8	1%

5. Result and Discussion

The case study was taken after 2 years of Covid-19 in Malaysia. From the result that obtain, Company B current resilience level is 20% referring to figure 2. Based on the findings, the company would survive with 20% chances if they face crisis “now”. Figure 3 shows the company reaction to different crisis level. Company B prefer to focus on Cost, Quality and Information sharing to overcome financial crisis. From table 5, Company B survival bag is only 20% “full”. As a result of which, Company B still has 80% for resiliency improvement. Referring to figure 3, Company B could enhance the financial metrics to improve the survival bag score. Remember, to arm a business with an arsenal of weapons/skill sets would definitely increase their survivability in times of crisis.

In the proposed model, only the “survival bag” score an organization could “control”. The other factor in the proposed model, such as time and probability of risk are beyond the organization control. As for the confidence threshold, is the "mental strength" of the organization, which required the leadership skill [66]. It could bring hope to the organization during an ordeal or difficulty to achieve success.

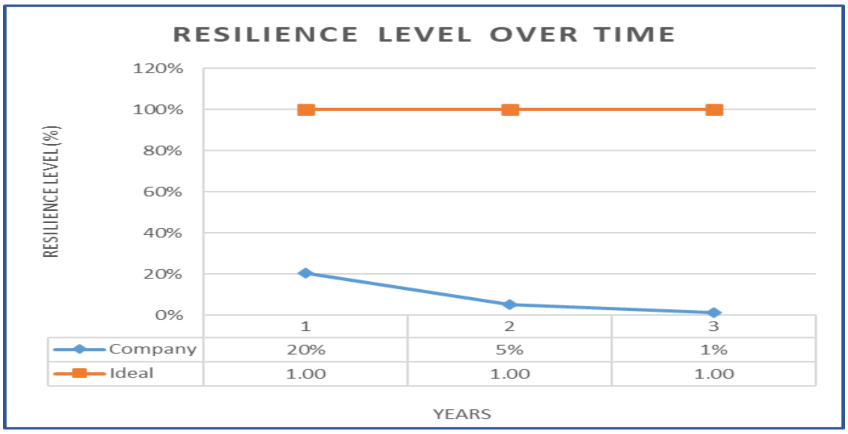

Figure 2: Resilience level of company B

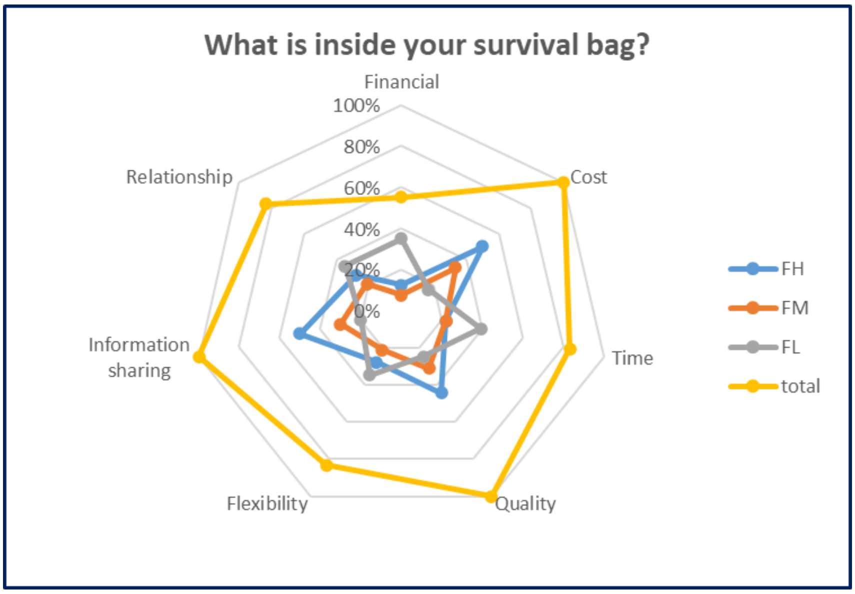

Figure 3: Company B's reaction to different crisis level

The outcomes of the research were consulted with industrial experts to examine the validity and applicability of the model. However, the research field are still in the nascent stage and is very difficult to validate as no other similar concept and mathematical model that well establish for comparison. Thus, the research is focused on the theoretical aspects and case studies. According to the industrial experts the proposed model seems logical and applicable for the managerial and practical implication. The implications for the research are as follows: (1) from the result obtain, it could help the managers to identify the lacking in their survival bag. (2) the model shed light on the issues of building financial resilience, requires the specified knowledge, experiences and resources.

6. Conclusions

Financial resilience is essential for every business in this turbulent era especially for the manufacturing industry which usually suffer the most [67]. This paper is to develop a resilience measurement model to measure and unify the various metrics into a single unit-less index was to achieve by using the hybrid rough fuzzy-set methodology. The model was used to evaluate the financial resilience level among SME manufacturers in Malaysia and was conducted by two case studies on the applicability, appropriateness and adequateness of the model.

The contribution of this paper is to provide a way to measure the "ability" in resilience measurement. This could help the organizations to have a better understanding on how to improve their resilience level. Secondly this model successfully includes the "risk indicator" and also "time" required to recover in the resilience measurement model.

The limitations of this model are that the evaluation process is very time consuming. It requires a deep holistic understanding of the organizations including the relationships of the employees and employers. Secondly the judgement on the different level of crisis is based on trade-off between metrics. Any changes in the decision or strategy would affect the final resilience level. The whole model is constrained by the probability of risk and confidence threshold which is the confidence of the organizations on facing financial crisis.

For future works, it will be worthwhile to consider developing a goal-oriented performance measurement model for resilience. For instance, if an organization desires to achieve 80% of the resilience level what criteria are required to be adopted in order to achieve this goal. Secondly, future work should consider investigating the risk of the financial survival bag. Considering the number of measures and metrics they're supposed to be in the financial survival bag, if they consider all the measures that are proposed will it be a burden for an organization? On the other hand, what is the minimum requirement number of metrics in the financial survival back to enable in organization to survive a crisis.

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