

Core Competence for Sustainable Competitive Advantage: A Structured Methodology for Identifying Core Competence

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Abstract—Core competencies are the crown jewels of a company and, therefore, should be carefully nurtured and developed. Companies can determine their future business directions based on the strengths of competencies. However, because generalized terms such as resource, asset, capability, and competence are not clearly explained in connection with competence theory, these posing difficulties in understanding many contemporary management concepts.

In this paper, we provide a summary of the recent management theories by comparing their salient features. We then propose a linking mechanism between assets, resources, capabilities, competencies, and core competencies. We provide a methodology to identify core competencies by isolating unique and flexible capabilities of the firm. We use this framework to identify the core competencies of a U.K. manufacturing company. The results of our analyses is to help the company to make more informed strategic management decision regarding capability development, outsourcing, focusing, or diversification, with regards to new products, services, or markets. The framework is generic in nature and is applicable to benchmark a manufacturing, public, or service sector organization.

Index Terms—Assets, capability, competence, core competence, resource, strategic flexibility, uniqueness.

I. INTRODUCTION

TRADITIONAL “competitive forces theory” asserts that in order to gain competitive advantage, a firm must exploit those forces driving the market dynamics. For example, Porter [1] suggests that the market power of a firm may be increased by leveraging the market segment and industry structure. It is argued that firms are homogeneous in their stocks of assets and capabilities. Therefore, the tactical maneuvering of external market forces forms a major factor in attaining competitive advantage.

A limitation of Porter’s five forces model [2] is that it is unable to address intellectual capital/property as a determinant of differentiation between business success and failure. In recent years, globalization trends and increased market competition have forced companies to look into other means by which they can further increase their competitive edge. For example, concepts have emerged encouraging management to strategically exploit those resources and capabilities, which are unique in

competition. The term “core competence” was used by Prahalad and Hamel [3] to deal with capabilities within diversified firms. Several measures have been proposed how to identify unique resources and capabilities [4]–[9].

However, because generalized terms such as resource, asset, capability, and competence are not clearly explained in connection with competence theory, they become an obstacle in understanding many contemporary management concepts. In this paper, we provide a summary of the recent management theories by comparing their salient features. Then, we propose a set of working definitions by categorizing resources into physical, intellectual, and cultural assets. Using our definitions, a conceptual framework is presented showing relationships between assets, capabilities, competencies, and core competencies. We show how to isolate competencies from capabilities by evaluating the collectiveness and unique attributes of capabilities, and how to further determine core competencies by evaluating the strategic flexibility of competencies. We use this framework to evaluate the competencies and core competencies of a U.K. manufacturing company.

II. NEW WAVES OF STRATEGIC MANAGEMENT

In recent years, three approaches have emerged as “a counterpoint to market structure analysis of competitive strategy” [10]. A brief account of these are given in the following and a summary of their salient features is shown in Table I.

A. Resource-Based View

In resource-based view, a firm is understood to be a bundle of assets and capabilities. The competitive advantage is acquired by accumulating strategic assets and capabilities. This is opposed to the competitive forces approach where industry structure and/or market segments are the competitive factors. However, the resource-based view argues that firms are heterogeneous to one another due to possessing of some unique assets and/or capabilities. These unique assets and capabilities, often known as strategic resources, can make all the difference in creating competitive advantage for a firm. Therefore, management efforts should be focused toward nurturing and exploiting these strategic resources [4], [9].

B. Competence-Based Perspective

Competence-based perspective argues that it is the core competencies of a firm, not discrete, individual assets, which are the

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TABLE I
COMPARISON OF THE CONTEMPORARY STRATEGIC MANAGEMENT APPROACHES

	Resource-based view (1980s)	Competence-based perspective (1990s)	Dynamic capabilities Approach (1990s)
Concept of a firm	A bundle of <i>resources and capabilities</i> comprising: <ul style="list-style-type: none"> • Tangible assets • Intangible assets • Capabilities <i>Activities</i>	An open system of <i>asset stocks and flows</i> comprising: <ul style="list-style-type: none"> • Tangible assets • Intangible assets • Capabilities <i>Managerial process</i>	A system formed by <i>processes, routines, and resources</i> comprising: <ul style="list-style-type: none"> • Tangible assets • Intangible assets • Capabilities <i>Organisational/ Managerial processes</i>
Competitive strategy	<i>Controlling and exploiting strategic resources</i> manifested in assets or capabilities	<i>Deploying, protecting and developing competencies</i> resulted from the integration of assets and capabilities	<i>Deploying and exploiting capabilities</i> embedded in <i>processes, and continual reshaping of the portfolio of assets</i>
Attributes of resources/competencies	<ul style="list-style-type: none"> • Valuable • Rare • Inimitable • Non-substitutable 	<ul style="list-style-type: none"> • Valuable • Rare • Inimitable • Non-substitutable <i>Robust (for new market)</i>	<ul style="list-style-type: none"> • Valuable • Rare • Inimitable • Non-substitutable <i>Dynamic</i>
Development method	Development of intangible assets	Development and integration of intangible assets and capabilities	Development and integration of intangible assets and capabilities
Development environment	Internal	Internal and external	Internal and external
Representative authors	[4], [9]	[3], [12]	[8], [13]

source of sustainable competitive advantage [3]. Core competencies are usually the result of “collective learning” processes and are manifested in business activities and processes. The core competencies are those unique capabilities, which usually span over multiple products or markets [6], [11], [12]. Comparing with the resource-based view, this approach stresses on the development of the right competencies for long-term success of a firm.

C. Dynamic Capabilities Approach

The dynamic capabilities approach claims that the competitive advantage comes through leveraging the managerial and organizational processes of a firm, and is shaped by the strategic positioning of its assets and available paths. In addition, long term competitiveness of the firm largely depends upon its “dynamic” capabilities. The term “dynamic” is defined as “the capacity to renew competencies so as to achieve congruence with the changing business environment” [8]. The ability of the firm to continuously generate new forms of competitive advantage is greatly influenced by its current competence endowment [13].

There are common elements in the three perspectives as indicated in Table I, however all these advocate that the competitive strategy is shaped by exploiting or redeploying these resources or competencies. This rather “inward” view is quite challenging to Porter’s five forces model where an “outward” context in terms of external markets or industry structure is taken as the main differentiation factor. The resource-based approach focuses upon controlling and exploitation of resources itself. This differs from the stance taken by the other two perspectives, where competence or capabilities are a major currency of

differentiation to which resource is a part of. In addition, the resource-based view suggests the development of assets in-house. In line with recent globalization and outsourcing trends, competence and dynamic capability perspectives argue internal as well as external cooperation for developing or acquiring these competence/capabilities.

III. CAPABILITY IS FORMED BY THE INTEGRATION OF RESOURCES

Table I shows that competitive advantage is gained by the strategic deployment of some resources, capabilities, and/or competencies. Literature review suggests that concepts such as resources, capabilities, competencies, and core competencies are not clearly defined. We have found that only the resource itself is defined with a wide range of meanings. On one hand, resources are defined as “anything which could be thought of as a strength or weakness of a firm” [9]. This “anything” may include physical resources (e.g., raw materials, equipment, financial endowment, etc.), human resources (e.g., training, experience, skills, etc.), as well as organizational resources (e.g., firm image, process, routines, etc.) [4], [14]. Note that with this definition, capabilities are considered as part of resource. On the other hand, capabilities are not part of resource because of their dynamic “doing” nature. Many authors argue that capabilities are the result of resource deployment and organizational processes. Capabilities use resources and, therefore, are more dynamic and complex entity and should be treated independent to resources [15]. We feel more comfortable with Grant [5] definition who argues: “Resources are inputs into the production process—they are the basic unit of analysis. A capability is the capacity for a team of resources to perform some task or activity.”

In our view, capabilities are formed through the coordination and integration of activities and processes, and are the product of collective learning of individual assets. We would define capability as “the ability to make use of resources to perform some task or activity,” for example, Kodak’s capability in imaging application. For this study, we would define resource as anything “tangible” as well as “intangible” owned or acquired by a firm. We agree that with current trends of globalization and network organizations, ownership is too restrictive a term. For example, resources should include employee skills even though not “owned by a firm.” In fact, in a network organization scenario, this definition is to include all those assets which a firm could employ or have an access to in order to achieve its corporate goals. This means that resources may be wholly outside the firm, particularly for a start-up company that may outsource much of its production activity.

For this study, we have classified resources into three subcategories:

- 1) physical assets;
- 2) intellectual assets;
- 3) cultural assets.

We define cultural assets in a broader sense, which include social, political, as well as relational dimensions. Also, a firm’s ability to make use of these resources is flexible not static. A conceptual framework relating resources (assets) and capabilities is illustrated in Fig. 1.

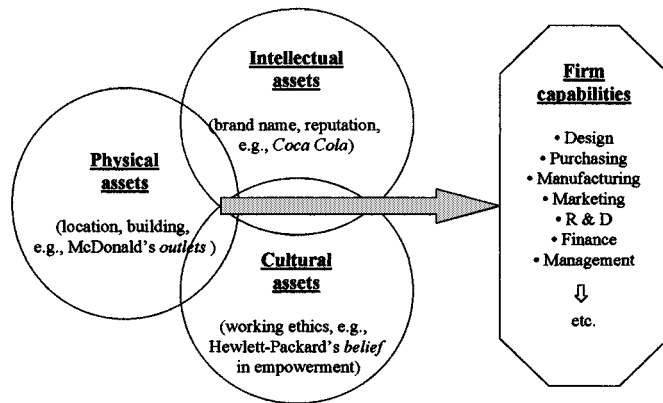


Fig. 1. Relationship between assets and capabilities.

Beside firm resources, routines (as patterns of interactions) that represent successful solutions to particular problems are also a candidate to form the capabilities of a firm [8]. Routines result from history, experience, and collective learning of the firm. Toyota's just-in-time manufacturing capability is such an example. While resources could exist on their own, capabilities are deeply embedded in the organizational routines, practices, and business activities [16].

IV. FIRM COMPETENCIES ARE SPECIAL CAPABILITIES

Firm competencies are valuable capabilities in terms of "enabling the firm to deliver a fundamental customer benefit" [6]. Competencies are usually a network of capabilities rather than single activity-based [17]. For example, 3M's competence in R&D is due to the coordination of several capabilities such as research, product development, and experimentation. Canon's product development capability is the result of its expertise in fine optics, precision mechanics, and microelectronics. Whereas, focused capabilities are those which are manifested within the activities and processes of a function [5], [15], [18].

Competencies are usually the platform of multiple lines of businesses and/or products within a corporation, and are the most important constituents of cross-functional business processes [6], [10], [19]–[21]. Due to their strong "collectiveness," competencies can provide the firm new patterns of product competition [8], [22]–[24]. For example, SKF's core competence rests on its ability to manufacture high precision, frictionless spherical devices. This competence can provide SKF opportunities to produce new products, for example, rollerball pens, or entering new markets such as VCR and electronics. Making use of the above citations, we have produced a brief description of the elements of collectiveness with relevant examples as given in Table II.

We have illustrated in Table I that being "unique" is the salient feature common to all three management approaches. This would help to create some "isolating mechanisms" and, therefore, preventing the competence from losing its competitive edge [25]. Barney [4] and Hamel [6] suggest that to render it "unique," a capability should have three attributes:

- 1) rare in marketplace;
- 2) less imitable by competitors;
- 3) difficult to be substituted.

TABLE II
EXAMPLES OF THE ELEMENTS OF COLLECTIVENESS

Elements of Collectiveness	Description	Examples
Across-function	The extent to which a capability is an indispensable element of one or more cross-functional processes	• Nissan's <i>cost control</i> for its efficient logistics and production processes
Across-product	The extent to which a capability is shared by various products	• Canon's <i>optical technology</i> used in image systems, copiers, and cameras
Across-business	The extent to which a capability is an indispensable element of various business units	• McDonald's <i>operations management</i> for its world-wide outlets

TABLE III
ATTRIBUTES OF UNIQUENESS

Attributes	Description	Examples
Rareness	The degree to which a particular capability is distinctive in competition	• Sony's <i>miniaturisation</i> capability
Inimitability	The degree to which a particular capability is inimitable by competitors	• Honda' <i>know-how</i> in engine design
Non-substitutability	The degree to which a particular capability cannot be replaced by other resources or capabilities	Microsoft's <i>marketing ability</i> in gaining market share based on their operating system products

TABLE IV
EXAMPLES OF THE STRATEGIC FLEXIBILITY

Strategic flexibility	Description	Examples
Resource re-deployment	the ease with which competencies may be re-deployed to develop new capabilities for potential business	• 3M's competence in <i>coating technology</i> has been re-deployed in automotive and office products industry.
Routines re-organisation	the ease with which the manifested routines may be re-organised to support future business development	• 3M's <i>laboratory management</i> competence (such as technical forum, procedures, and audit process) can readily re-organised to support new competence development.

Being rare refers to the extent to which a capability is distinctive among competitors. If a valuable activity is difficult to be imitated, then it is likely to maintain its superiority. Dierickx and Cool [26] have pointed out that existence of substitutes of a capability threatens to render the capability obsolete because it will no longer be able to create distinctive value to the buyer. A description of these attributes with relevant examples is given in Table III.

V. CORE COMPETENCIES ARE FLEXIBLE

Many authors have questioned that "being unique in competition" is not the sufficient criteria for sustaining competitive advantage in dynamic environment [3], [8]. It is argued that competitive advantage may be lost due to technological or social changes taking place in markets [11], [25], [27]. Barney [4] points out that "unanticipated changes in the economic structure of an industry

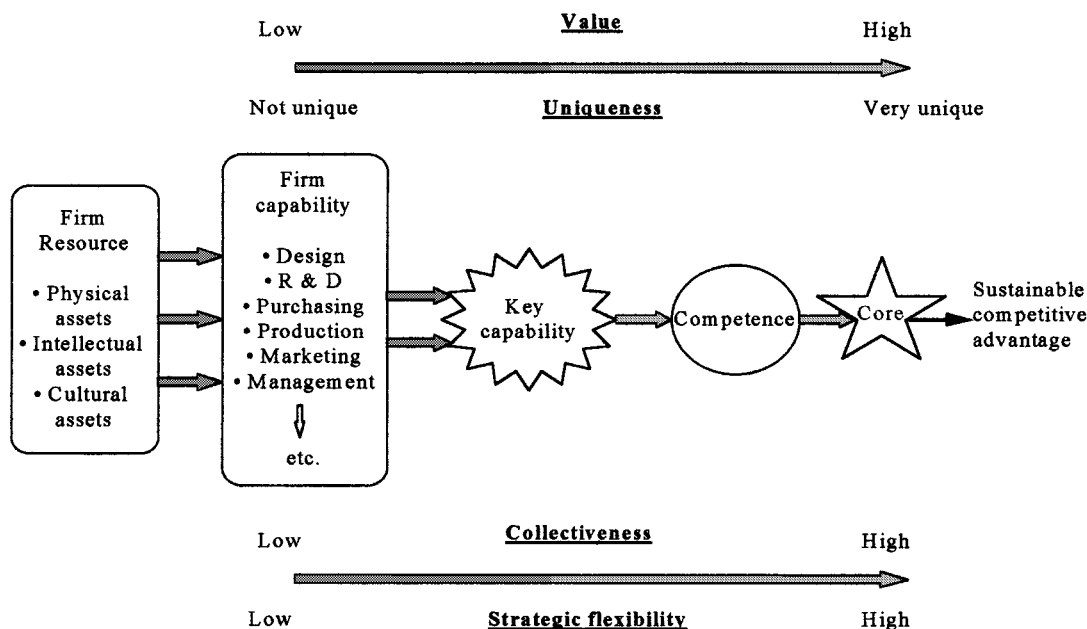


Fig. 2. The architecture of core competencies.

may make what was, at one time, a source of sustained competitive advantage, no longer valuable for a firm, and thus not a source of any competitive advantage.” Examples are readily found in the computer, semiconductor, aerospace, and steel industries to substantiate that a less dynamic “core competence” may quite easily turn into tomorrow’s “core rigidity” [28], [29].

Under the circumstances, many authors argue that core competencies must have the potential for continuous upgrading and development [6], [30]. Sanchez [12] suggests that firms with superior dynamic efficiencies in reconfiguring and redeploying resources may compete by taking advantage of changing technology and market opportunities. For example, Motorola’s manufacturing-based competence has helped it to enter various markets, such as cellular telephone, workstations, and consumer electronics. Motorola can easily redeploy its existing semiconductor knowledge, and readily develop new more sophisticated electronic equipment.

As mentioned earlier, routines are patterns of interactions that represent successful solutions to particular problems. While the routines can be the source of sustainable competitive advantage for a specific period of time, “they can also create an organizational inertia which limits their ability to comprehend new signals from the environment and act upon them expediently” [30]. Drawing on these views, a description of the elements of strategic flexibility with relevant examples is given in Table IV.

VI. CORE COMPETENCE IDENTIFICATION: A CASE STUDY

Fig. 2 shows our perception of how resources, capabilities, competencies, and core competencies may be interlinked. In summary, firm resources are the inputs to capabilities. Some capabilities play a more important role than others do in realizing the business objectives of a firm. These are the key capabilities. Note that only those key capabilities which are relatively unique in competition and highly collective in operation are likely to form competencies of a company. Core competencies are strategically flexible and dynamic by nature, and therefore, are an in-

tegral part of organizational learning and competence building process.

Based on our working definitions of uniqueness, collectiveness, and strategic flexibility set out earlier, we propose a structured framework for identifying core competence. Essentially, the framework consists of three stages as illustrated in Fig. 3:

- Stage 1: identification of key capabilities;
- Stage 2: determination of competence;
- Stage 3: determination of core competence.

We describe a step-by-step procedure how to implement this framework for identifying the core competencies of an U.K. manufacturing company in the following subsections.

A. Stage 1: Identification of Key Capabilities

Identifying those capabilities which are crucial to the success of the business is the first and foremost important step. The identification process may involve benchmarking internally the key business functions, such as general management, financial management, marketing, selling and market research, product R&D, engineering, production, and distribution, etc. Although experiential knowledge of the company can help at this stage, value analysis may be conducted. The key capabilities are those which help to generate high profit margins, and are the clear market winners in securing market share. However, relying purely on financial measures have implications. For example, key capabilities evolving through a firm’s R&D that do not, as yet, generate a high profit margin would be eliminated at this stage. In many respects, such dynamic competencies will be very valuable to the firm. Therefore, we have proposed a methodology described elsewhere [31] based on balance score card which includes both financial and nonfinancial measures. The nonfinancial measures are those reflecting customer and innovation perspectives. The customer perspective encompasses measures of customer satisfaction, brand awareness and customer retention. With regards to innovation, the main measure used is the new product introduction rate.

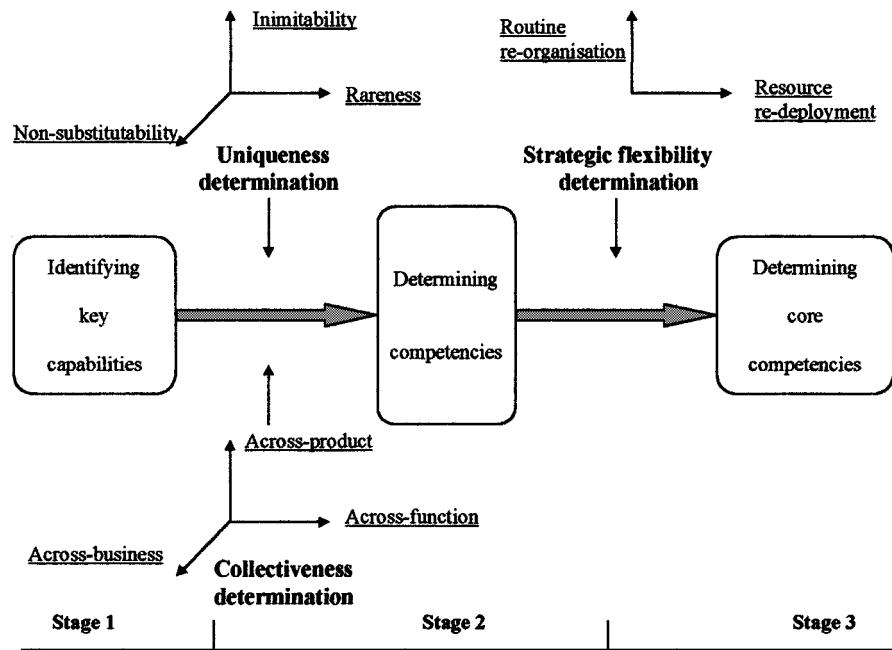


Fig. 3. Framework for core competence identification.

Our case (Company A) is a U.K. firm with annual sales around £50 million. Its business portfolio includes metal and plastic products for home and overseas commercial markets. The company's operation is divided into five major functional areas:

- 1) purchasing;
- 2) manufacturing;
- 3) sales and marketing;
- 4) R&D;
- 5) performance management.

The management of Company A was asked to identify essential capabilities within each functional area. These capabilities are those which are perceived as the strengths of the company and crucial to the business objectives. The mapping process was restricted to analyzing activities at the operational level. A list of 37 capabilities were initially generated, which in consultation with the management, were prioritized according to their perceived financial and nonfinancial importance to the business. Keeping in mind the business objectives and strategies, the management selected five measures as the evaluation criteria. The financial measures included return on capital employed, sales growth and operating profits and the nonfinancial measures relates to market share and new product introduction. This helped to reduce the list to a set of 20 capabilities understood to be the key operational capabilities of the company (see Table V).

B. Stage 2: Determination of Competencies

Stage 2 involves assessing collectiveness, that is, the integration of key capabilities in the company wide business activities. As explained earlier, for this study collectiveness is understood to be the operational flexibility of a company and is assessed by gauging the integration: across-function, across-business and across-product wide operations. The key capabilities of Company A were evaluated on a four-point scale where 1 = no

TABLE V
COMPANY A'S KEY CAPABILITIES

Functional Areas	Key Capabilities
Purchasing	<ul style="list-style-type: none"> • Defining specification • Expediting • Information analysis
Manufacturing	<ul style="list-style-type: none"> • Tool engineering • Process technology • Assembling • Testing • Economies of scale
Sales and marketing	<ul style="list-style-type: none"> • Product management • Promotion • Distribution • Customer service • Pricing
R & D	<ul style="list-style-type: none"> • Research • Product development • Experiment
Performance management	<ul style="list-style-type: none"> • Review • Monitoring • Goal-setting procedures • Reward system

integration and 4 = high integration (see Table VI). The score assigned to each attribute reflects Company A's management perception how key capabilities are integrated among various business functions. In our view, key capabilities with a total score of 7 out of 12 or more may be considered highly collective, i.e., they are an integral part of various key business operations. It is interesting to note that four manufacturing related key capabilities received highest scores (9s) as opposed to two nonmanufacturing capability i.e., pricing (9) and customer service (10).

The results from the Table VI are used for assessing of the uniqueness of "key integrated capabilities." This is similar to external benchmarking as some knowledge of the strengths and

TABLE VI
OPERATIONAL FLEXIBILITY OF COMPANY A

Key capability	Collectiveness			
	Across-function (score out of 4)	Across-product (score out of 4)	Across-business (score out of 4)	Total (score out of 12)
Defining specification	3	3	2	8
Expediting	3	2	2	7
Information analysing	2	2	2	6
Tool engineering	3	3	3	9
Process technology	3	3	3	9
Assembling	3	3	3	9
Testing	3	3	3	9
Economies of scale	2	2	2	6
Product management	3	2	2	7
Promotion	2	3	2	7
Distribution	2	2	2	6
Customer service	3	4	3	10
Pricing	3	3	3	9
Research	2	2	2	6
Experimentation	2	2	2	6
Product development	1	1	1	3
Review	2	3	1	6
Goal-setting	2	2	2	6
Monitoring	1	1	1	3
Reward system	1	1	1	3

weakness of major competitors is a prerequisite. As explained earlier, each key integrated capability may be assessed against the three attributes of uniqueness namely: rareness, inimitability, and nonsubstitutability. Each attribute is measured on a scale, say 1 to 4, where 1 represents very low probability and 4 represents very high probability of having that characteristic. Table VII illustrates the scores for the three attributes of uniqueness for Company A’s key integrated capabilities. Note that the “uniqueness” rating has shifted the balance toward nonmanufacturing capabilities such as promotion (rareness score 4) and customer service (rareness score 4). It is interesting to see that Company A gives special importance to their customer service. According to their perception, they can easily differentiate themselves against competitors on this basis. Out of manufacturing related key capabilities, only testing secured highest score (4) on the rareness dimension.

Using these scores, each key-integrated capability may be placed on an appropriate location in a three-dimensional (3-D) box, as shown in Fig. 4. Ideally, the upper right hand corner of the box represents the key capabilities those are rare, highly inimitable, and highly nonsubstitutable. Clearly capabilities located in this zone are very likely to be the competencies of the firm. In reality, not more than a few capabilities can be simultaneously rare, inimitable, and nonsubstitutable in competition.

C. Stage 3: Determination of Core Competencies

As explained earlier, strategic flexibility is defined using two elements: resource redeployment and routines reorganization. Again, each element is evaluated on a scale ranging from 1 to 4, where 1 refers to not flexible and 4 refers to highly flexible. In this case, competencies with a total score of 6 or more (out of 8) is considered highly flexible in developing potential business. That means that they may be readily redeployed as well as reorganized for developing the future business. However extreme care is needed to select an appropriate level of threshold for such a selection. In the absence of a universal norm or industry specific threshold value, some kind of average can be used as a rule of thumb. This is to avoid throwing away a potential competence candidate at the early stage of the analysis. The strategic flexibility assessment for Company A is presented in Table VIII.

VII. DISCUSSION

It is interesting to note that although Company A’s main business is manufacturing, our analysis shows that their core competencies are “promotion” and “customer service.” Competencies such as “defining specification” and “testing” require some degree of flexibility to qualify as the core competencies. However, one must understand that promotion and customer service

TABLE VII
 ATTRIBUTES OF UNIQUENESS FOR THE KEY INTEGRATED CAPABILITIES

Key integrated capability	Uniqueness		
	Rareness (Score out of 4)	Inimitability (Score out of 4)	Non-substitutability (Score out of 4)
Defining specification	3	2	2
Tool engineering	3	2	1
Process technology	3	2	1
Assembling	2	2	1
Testing	4	2	1
Product Management	3	2	1
Promotion	4	2	1
Customer service	4	2	1
Pricing	2	2	1

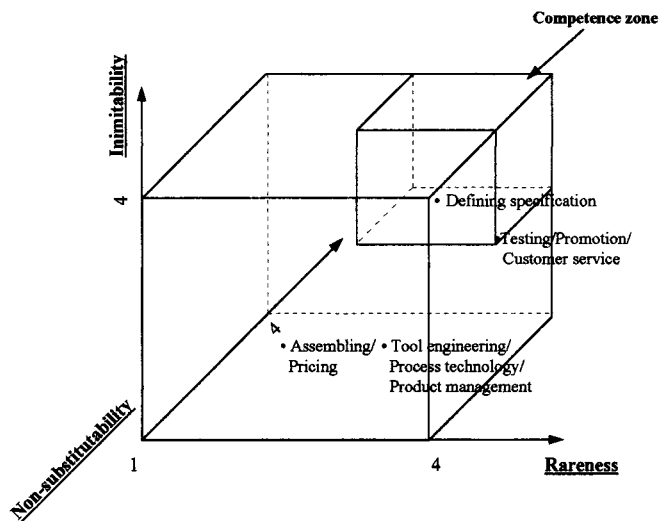


Fig. 4. Competencies of Company A.

TABLE VIII
 COMPANY A'S STRATEGIC FLEXIBILITY

Competencies	Strategic Flexibility		Total
	Resource re-deployment (Score out of 4)	Routine re-organisation (Score out of 4)	
Defining specification	3	3	6
Testing	2	2	4
Customer service	3	4	7
Promotion	4	4	8

would add value only if there is a portfolio of core products. Table IX presents a capability map illustrating the relationships between the key capabilities, competencies, and core competencies of Company A. The results show that the core competencies of Company A are residing mainly in one functional area, sales and marketing. Being a manufacturing company mindset, these results raised many eyebrows within the case company. However, when they understood our filtering mechanism, the results were accepted by the management of Company A.

TABLE IX
 KEY CAPABILITIES, COMPETENCIES AND CORE COMPETENCIES OF COMPANY A

Functional Areas	Key Capabilities	Competencies	Core Competencies
Purchasing	<ul style="list-style-type: none"> Defining specification Expediting Information analysis 	<ul style="list-style-type: none"> Defining specification 	
Manufacturing	<ul style="list-style-type: none"> Tool engineering Process technology Assembling Testing Economies of scale 	<ul style="list-style-type: none"> Testing 	
Sales and marketing	<ul style="list-style-type: none"> Product management Promotion Customer service Pricing Distribution 	<ul style="list-style-type: none"> Promotion Customer service 	<ul style="list-style-type: none"> Promotion Customer service
R & D	<ul style="list-style-type: none"> Research Experiment Product development 		
Performance management	<ul style="list-style-type: none"> Review Monitoring Goal-setting procedures Reward system 		

VIII. CONCLUSION

The theory of competence-based competition argues that core competencies are the source of sustainable competitive advantage. Core competencies are valuable capabilities those are collective and unique in their characteristics, as well as strategically flexible contributing toward the success of potential business. This paper provides a framework for core competence identification using firm capabilities. The effectiveness of this framework is demonstrated by identifying the core competencies of a U.K. manufacturing company.

One useful finding of our analysis is that although Company A regards its core business as manufacturing engineering, the core competencies reside in the sales and marketing area. Such understanding of business operation together with other strengths of the company (such as, defining specification or testing for Company A) would allow a firm to make more

informed strategic management decision with regards to capability development, outsourcing, focusing, or diversification with regards to new products, services, or markets. The framework is generic in nature and is applicable to benchmark a manufacturing, public, or service sector organization.

In a further study, we have introduced an analytic hierarchy process (AHP) approach to provide some quantitative aspects to what otherwise is purely a subjective assessment [32]. In addition, an AHP approach helps to eliminate personal prejudices, politics, conflicting evidences, or error of judgement, which is commonplace in such subjective assessment procedures.

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