A COMPARATIVE ANALYSIS OF NEW PRODUCT DEVELOPMENT: IMPACT OF PRACTICES, PROCESS, STRATEGY AND CAPABILITIES ON PERFORMANCE IN ITALIAN AND JAPANESE MANUFACTURING COMPANIES

ABSTRACT

We develop six measurement scales for practices, process, strategic guide, and capabilities for new product development as potential determinants of its performance, based on the survey data from Italian and Japanese companies. Eight indicators are proposed to measure new product development performance. Employing a regression model with a country dummy variable, we estimate the differential determinants of performance between Italian and Japanese samples. We find significant differences in the impacts of new product development capabilities on attainment of profit goals and product quality capability, suppliers' linkage on revenue percentage of new products, and strategic guide on time-to-market reduction. This analysis demonstrates the overwhelming importance of technology and marketing capabilities concerning new product development. Then, we evaluate the level of improvement in explanatory power by dividing the pooled sample into two and enabling regression coefficients to take different values, and find no evidences of the significant improvement.

KEYWOERD: New product development, manufacturing, international comparison, empirical research

INTRODUCTION

Quick development and launch of innovative new products is one of the most important challenges for manufacturing companies facing uncertain and competitive business environments. An intermittent introduction of timely new products into market potentially contributes to sales growth and profitability improvement. From a perspective of competitive strategy, product and process technology is often considered as one of the most important sources of core competence, which has a potential to improve reliability and attractiveness of a company's products and reduce the cost of its manufacturing cost (Hamel and Prahalad, 1994). New product development (NPD) based on technological competence is essential for almost all manufacturing companies regardless of their size, location, product area or market they serve.

In this paper we try to comparatively analyze the impact of practices, process, strategy, and capabilities of NPD on its performance results between Italian and Japanese manufacturing companies. As typical Italian companies are much smaller, and more creative or innovative than the Japanese counterparts, our previous papers (2003 and 2004, not included in references) focused on the difference in NPD activities between two countries. On the other hand, they have similar business orientations and practices such as attitude toward human resources and close relationships with suppliers and customers. This paper intends to emphasize on the similarity of the determinants of NPD performance between these two countries, based on the relevant measurement scales of NPD activities. It contributes to make it clear what are common effects and what are country-specific effects of NPD activities upon NPD performance.

ANALYTICAL FRAMEWORK AND HYPOTHESES

We started with a simple analytical framework of new product development (NPD), which consists of (1) NPD practices, (2) NPD process, (3) strategic guide for NPD, (4) capabilities or competence concerning NPD, and (5) NPD performance (Figure 1). NPD practices are concerned with many aspects of NPD activities such as levels of parts standardization and modularization, uses of platform logic and team, characteristics of project managers, type of incentives, functional integration, involvements of suppliers and customers. NPD process includes idea generation, concept development, new product concept test, preliminary design, process development, pilot production, and the level of phase overlapping between these phases. Strategic guide represents top management support and clear communication of well-defined strategy for new products, while NPD competence comes from not only technological but also marketing capabilities.

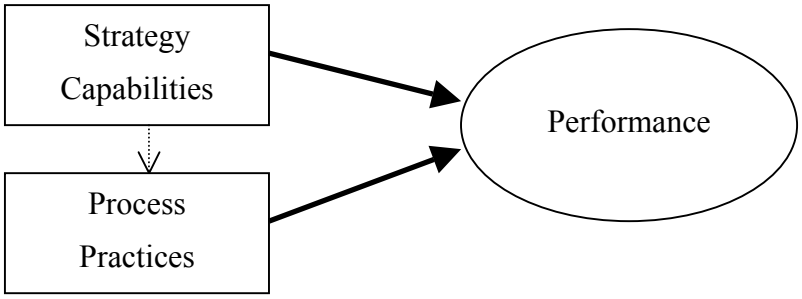

Figure 1
Analytical Framework of New Product Development

Performance of NPD supposed to be multi-dimensional. We tried to measure the performance in terms of the following eight indicators: attainment of profit goals due to new products; overall success of new products compared to competitors; percentage of revenues due to new products; attainment of revenue goals due to new products compared to the company expectations; on-time launch of new products; reduction in time-to-market for new products; innovativeness of new products; and product quality capability satisfying customer needs.

Hypotheses

Based on the analytical framework above, we established general research hypotheses on the determinants of performance as follows:

Hypothesis 1: Use of architecture in developing new products contributes to NPD performance.

Hypothesis 2: Close relationships with suppliers and customers in developing new products contribute to NPD performance.

Hypothesis 3: Concurrent approach contributes to improving NPD performance, directly in timing.

Hypothesis 4: Clear objectives and a shared strategy concerning new products lead to high NPD performance.

Hypothesis 5: Capabilities in marketing and technology development lead to high NPD performance.

DATA COLLECTION, SCALE DEVELOPMENT AND RESEARCH VARIABLES

The rest of our research consisted of designing questionnaire, collecting data from those who were responsible for NPD projects in manufacturing companies, constructing

measurement scales, and analyzing the data by statistical techniques. According to the analytical framework, the questionnaire was designed to include more than fifty question items covering (1) characteristics of new products, (2) NPD performance, (3) NPD practices, (4) process of NPD, (5) new product strategic guide and internal environment, and (6) general demographic information. More than half of these question items were measured on a five-point Likert scale. The respondents were assumed to be new product development department managers, new product development project managers, executives responsible for technology development, or top management particularly for small and medium sized enterprises.

Data Collection

Data for this research were gathered from Italian and Japanese manufacturing companies producing mainly industrial goods, working in such sectors as industrial and commercial machinery, computer equipment, electronic & other electrical equipment and their components (35 and 36 in terms of two-digit standard industry classification code). The resulting questionnaire was mailed to 405 Italian companies and 837 Japanese companies, accompanied by a letter explaining the purpose of the research and the unit of analysis. The respondents were assumed to be new product development department managers, new product development project managers, executives responsible for technology development, or top management particularly for small and medium sized enterprises. They were asked to consider all of the NPD projects developed and launched in the last three years by the companies. We could get responses from 85 Italian and 87 Japanese companies, which formed samples for analysis. The response rate was approximately 21.0% in Italy and 10.4% in Japan.

After constructing and cleaning datasets for Japanese, Italian, and the pooled companies, we simply compared the summarized results from two countries as a preliminary analysis. The most distinguished difference is found in company size either in number of employees or sales value. On average the Japanese companies are much larger than the Italian. We categorized the type of new products into new products for new markets, products that replace existing products, and important improvements in existing products. Italian manufacturing companies show an approximately uniform distribution into these three categories, with a slightly large proportion of products that replace existing products. On the other hand, about 43% of Japanese companies characterized their new products as important improvements in existing products. Taking these differences in mind, we analyzed the structure of NPD through statistical techniques. In this paper we utilize factor analysis and regression analysis, and actual calculations were made by means of the 11th version of SPSS. The next subsections are devoted to constructing measurement scales for NPD activities and showing research variables for the analysis.

Constructing Measurement Scales for NPD

Employing Cronbach's alpha and results from confirmatory factor analysis (Table 1), we can find six reliable and valid measurement scales characterizing new product development activities for both Italian and Japanese manufacturing companies. They are *Architecture of New Products* (SANP), *Suppliers Linkage* (SSL), *Customers Linkage* (SCL), *NPD Process* (SNPDP), *Strategic Guide* (SSG), and *NPD Capabilities* (SNPDC), each of which is defined as an average value of relevant question items. All the question items were measured on a five-point Likert scale.

Architecture of New Products (SANP) consists of question items on the level of parts standardization (ARCH_STD), the level of modularization (ARCH_MOD), and the use of

a platform logic from which derived products can be obtained (ARCH_PLT). *Suppliers Linkage* (SSL) includes question items on the level of suppliers' involvement in NPD (SUP_INV1) and electronic connections with suppliers to cooperate in designing new products (SUP_INV2). *Customers Linkage* (SCL) includes not only the corresponding questions to SSL (CUST_INC1 and CUST_INV2), but also question items on the use of teams composed of people from different functions (TEAM_USE) and integration and communication among design, marketing and manufacturing (INT_D_MK and INT_D_MF). Those three scales are concerned with NPD practices. *NPD Process* (SNPDP) consists of questions on new product concept test (CONC_TES), formal approach and approval phase for preliminary design (PRE_DES1 and PRE_DES2), and modifications to new products during pilot product production phases (EARLY_MO). For Japanese companies, the scale additionally includes two question items on the use of new production processes for the new products (PROC_ENG) and phase overlapping approach (OVERLAP). *Strategic Guide* (SSG) represents top management support and involvement (TOP_MG), clearly defined objectives for new products (STR_G1), development of a well defined, shared strategy for new products (STR_G2), and clearly explained role of new products to fulfill company objectives (STR_G3). Finally, *NPD Capabilities* (SNPDC) measures the level of understanding competitive evolution and customer needs early on (UP_FRONT_CAP1 and UP_FRONT_CAP2), levels of capabilities to innovate the technology of new products and improve the manufacturing process for new products (TECH_CAP1 and TECH_CAP2), and the degree of innovative culture compared to competitors (CULTURE). These measurement scales are potential determinants of NPD performance, and used as independent variables in the subsequent regression analysis.

Table 1
Measurement analysis for NPD Activities

Scales	Architecture of New Products		Suppliers Linkage			Customers Linkage		
	Japan	Italy		Japan	Italy		Japan	Italy
Cronbach's alpha	0.8313	0.8404		0.6978	0.6098		0.6748	0.639
Factor loadings (the first only)								
ARCH_STD	0.892	0.869	SUP_INV1	0.877	0.853	TEAM_USE	0.715	0.481
ARCH_MOD	0.899	0.922	SUP_INV2	0.877	0.853	INT_D_MK	0.713	0.623
ARCH_PLT	0.826	0.825				INT_D_MF	0.752	0.503
						CUST_INV1	0.56	0.731
						CUST_INV2	0.579	0.814
Variance explained	76.25%	76.22%		74.83%	72.81%		44.69%	41.39%
# of factors	1	1		1	1		1	1
Scales	**NPD Process**		**Strategic Guide**			**NPD Capabilities**		
	Japan	Italy		Japan	Italy		Japan	Italy
Cronbach's alpha	0.7139	0.7544		0.7944	0.7338		0.8327	0.7425
Factor loadings (the first only)								
CONC_TES	0.686	0.672	TOP_MG	0.712	0.624	UP_FRONT_CAP1	0.791	0.705
PRE_DES1	0.691	0.874	STR_G1	0.877	0.803	UP_FRONT_CAP2	0.768	0.699
PRE_DES2	0.708	0.876	STR_G2	0.699	0.775	TECH_CAP1	0.825	0.774
PROC_ENG	0.594		STR_G3	0.843	0.776	TECH_CAP2	0.695	0.706
EARLY_MO	0.554	0.628				CULTURE	0.805	0.629
OVERLAP	0.636							
Variance explained	41.89%	59.45%		61.93%	55.89%		60.54%	49.58%
# of factors	1	1		1	1		1	2

Performance Indicators

In the questionnaire we asked respondents to show their evaluation on the following eight performance indicators:

a) PROFIT: Attainment of profit goals due to new products in 2000 (five-point scale with totally unsatisfactory, not satisfactory, satisfactory, more than satisfactory, and totally satisfactory)
b) PROD_SUC: Overall success of new products compared to competitors (five-point scale with very badly, not well, same level, superior, and definitely superior)
c) REV_PERC: Percentage of revenues in 2000 due to new products launched in 1998 to 2000
d) REV_GOAL: Attainment of revenue goals due to new products in 2000 compared to the company expectations (five-point scale with very low, low, as expected, higher, and definitely higher)
e) ON_TIME: On-time launch of new products (five-point scale with late for all the new products, a few new products were launched on time, about half the new products were launched on time, the majority of new products were launched on time, and all new products were launched on time)
f) TTM_RED: Reduction in time-to-market for new products introduced in the past three years (five-point scale with for no new products, for a few new products, for about half the new products, for the majority of new products, and for all the new products)
g) INNOVAT: Innovativeness of new products introduced in the past three years compared to previously existed products (five- point scale with in no new products, in a few new products, in about half the new products, in the majority of new products, and in all the new products)
h) QUAL_CAP: Product quality capability satisfying customer needs (five-point scale with none of the new products, a few of the new products, about half the new products, the majority of the new products, and all the new products)

The respondents had to subjectively judge all the performance indicators except REV_PERC.

RELATIONS AMONG NPD PERFORMANCE INDICATORS

The next question on performance measurement is whether NPD performance indicators were considered to be virtually identical, in other words, whether they could be summarized into one dimension. Table 2 shows the results of factor analysis for all the NPD performance indicators with a factor loadings matrix after the varimax rotation. For the Italian sample we could abstract four factors whose eigenvalue is more than one from eight performance indicators. The first factor is strongly associated with two indices concerning the time performance, ON_TIME and TTM_RED, while the second factor affects attainment of revenue and profit goals (PROFIT and REV_GOAL). The third factor is related with quality capability and overall success of new products, and the fourth factor influences the innovativeness of new products and the percentage of revenues due to new products. Although the correlation coefficient between ON_TIME and TTM_RED is 0.422 and significantly different from zero, it is not so high that we may regard them as identical. It is clearly impossible to prove the uni-dimensionality of NPD performance, because we found four factors. For the Japanese sample three factors were abstracted. The first factor is associated with revenue and profit goals and other financial and overall performance indicators, while the second factor affects the innovativeness and quality capability of new products. The third factor tends to influence two indicators concerning the time performance. The correlation coefficient between ON_TIME and TTM_RED is 0.385 and

less than that for the Italian sample. As though it is significantly different from zero. It is never possible to prove the uni-dimensionality of NPD performance from this result. Finally, for the pooled sample including both Japanese and Italian companies, we obtained four factors, which seem eclectic and more similar to the Italian case.

Table 2
Factor Analysis of NPD Performance Indicators

(a) Japan				(b) Italy				
	1st Factor	2nd Factor	3rd Factor		1st Factor	2nd Factor	3rd Factor	4th Factor
PROFIT	0.7872	0.2760	-0.0556	PROFIT	0.0290	0.8337	-0.0120	0.2023
PROD_SUC	0.5356	0.3311	0.2347	PROD_SUC	-0.0568	0.0298	0.7484	0.2931
REV_PERC	0.5218	0.0985	0.2530	REV_PERC	-0.0842	0.1446	-0.0894	0.7787
REV_GOAL	0.8263	-0.0534	0.0953	REV_GOAL	0.1677	0.8483	0.1351	-0.1506
ON_TIME	0.2431	-0.0765	0.8546	ON_TIME	0.8469	0.1479	0.1469	-0.0218
TTM_RED	0.0222	0.4306	0.6890	TTM_RED	0.8806	0.0379	-0.1114	0.0371
INNOVAT	0.1529	0.9094	-0.0675	INNOVAT	0.1108	-0.0942	0.1948	0.7820
QUAL_CAP	0.1725	0.6371	0.3443	QUAL_CAP	0.0803	0.0842	0.8595	-0.1546

(c) Pooled				
	1st Factor	2nd Factor	3rd Factor	4th Factor
PROFIT	0.2481	0.7563	-0.0157	0.2753
PROD_SUC	0.6926	0.2520	0.0460	-0.0054
REV_PERC	0.0263	0.1449	0.1348	0.8464
REV_GOAL	0.0666	0.8857	0.1556	-0.0540
ON_TIME	-0.0335	0.1504	0.8541	-0.0237
TTM_RED	0.1683	-0.0127	0.7981	0.1563
INNOVAT	0.7876	-0.0680	-0.0397	0.3741
QUAL_CAP	0.6756	0.1842	0.2275	-0.3424

In summary, we can conclude that NPD performance cannot be treated as one dimension. Further, there is a clear difference in the factorial structure between Italian and Japanese samples. It is difficult to appropriately interpret what each factor really implies. Only a common factor seems to be the time performance, which is strongly associated with two performance indicators of ON_TIME and TTM_RED. That is the first factor for the Italian sample, and the third factor for the Japanese and pooled samples. Clark and Fujimoto (1991) and Wheelwright and Clark (1992) emphasized the importance of time performance in NPD and investigated the impact of NPD process and practices. One of authors (2002, not included in references) found the technological development involvement improved operational time performance such as cycle time. In this paper we use each of these NPD performance indicators as a dependent variable.

DETERMINANTS OF NPD PERFORMANCE

We shall test five hypotheses mentioned above for eight performance indicators of NPD by a series of regression analyses. Table 3 shows the result of regression analysis with a country dummy variable (ID) for the pooled sample. ID takes a value of 1 if the company is located in Italy, otherwise 0. The coefficient of each measurement scale is appropriate for Japanese companies only, while the coefficient of ID multiplied by each measurement scale represents the differential effect of the measurement scale between Italian and

Japanese companies. Tables 4 to 11 summarize the results of regression analysis for the Italian, Japanese, and pooled samples.

We can find a significant difference in the impact of *NPD Capabilities* (SNPDC) on profit goals attainment (PROFIT) between two countries. The effect, expressed by the estimated value of coefficient of 0.5792, is highly significant for the Japanese companies, and it is significantly stronger than the effect for the Italian companies by 0.4763. The impact of *NPD Process* (SNPDP) on PROFIT is marginally significant for the Japanese sample, while it is almost nothing for the Italian sample. The estimated coefficient value is 0.2623 for Japan, and -0.0160 for Italy.

Table 3
Regression Analysis with Country Dummy Variable (ID)

Depend	PROFIT		PROD_SUC		REV_PERC		REV_GOAL	
	coeff	t	coeff	t	coeff	t	coeff	t
(const)	0.4780	0.8791	1.8952	4.0737	-40.1083	-2.2320	1.3915	2.7368
ID	2.0292	2.6276	0.5555	0.8666	56.1226	2.2165	-0.1742	-0.2427
SANP	-0.0053	-0.0452	0.0270	0.2819	3.9829	1.0221	0.1544	1.4190
IDSANP	0.1030	0.7399	0.1021	0.8962	-1.0967	-0.2373	-0.1245	-0.9593
SSL	0.0803	0.7493	-0.0442	-0.4937	10.4538	2.9615	-0.0367	-0.3663
IDSSL	-0.0888	-0.6554	0.0158	0.1426	-8.7477	-1.9868	0.0416	0.3328
SCL	-0.0699	-0.3422	-0.2667	-1.5379	-9.2860	-1.3651	0.0350	0.1830
IDSCL	-0.0097	-0.0402	0.0943	0.4654	8.2388	1.0281	0.0839	0.3715
SNPDP	0.2623	1.6132	-0.0021	-0.0147	1.8882	0.3478	0.0269	0.1767
IDSNPDP	-0.2783	-1.4735	-0.1782	-1.0988	-5.9824	-0.9544	-0.0949	-0.5383
SSG	-0.1592	-1.0206	0.0241	0.1899	8.6771	1.6830	-0.1434	-0.9828
IDSSG	0.1472	0.7257	0.1070	0.6504	-5.4048	-0.8089	0.2788	1.4747
SNPDC	0.5792	3.0664	0.7928	5.1148	11.0470	1.7661	0.3624	2.0519
IDSNPDC	-0.4763	-1.9913	-0.3064	-1.5693	-9.7515	-1.2355	-0.1467	-0.6574
Depend	ON_TIME		TTM_RED		INNOVAT		QUAL_CAP	
	coeff	t	coeff	t	coeff	t	coeff	t
(const)	1.8020	2.5661	0.7629	0.9602	0.4184	0.6517	2.3803	4.4809
ID	-0.8034	-0.8098	0.9478	0.8445	2.2226	2.4507	-0.3364	-0.4483
SANP	0.1584	1.0546	0.0823	0.4843	0.0886	0.6448	0.1200	1.0559
IDSANP	-0.0848	-0.4727	-0.0456	-0.2250	0.0321	0.1958	-0.2170	-1.5998
SSL	0.0076	0.0546	0.2504	1.5972	0.0373	0.2946	-0.0353	-0.3364
IDSSL	0.0437	0.2525	-0.3185	-1.6270	0.0038	0.0238	-0.0389	-0.2975
SCL	0.0788	0.3012	-0.2594	-0.8764	-0.0773	-0.3234	0.1483	0.7496
IDSCL	-0.0363	-0.1169	0.2656	0.7570	0.0329	0.1161	-0.2049	-0.8735
SNPDP	0.0775	0.3689	0.2770	1.1660	0.2892	1.5065	0.0281	0.1771
IDSNPDP	-0.0873	-0.3583	-0.3158	-1.1461	-0.2568	-1.1533	-0.1398	-0.7589
SSG	-0.3563	-1.7666	-0.2064	-0.9045	0.0040	0.0218	-0.0505	-0.3309
IDSSG	0.3662	1.4013	0.5554	1.8784	-0.0445	-0.1862	0.2525	1.2774
SNPDC	0.5587	2.2936	0.5050	1.8326	0.5041	2.2637	0.2260	1.2268
IDSNPDC	-0.1919	-0.6230	-0.5473	-1.5704	-0.2798	-0.9936	0.3925	1.6844

IDS????=ID*S????

There is a marginal difference in the impact of *NPD Capabilities* (SNPDC) on overall success of new products (PROD_SUC). This impact is larger for the Japanese companies, even though it is also strongly significant for the Italian.

The impact of *Suppliers Linkage* (SSL) on revenue percentage of new products (REV_PERC) is significantly different between two countries. This impact is significantly positive for the Japanese companies, while it is much smaller for the Italian.

Table 4
Regression Analysis of Attainment of Profit Goals (PROFIT)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	0.4780	0.9644	2.5072	4.2619	1.4866	4.0491		
SANP	-0.0053	-0.0496	0.0977	1.1926	0.1032	1.6541		
SSL	0.0803	0.8220	-0.0085	-0.0956	0.0475	0.7405		
SCL	-0.0699	-0.3754	-0.0797	-0.5742	-0.0145	-0.1366		
SNPDP	0.2623	1.7697	-0.0160	-0.1552	0.0295	0.3624		
SSG	-0.1592	-1.1196	-0.0121	-0.0868	-0.1012	-1.0442		
SNPDC	0.5792	3.3640	0.1029	0.6534	0.3240	3.1299		
RSQ	0.263		0.041		0.117			
Adjusted RSQ	0.197		-0.036		0.081			
F and p	3.991	0.002	0.537	0.779	3.283	0.005	1.025	0.442

Table 5
Regression Analysis of Overall Success of New Products (PRODUCT_SUCCESS)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	1.8952	4.1143	2.4507	5.5115	2.2693	7.7061		
SANP	0.0270	0.2847	0.1291	2.0781	0.1037	2.0939		
SSL	-0.0442	-0.4986	-0.0284	-0.4320	-0.0293	-0.5800		
SCL	-0.2667	-1.5533	-0.1724	-1.6306	-0.1809	-2.1500		
SNPDP	-0.0021	-0.0148	-0.1803	-2.3020	-0.1562	-2.3879		
SSG	0.0241	0.1918	0.1311	1.2433	0.0977	1.2718		
SNPDC	0.7928	5.1658	0.4864	4.0643	0.5806	7.0486		
RSQ	0.366		0.346		0.378			
Adjusted RSQ	0.308		0.296		0.354			
F and p	6.353	0.000	6.873	0.000	15.323	0.000	0.981	0.548

We can find a marginal difference in the effect of *Strategic Guide* (SSG) on revenue goals attainment (REV_GOAL) between two countries, although the effect is never significant for both samples. For the Japanese companies, SNPDC has a significant impact on REV_GOAL, and *Architecture of New Products* (SANP) marginally contributes to REV_GOAL. This result rather suggests there are no significant differences in the determinants of NPD performance between two countries.

There is a marginal difference in the impact of *Strategic Guide* (SSG) upon on time launch of new products (ON_TIME) between two countries. This impact is significantly negative for the Japanese companies, while it is never significant for the Italian.

We can find a significant difference in the effect of *Strategic Guide* (SSG) on time-to-market reduction (TTM_RED) between two countries. The effect is strongly positive for the Italian companies. It is negative for the Japanese, although not significant. There is a marginal difference in the impact of *NPD Capabilities* (SNPDC) on TTM_RED. The impact is significantly positive for the Japanese companies, and almost nothing for the Italian.

Table 6
Regression Analysis of Attainment of Revenue Percentage of New Products (REV_PERC)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	-40.1083	-2.1263	16.0143	0.9390	-1.8785	-0.1497		
SANP	3.9829	0.9737	2.8862	1.2144	3.0343	1.4257		
SSL	10.4538	2.8213	1.7062	0.6782	6.0346	2.7977		
SCL	-9.2860	-1.3005	-1.0472	-0.2586	-1.8483	-0.5101		
SNPDP	1.8882	0.3314	-4.0941	-1.3667	-2.9047	-1.0404		
SSG	8.6771	1.6033	3.2723	0.8054	7.2235	2.1758		
SNPDC	11.0470	1.6825	1.2956	0.2815	0.3587	0.1006		
RSQ	0.322		0.067		0.127			
Adjusted RSQ	0.260		-0.005		0.092			
F and p	5.150	0.000	0.927	0.481	3.627	0.002	1.113	0.261

Table 7
Regression Analysis of Attainment of Revenue Goals (REV_GOAL)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	1.3915	3.0380	1.2173	2.2283	1.2351	3.6860		
SANP	0.1544	1.5752	0.0299	0.3913	0.0631	1.1122		
SSL	-0.0367	-0.4066	0.0049	0.0610	-0.0124	-0.2148		
SCL	0.0350	0.2032	0.1189	0.9154	0.1193	1.2350		
SNPDP	0.0269	0.1961	-0.0680	-0.7073	-0.0509	-0.6851		
SSG	-0.1434	-1.0910	0.1354	1.0448	0.0213	0.2415		
SNPDC	0.3624	2.2777	0.2157	1.4669	0.2850	3.0128		
RSQ	0.164		0.121		0.141			
Adjusted RSQ	0.089		0.053		0.107			
F and p	2.196	0.054	1.788	0.112	4.154	0.001	0.981	0.546

There are no significant differences in the effect on innovativeness of new products (INNOVAT) between two countries.

Furthermore, we can find a marginally significant difference in the impact of *NPD Capabilities* (SNPDC) on Product Quality Capability (QUAL_CAP) between two countries. This effect is not significant for the Japanese companies, but highly significant for the Italian. We also detect a marginally significant difference in the impact of *Architecture of New Products* (SANP), although it is not significant for the Italian, Japanese, and pooled samples.

Table 8
Regression Analysis of On Time Launch of New Products (ON_TIME)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	1.8020	2.6649	0.9986	1.3821	1.6593	3.4653		
SANP	0.1584	1.0952	0.0737	0.7296	0.0615	0.7564		
SSL	0.0076	0.0567	0.0513	0.4799	0.0776	0.9407		
SCL	0.0788	0.3128	0.0425	0.2475	0.0480	0.3478		
SNPDP	0.0775	0.3831	-0.0098	-0.0770	0.0407	0.3823		
SSG	-0.3563	-1.8346	0.0099	0.0579	-0.0297	-0.2351		
SNPDC	0.5587	2.3819	0.3668	1.8858	0.2242	1.6550		
RSQ	0.153		0.089		0.055			
Adjusted RSQ	0.078		0.019		0.018			
F and p	2.045	0.071	1.278	0.277	1.485	0.187	1.053	0.377

Table 9
Regression Analysis of Time-to-Market Reduction (TTM_RED)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
const	0.7629	1.0819	1.7107	1.9823	1.1097	2.1004		
SANP	0.0823	0.5456	0.0367	0.3041	0.0633	0.7058		
SSL	0.2504	1.7995	-0.0681	-0.5335	0.0652	0.7167		
SCL	-0.2594	-0.9874	0.0062	0.0304	0.0177	0.1166		
SNPDP	0.2770	1.3137	-0.0388	-0.2553	0.0218	0.1857		
SSG	-0.2064	-1.0190	0.3490	1.7050	0.0987	0.7084		
SNPDC	0.5050	2.0647	-0.0423	-0.1821	0.1975	1.3211		
RSQ	0.155		0.057		0.057			
Adjusted RSQ	0.081		-0.015		0.02			
F and p	2.085	0.066	0.790	0.580	1.529	0.172	1.001	0.497

Table 10
Regression Analysis of Innovativeness of New Products (INNOVAT)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
Const	0.4184	0.6780	2.6409	3.9925	1.4135	3.2326		
SANP	0.0886	0.6708	0.1206	1.3054	0.1611	2.1697		
SSL	0.0373	0.3065	0.0411	0.4203	0.0282	0.3740		
SCL	-0.0773	-0.3365	-0.0444	-0.2824	0.0125	0.0991		
SNPDP	0.2892	1.5673	0.0324	0.2783	0.0574	0.5910		
SSG	0.0040	0.0227	-0.0405	-0.2580	-0.1005	-0.8709		
SNPDC	0.5041	2.3550	0.2242	1.2595	0.4791	3.8735		
RSQ	0.227		0.061		0.180			
Adjusted RSQ	0.159		-0.011		0.148			
F and p	3.337	0.006	0.844	0.540	5.608	0.000	1.050	0.382

To test this suggestion formally, we compare a regression model including six scales as independent variables for the pooled sample with the same model applied for two sub samples divided by the regional location, which are the Italian and Japanese samples. We evaluate the level of improvement in explanatory power by dividing the pooled sample into two sub samples and enabling regression coefficients to take different values by an F test. As shown in Tables 4 to 11, we find no evidences of significant improvement in the explanatory power of regression models of any performance indicators.

Table 11
Regression Analysis of Product Quality Capability (QUAL_CAP)

	Japan		Italy		Pool		Pool/(Japan+Italy)	
	coeff	t	coeff	t	coeff	t		
Const	2.3803	4.5431	2.0439	3.8112	2.1506	6.0745		
SANP	0.1200	1.0706	-0.0970	-1.2945	-0.0250	-0.4166		
SSL	-0.0353	-0.3411	-0.0742	-0.9361	-0.0583	-0.9567		
SCL	0.1483	0.7600	-0.0566	-0.4439	0.0323	0.3171		
SNPDP	0.0281	0.1795	-0.1117	-1.1828	-0.0361	-0.4594		
SSG	-0.0505	-0.3355	0.2021	1.5884	0.0926	0.9913		
SNPDC	0.2260	1.2438	0.6186	4.2853	0.4733	4.7257		
RSQ	0.115		0.313		0.214			
Adjusted RSQ	0.037		0.260		0.183			
F and p	1.476	0.200	5.924	0.000	6.949	0.000	1.006	0.486

We can finally judge that there are no differences in the effects of the NPD measurement scales on financial performance between two countries, and make clear the common determinants of each performance indicator. Main determinants of profit and revenue goals attainments are strongly influenced by *NPD Capabilities*, which suggests the importance of marketing and technology capabilities to improve NPD financial performance, compared to other activities.

CONCLUSIONS

In conclusion, we can show some common effects of NPD practices, process, strategic guide and capabilities upon NPD financial performance indicators, and the overwhelming importance of capabilities concerning NPD. Although a couple of country-specific effects are also detected, we should pay more attention to the universal effects of NPD activities.
Further research work is aimed to explore the determinants of other performance indicators and develop small number of performance scales such as time performance, financial performance, and innovativeness performance. Another problem is to improve explanatory power of regression models for the Italian sample. Finally, we should proceed to more comprehensive models incorporating the relationships among practices, process, strategic guide and capabilities of NPD.

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