New Product Development Projects Selection for Taiwanese Century-old Businesses

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Abstract: Businesses capable of remaining in operation for more than 100 years are rare. In 2008, Taiwan External Trade Development Council (TAITRA) established an association to assist century-old businesses in maintaining growth and competitive advantage. The rapid economic growth has increased the demand for products in the market place. The most decisive factor that survives companies under stiff competition is the development of new product. The vital issue in new product development (NPD) is how to select the optimal projects for new products. This paper contributes to a more effective selection of the optimal NPD projects. With reviewing literatures about balanced scorecard (BSC) and key success factors (KSFs) of NPD, the study collects criteria for selecting optimal NPD projects. Fuzzy Delphi method, which can lead to better criteria selection, is used to modify previous studies to construct the hierarchy. Considering the interdependence among the selection criteria in the hierarchy, analytic network process (ANP) is utilized to help Taiwanese century-old businesses managers make better decisions for NPD projects selection.

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1. Introduction

Businesses capable of remaining in operation for more than 100 years are rare. In 2008, TAITRA established an association to assist century-old businesses in maintaining growth and competitive advantage. The rapid economic growth has increased the demand for products in the market place (Nalini and Muruganandam, 2013). In order to excel in the competitive markets, new product introduction is important to get new sales and profits. Hence, companies have to keep developing new products to attract customers (Kang et al., 2012). NPD is a key to developing competitive advantage and maintaining the growth of the firm (Chang and Cho, 2008; Liao et al., 2008; Wang, 2009). Differentiation through NPD is one of the most effective ways to achieve success (Wang, 2009); however, it is a risky process. Managers must carefully evaluate new products and make appropriate decisions (Ozer, 2005). Thus, the vital issue in NPD is determining the means by which to select optimal projects for new products. Nevertheless, most approaches to the selection of NPD projects focus only on issues such as financial benefits, quality, and the number of potential customers (Oh et al., 2009). Decision makers require an all-encompassing model for the selection of optimal NPD projects.

Chen et al. (2008) employ KSFs of NPD to select new product mix. Eilat et al. (2008) use BSC for the evaluation of research and development (R&D) projects. Lee et al. (2008) apply KSFs of NPD to select the most appropriate NPD mix. Oh et al. (2009) utilize the concept of BSC to estimate the feasibility of a new telecom service. Tsai (2012) utilizes KSFs of NPD to select green product development projects in Taiwan's consumer electronics industry. According to past researches, BSC and KSFs of NPD are used for NPD projects selection separately. BSC, as proposed by Kaplan and Norton (1992) is widely applied to the evaluation of business performance. BSC links the financial and non-financial, tangible and intangible, and inward and outward factors, thereby providing an integrated viewpoint from which decision makers may select optimal NPD projects. KSFs, those few things that must go well to affirm the success of an organization (Rockart, 1979; Chung, 1987), are also suitable for NPD project selection. With reviewing literatures about BSC and KSFs of NPD, the study collects criteria for selecting optimal NPD projects.

Moreover, in this paper, fuzzy Delphi method, which can lead to better criteria selection (Hsu and Yang, 2000; Ma et al., 2011), is used to modify criteria for selecting optimal NPD projects. The geometric mean value is used to denote the consensus of the expert group on each criterion's evaluation.

However, BSC takes into account the presence of dynamic relationships among various perspectives, which means that the importance of a single perspective cannot be determined without considering other perspectives (Leung et al., 2006; Yüksel and Dağdeviren, 2010). In other words, BSC is a cause-and-effect relationship, perspectives and criteria of BSC are interrelated. As to the KSFs of NPD, the interdependent relationships are also existing (Chen et al., 2008; Lee et al., 2008). Due to the interdependent perspectives and criteria, ANP which can handle not only hierarchical but also more complicated problems with the network model appears to be one of the more feasible and accurate solutions for us to handle such problems. By combining BSC, KSFs of NPD, fuzzy Delphi method with ANP, this study can make better decisions to select optimal NPD projects for Taiwanese century-old businesses. In this paper, we firstly present BSC and KSFs of NPD. Next, fuzzy Delphi method and ANP as selecting tools are described. The proposed approach within the context of selecting the optimal NPD projects is shown in Section 6. The conclusion is given in Section 7.

2. BSC

BSC is originally proposed by Kaplan and Norton as a performance measurement tool for managers to obtain a quick and comprehensive view of how their businesses were operating. BSC adds non-financial performance measures to traditional financial metrics to give managers a more "balanced" perspective of organizational performance (Kaplan and Norton, 1992). BSC considers the organization's vision and strategies, focusing on both financial and non-financial performance. Of the BSC 4 perspectives, one is financial and the other 3 involve non-financial performance measurement indexes: customer, internal business process and learning and growth. The financial perspective is about how the strategic action contributes to the improvement of revenue. In customer perspective, customers are the source of business profits. Hence, satisfying customer needs is the objective pursued by companies. There is an increasing realization of the importance of customer focus and satisfaction in any business. These are leading criteria. If consumers are not satisfied, they will find other suppliers that will meet their needs. The objective of internal business process perspective is to satisfy shareholders and customers by excelling at business processes. Metrics on the basis of this perspective allow managers to know how well their business is running and whether its products and services conform to consumer requirements. The goal of the last perspective, learning and growth, is to provide the infrastructure for achieving the objectives of the other 3 perspectives and for creating long-term growth and improvement through systems, employees and organizational procedures. In any case, learning and growth perspective constitutes the essential foundation for success of organization (Kaplan and Norton, 1992; Kaplan and Norton, 1996).

BSC is a customer-based planning and control system that helps managers to translate strategy into an integrated set of financial and non-financial measures (Kaplan and Norton, 1996). Recent studies illustrate the adoption of BSC by a broad range. Bentes et al. (2012) integrate BSC and analytic hierarchy process (AHP) to provide a better assessment of the performance of 3 organizational units in a Brazilian telecommunications company. Torabi Moghaddam (2012) explores the role of BSC implementation on financial performance transparency. Author finds that the performance measurement system, with BSC will be able to overcome barriers of implementation applying strategies. Tsai and Chang (2012) utilize ANP, grey relational analysis (GRA) and BSC to measure the performance of wealth management banks in Taiwan. Franceschini and Turina (2013) present a performance measurement system for quality improvement of an academic organization by BSC. Lin et al. (2013) propose fuzzy linguistic integrating with BSC to evaluate operating room performance. Balanced scorecard is a well-known procedure which can measure a project using different perspectives (Eilat et al., 2008). Reviewing literatures about BSC, the study collects criteria to select optimal NPD projects for Taiwanese century-old businesses.

3. KSFs of NPD

There are many factors which influence the success or failure of product development. KSFs are those few things that must go well to insure the success of an organization (Rockart, 1979; Chung, 1987). The object of NPD is to accumulate the knowledge and capability necessary to determine a suitable new product (Wang, 2009). Chen et al. (2008) identify 37 KSFs of technology companies in China. They employ ANP and KSFs of NPD to select new product mix. On the basis of questionnaires, Lee et al. (2008) investigate 108 technology companies in China to obtain the relative importance of 43 KSFs. They apply ANP and KSFs of NPD to select the most appropriate NPD mix. Suwannaporn and Speece (2010) measure the NPD success factors in Thai food industry. Andreev (2011) identifies the KSFs in Russian industrial R&D projects. Tsai (2012) summarizes 24 KSFs of NPD in Taiwan's consumer electronics industry. Moreover, fuzzy multiple attribute decision making (FMADM) is used to select green product development projects. Reviewing literatures about KSFs of NPD, the study collects criteria to select optimal NPD projects for Taiwanese century-old businesses.

4. Fuzzy Delphi method

The Delphi method is a traditional forecasting approach that does not require large samples. It can be utilized to generate a professional consensus for complex topics (Hartman, 1981). The Delphi method suffers from low convergence expert opinions and more execution cost. Murray et al. (1985) integrate Delphi method and fuzzy theory. Membership degree is applied to establish the membership function of each participant. Ishikawa et al. (1993) also introduce fuzzy theory into Delphi method. Max-min and fuzzy integration algorithm is developed. Hsu and Yang (2000) apply a triangular fuzzy number to encompass expert opinions and establish a fuzzy Delphi method. The max and min value of expert opinions are taken as the 2 terminal points of triangular fuzzy numbers, and the geometric mean is taken as the membership degree of triangular fuzzy numbers to derive the statistical unbiased effect and avoid the impact of extreme values. Kuo and Chen (2008) point out that the advantage of fuzzy Delphi method for collecting group decision is that every expert opinion can be considered and integrated to achieve the consensus of group decisions. Moreover, it reduces the time of investigation and the consumption of cost and time. Ma et al. (2011) describe the advantage of fuzzy Delphi method is its simplicity. All the expert opinions can be encompassed in one investigation. Hence, this method can create more effective criteria selection. Shen et al. (2011) use fuzzy Delphi method on the basis of center-of-gravity method to integrate experts' opinions. This paper adopts fuzzy Delphi method to identify the selection criteria for selecting optimal NPD projects. The geometric mean is used to denote the consensus of the experts' evaluation (Hsu and Yang, 2000).

5. ANP

ANP (Saaty, 1996) is a comprehensive decision-making technique that captures the outcome of dependency between criteria. AHP serves as a starting point of the ANP. Priorities are established in the same way that they are in AHP using pairwise comparisons. The weight assigned to each perspective and criterion may be estimated from the data or subjectively by decision makers. It would be desirable to measure the consistency of the decision makers' judgment. AHP provides a measure through the consistency ratio (CR) which is an indicator of the reliability of the model. This ratio is designed in such a way that the values of the ratio exceeding 0.1 indicate inconsistent judgment (Saaty, 1980). ANP comprises 5 major steps (Saaty, 1996).

Step 1. Construct hierarchy and structure problem

The problem should be clearly stated and construct the hierarchy structure. The hierarchy can be determined by decision makers' opinion via brainstorming or other appropriate methods such as literatures reviewing.

Step 2. Determine the perspectives weights

According to the interrelationship among the perspectives, a series of pairwise comparisons made by a committee of decision makers are made to establish the relative importance of perspectives.

Step 3. Determine the pairwise comparisons for the criteria

The criteria weights within each perspective are derived using the standard application of AHP (Saaty, 1980). The study applies pairwise comparisons again to establish the criteria relationships within each perspective.

Step 4. Construct and solve the supermatrix

The priority weights of criteria are entered in the appropriate columns of a matrix, knowing as an unweighted supermatirx. After multiplying unweighted supermatrix and priority weights from the perspectives, the study obtains the weighted supermatrix. Finally, the supermatrix will be steady by multiplying the supermatrix by itself until the supermatrix's row values converge to the same value for each column of the matrix. The study calls that limiting matrix.

Step 5. Select the best alternative

According to the weights from the limiting matrix and weights of alternatives with respect to criteria, the study can get the aggregated weight of each alternative. The study ranks the alternative according to their priority weights.

In the previous literatures regarding the application of ANP, Altuntas et al. (2012) apply AHP and ANP to measure hospital service quality. Fazli and Jafari (2012) apply decision-making trial and evaluation laboratory (DEMATEL), ANP and VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR) to select the best alternative for investment in stock exchange. Hsu (2012) applies ANP and GRA to select optimal media agency. Hsu et al. (2012) propose a process of algorithm that combined the consistent fuzzy preference relations method with ANP to evaluate e-service quality. They also point out that ANP is capable of addressing interdependent relationships among criteria. Hu et al. (2012) utilize ANP to evaluate e-service quality of microblogging. Hu et al. (2012) use ANP to evaluate the performance of Taiwan homestay industry. Kabak et al. (2012) combine fuzzy ANP, fuzzy technique for order preference by similarity to ideal solution (TOPSIS) and fuzzy ELimination Et Choix Traduisant la REalité (ELECTRE) to select sniper. Kang et al. (2012) apply fuzzy ANP and interpretive structural modeling (ISM) to select technologies for NPD. Lee (2012) uses fuzzy ANP for competitive strategy selection. Lee and Lee (2012) apply ANP to select most suitable competitive strategy for multinational biotech pharmaceutical enterprises. Liu et al. (2012) apply DEMATEL, ANP and VIKOR to suggest an optimal improvement plan for Taiwan tourism policy. Mehrabi et al. (2012) use ANP to find influential barriers in implementation of green supply chain management (GSCM). Shiue and Lin (2012) integrate ANP, BSC and benefits, opportunities, costs and risks (BOCR) to evaluate recycling strategies in the solar energy industry. Tsai and Chang (2012) utilize ANP and GRA to measure the performance of wealth management banks in Taiwan. Hsu et al. (2013) use DEMATEL and ANP to select the outsourcing provider. Kabak (2013) applies fuzzy DEMATEL-ANP model to select snipers. Wang et al. (2013) construct a project selection model on the basis of fuzzy Delphi method, ISM and ANP. Zareinejad and Javanmard (2013) apply ANP, intuitionistic fuzzy set (IFS) and GRA to select third-party reverse logistics providers. They also point out that the unique ability of ANP to analyze the relationships and feedback of factors should not be ignored.

From the previous literatures, ANP which widely applied in decision making is more accurate and feasible under interdependent situations. Perspectives or criteria of BSC and KSFs of NPD are interrelated. Due to the interdependent perspectives and criteria, ANP appears to be one of the more feasible and accurate solutions for us to handle such problems. By combining BSC, KSFs of NPD, fuzzy Delphi method with ANP, this study can make better decisions in NPD projects selection for Taiwanese century-old businesses.

6. Application

Fuzzy Delphi method and ANP are applied in a Taiwanese century-old business to solve NPD projects selection problem. The case company makes soy sauce since 1909. The decision committee includes a chairman and his assistant. There are 4 NPD projects (A_1, A_2, A_3, A_4) as alternatives. We depict the selecting process as follow.

Step 1. Construct hierarchy and structure problem

With reviewing literatures about BSC and KSFs of NPD, the study collects criteria for selecting optimal NPD projects. ANP needs more calculations and additional pairwise comparisons. The computing process would be complex if there are too many criteria (Ravi et al., 2005). Fuzzy Delphi method can create better criteria selection (Hsu and Yang, 2000; Ma et al., 2011). As a result, we apply fuzzy Delphi method to modify criteria to construct the hierarchy. The Likert 9 point scale questionnaires based on criteria of BSC and KSFs of NPD are sent to senior executives to obtain the importance of criteria in selecting the optimal NPD projects. In this paper, we focus on food industry which is the majority of Taiwanese century-old businesses. The study collects 24 valid questionnaires from Taiwanese century-old food businesses. According to the geometric mean values, the study chooses the top 12 criteria showing in Table 1 to structure the hierarchy for NPD projects selecting, as shown in Figure 1. Level 1 represents the 4 perspectives in selecting most optimal NPD projects (Learning and growth, Internal business process, Customer and Financial). Each perspective is decomposed into 3 criteria. Level 2 contains 4 alternatives. Learning and growth perspective (P_1) includes 3 criteria: Capabilities, Well-being and Satisfaction. Internal business process perspective (P_2) includes 3 criteria: Lead-time, Equipment and Facility. Customer perspective (P_3) includes 3 criteria: Reputation, Loyalty and New customer. Financial perspective (P_4) includes 3 criteria: Market, Profitability and New market.

Table 1. Definitions and literatures of selection criteria

Criteria	Definition	Literatures
C_1: Capabilities	The capabilities of employee.	McPhail et al. (2008); Yüksel and Dağdeviren (2010); Tsai (2012); Lin et al. (2013).
C_2: Well-being	The well-being of employee.	McPhail et al. (2008).
C_3: Satisfaction	The satisfaction index of employee.	Cebeci (2009); Yüksel and Dağdeviren (2010); Bentes et al. (2012); Lin et al. (2013).
C_4: Lead-time	The lead-time of new product.	Cebeci (2009); Hubbard (2009); Tseng (2010).
C_5: Equipment	The equipment of production.	Kristensen et al. (1998).
C_6: Facility	Facility utilization.	Tseng (2010).
C_7: Reputation	The reputation of brand.	Cebeci (2009).
C_8: Loyalty	The loyalty of customer.	Cebeci (2009).
C_9: New customer	New customer acquisition.	Hubbard (2009); Yüksel and Dağdeviren (2010); Tsai and Chang (2012).
C_{10}: Market	Target market sharing.	Hubbard (2009); Yüksel and Dağdeviren (2010); Tsai and Chang (2012).
C_{11}: Profitability	The profitability of new product.	Cebeci (2009); Tsai and Chang (2012).
C_{12}: New market	New market expansion.	Hubbard (2009).

Step 2. Determine the perspectives weights

In this step, the decision committee makes a series of pairwise comparisons to establish the relative importance of perspectives. In these comparisons, a 9 point scale is applied to compare the 2 perspectives. The pairwise comparison matrix and the development of each perspective priority weight are shown in Table 2 to 5.

Table 2. The pairwise comparison and priority weights of perspectives with respect to Learning and Growth

	P_1	P_2	P_3	P_4	Priority weights
	$\lambda_{max}=4.0707$ CR＝0.0238				
P_1	1.0000	1.4142	7.4833	6.4807	0.5409
P_2	0.7071	1.0000	2.4495	2.6458	0.2750
P_3	0.1336	0.4082	1.0000	0.7071	0.0833
P_4	0.1543	0.3780	1.4142	1.0000	0.1007

Table 3. The pairwise comparison and priority weights of perspectives with respect to Internal Business Process

	P_1	P_2	P_3	P_4	Priority weights
	$\lambda_{max}=4.0918$ CR＝0.0309				
P_1	1.0000	2.4495	1.2247	2.4495	0.3902
P_2	0.4082	1.0000	1.4142	1.4142	0.2253
P_3	0.8165	0.7071	1.0000	1.4142	0.2253
P_4	0.4082	0.7071	0.7071	1.0000	0.1593

Table 4. The pairwise comparison and priority weights of perspectives with respect to Customer

	P_1	P_2	P_3	P_4	Priority weights
	$\lambda_{max}=4.2251$ CR＝0.0758				
P_1	1.0000	5.4772	4.8990	5.9161	0.6175
P_2	0.1826	1.0000	2.0000	4.2426	0.1941
P_3	0.2041	0.5000	1.0000	3.0000	0.1294
P_4	0.1690	0.2357	0.3333	1.0000	0.0591

Table 5. The pairwise comparison and priority weights of perspectives with respect to Financial

	P_1	P_2	P_3	P_4	Priority weights
	$\lambda_{max}=4.0703$ CR＝0.0237				
P_1	1.0000	1.7321	0.7071	0.4082	0.1856
P_2	0.5774	1.0000	0.2582	0.2887	0.1005
P_3	1.4142	3.8730	1.0000	1.4142	0.3683
P_4	2.4495	3.4641	0.7071	1.0000	0.3455

Step 3. Determine the pairwise comparisons for the criteria

The study applies pairwise comparisons again to establish the criteria relationships within each perspective. The eigenvector of observable pairwise comparison matrix provide the criteria weights at this level, which will be used in the unweighted supermatrix. With respect to Capabilities, for example, a pairwise comparison within the Financial perspective can be shown in Table 6. According to this way, the study can derive every criterion weight to obtain the unweighted supermatrix.

Table 6. The pairwise comparison within Financial perspective with respect to Capabilities

	C_{10}	C_{11}	C_{12}	Priority weights
	$\lambda_{max}=3.0000$ CR＝0.0000			
C_{10}	1.0000	3.1623	4.4721	0.6494
C_{11}	0.3162	1.0000	1.4142	0.2054
C_{12}	0.2236	0.7071	1.0000	0.1452

Step 4. Construct and solve the supermatrix

The unweighted supermatrix which derived from Step 3 is shown in the Appendix is then multiplied by the priority weights from the perspectives which illustrated in Table 2 to 5. After multiplying unweighted supermatrix and priority weights from the perspectives, the study obtains the weighted supermatrix as shown in Appendix. For example, (0.6494, 0.2054, 0.1452) ×0.1007= (0.0654, 0.0207, 0.0146). In other words, the weights of the criteria multiply the weight of its own perspective to obtain the weighted supermatrix. Finally, the system solution is derived by multiplying the weighted supermatrix of model variables by itself, which accounts for variable interaction, until the system's row values converge to the same value for each column of the matrix. The study applies this process to yield the limiting matrix as sown in Appendix.

Step 5. Select the best alternative

The weight of the alternatives with respect to the criteria is shown in Table 7. The study can obtain the aggregated weight of each alternative as shown in Table 8, according to the weight of each alternative with respect to the criteria and the weights from limiting matrix. Therefore, the rank of optimal NPD projects is Project 1, Project 3, Project 2 and Project 4. The case company implements Project 1 based on our result.

Table 7. The weight of each alternative with respect to criteria

	A_1	A_2	A_3	A_4
C_1	0.5409	0.2750	0.0833	0.1007
C_2	0.3902	0.2253	0.2253	0.1593
C_3	0.6175	0.1941	0.1294	0.0591
C_4	0.1856	0.1005	0.3683	0.3455
C_5	0.3475	0.2110	0.2640	0.1775
C_6	0.3340	0.1656	0.2869	0.2134
C_7	0.1719	0.1106	0.3058	0.4117
C_8	0.1719	0.1106	0.3058	0.4117
C_9	0.5040	0.1160	0.2263	0.1536
C_{10}	0.3204	0.2265	0.2265	0.2265
C_{11}	0.3504	0.3741	0.1498	0.1257
C_{12}	0.5545	0.2188	0.1492	0.0775

Table 8. The aggregated weight of each alternative

	A_1	A_2	A_3	A_4
C_1	0.0988	0.0503	0.0152	0.0184
C_2	0.0596	0.0344	0.0344	0.0243
C_3	0.0825	0.0259	0.0173	0.0079
C_4	0.0178	0.0096	0.0353	0.0331
C_5	0.0218	0.0132	0.0166	0.0111
C_6	0.0225	0.0111	0.0193	0.0144
C_7	0.0119	0.0076	0.0211	0.0284
C_8	0.0071	0.0045	0.0126	0.0169
C_9	0.0268	0.0062	0.0120	0.0082
C_{10}	0.0181	0.0128	0.0128	0.0128
C_{11}	0.0158	0.0168	0.0067	0.0057
C_{12}	0.0223	0.0088	0.0060	0.0031
Aggregated weight	**0.4049**	**0.2014**	**0.2093**	**0.1843**

7. Conclusion

Businesses capable of remaining in operation for more than 100 years are rare. In 2008, TAITRA established an association to assist century-old businesses in maintaining growth and competitive advantage. NPD is vital for firms to developing competitive advantage and maintaining the growth; however, it is a risky process. Decision makers require an all-encompassing model for the selection of optimal NPD projects.

Based on past researches, BSC and KSFs of NPD are used for NPD projects selection separately. BSC links the financial and non-financial, tangible and intangible, and inward and outward factors, thereby providing an integrated viewpoint from which decision makers may select optimal NPD projects. KSFs, those few things that must go well to affirm the success of an organization, are also suitable for NPD project selection. Combine BSC with KSFs of NPD can provide an integrated viewpoint for Taiwanese century-old businesses managers to select optimal NPD projects. With reviewing literatures about BSC and

KSFs of NPD, the study collects criteria for selecting optimal NPD projects. According to fuzzy Delphi method, the Likert 9 point scale questionnaires based on criteria of BSC and KSFs of NPD are received from 24 senior executives to obtain the importance of criteria in selecting the optimal NPD projects for Taiwanese century-old businesses. The study chooses the top 12 criteria including Capabilities, Well-being, Satisfaction, Lead-time, Equipment, Facility, Reputation, Loyalty, New customer, Market, Profitability and New market to structure the hierarchy for NPD projects selecting. Perspectives or criteria of BSC and KSFs of NPD are interrelated. Due to the interdependent perspectives and criteria, ANP is utilized for us to handle such problems. Combining these 2 methods can deliver better results.

By combining BSC, KSFs of NPD, fuzzy Delphi method with ANP, this study can make better decisions to select optimal NPD projects for Taiwanese century-old businesses. In this paper, CR of each pairwise comparison is less than 0.1, which means that the reliability of data is accepted. The computing process of ANP would be complex if there are too many criteria. As the result, the study only retains 12 important criteria to structure the hierarchy. The study suggests that future research studies can incorporate more criteria in order to conduct more accurate estimates. Moreover, follow-up researchers could analyze this topic with the concept of fuzzy sets or combining ANP with other multiple criteria decision making (MCDM) approaches such as TOPSIS.

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Appendix

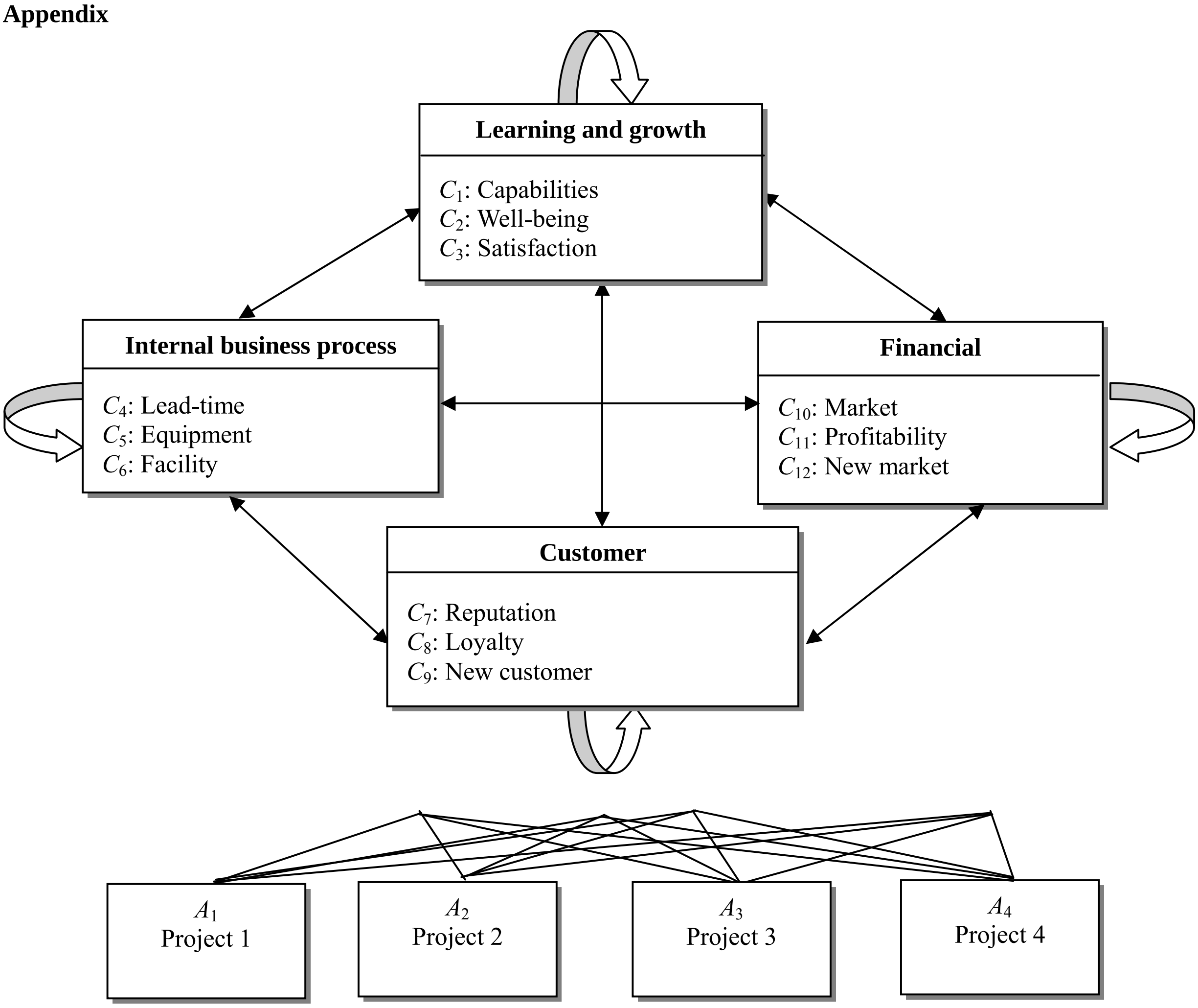

Figure 1. Hierarchy to select optimal NPD projects for Taiwanese century-old businesses

The unweighted supermatrix

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}
C_1	0.0000	0.7597	0.5000	0.4967	0.6175	0.6494	0.2679	0.1494	0.2128	0.4310	0.3244	0.4967
C_2	0.6340	0.0000	0.5000	0.1979	0.2758	0.2054	0.2679	0.3764	0.2556	0.1029	0.2811	0.1979
C_3	0.3660	0.2403	0.0000	0.3054	0.1067	0.1452	0.4641	0.4742	0.5316	0.4661	0.3946	0.3054
C_4	0.4630	0.4967	0.4226	0.0000	0.7101	0.7597	0.3494	0.2128	0.2997	0.2254	0.4967	0.3989
C_5	0.2435	0.1979	0.2113	0.7597	0.0000	0.2403	0.3331	0.2556	0.2379	0.5680	0.1979	0.3179
C_6	0.2935	0.3054	0.3660	0.2403	0.2899	0.0000	0.3175	0.5316	0.4624	0.2066	0.3054	0.2832
C_7	0.4967	0.3989	0.2128	0.4839	0.3608	0.4967	0.0000	0.5000	0.5858	0.5031	0.6494	0.1996
C_8	0.1979	0.3179	0.2556	0.1387	0.2481	0.1979	0.5000	0.0000	0.4142	0.3488	0.2054	0.2515
C_9	0.3054	0.2832	0.5316	0.3774	0.3910	0.3054	0.5000	0.5000	0.0000	0.1481	0.1452	0.5489
C_{10}	0.6494	0.1996	0.4967	0.2414	0.4967	0.3971	0.4967	0.2128	0.2128	0.0000	0.7597	0.5000
C_{11}	0.2054	0.2515	0.1979	0.6154	0.1979	0.1640	0.1979	0.2556	0.2556	0.6340	0.0000	0.5000
C_{12}	0.1452	0.5489	0.3054	0.1432	0.3054	0.4389	0.3054	0.5316	0.5316	0.3660	0.2403	0.0000

The weighted supermatrix

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}
C_1	0.0000	0.4110	0.2705	0.1938	0.2409	0.2534	0.1655	0.0922	0.1314	0.0800	0.0602	0.0922
C_2	0.3429	0.0000	0.2705	0.0772	0.1076	0.0801	0.1655	0.2324	0.1578	0.0191	0.0522	0.0367
C_3	0.1980	0.1300	0.0000	0.1192	0.0416	0.0567	0.2866	0.2928	0.3283	0.0865	0.0732	0.0567
C_4	0.1273	0.1366	0.1162	0.0000	0.1600	0.1711	0.0678	0.0413	0.0582	0.0227	0.0499	0.0401
C_5	0.0670	0.0544	0.0581	0.1711	0.0000	0.0541	0.0646	0.0496	0.0462	0.0571	0.0199	0.0320
C_6	0.0807	0.0840	0.1007	0.0541	0.0653	0.0000	0.0616	0.1032	0.0897	0.0208	0.0307	0.0285
C_7	0.0414	0.0332	0.0177	0.1090	0.0813	0.1119	0.0000	0.0647	0.0758	0.1853	0.2392	0.0735
C_8	0.0165	0.0265	0.0213	0.0313	0.0559	0.0446	0.0647	0.0000	0.0536	0.1285	0.0756	0.0926
C_9	0.0254	0.0236	0.0443	0.0850	0.0881	0.0688	0.0647	0.0647	0.0000	0.0545	0.0535	0.2021
C_{10}	0.0654	0.0201	0.0500	0.0385	0.0791	0.0633	0.0293	0.0126	0.0126	0.0000	0.2625	0.1728
C_{11}	0.0207	0.0253	0.0199	0.0980	0.0315	0.0261	0.0117	0.0151	0.0151	0.2190	0.0000	0.1728
C_{12}	0.0146	0.0553	0.0308	0.0228	0.0486	0.0699	0.0180	0.0314	0.0314	0.1265	0.0830	0.0000

The limiting matrix

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}
C_1	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827	0.1827
C_2	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526	0.1526
C_3	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336	0.1336
C_4	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958	0.0958
C_5	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627	0.0627
C_6	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673
C_7	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690	0.0690
C_8	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411	0.0411
C_9	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532	0.0532
C_{10}	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566	0.0566
C_{11}	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450
C_{12}	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403	0.0403

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