

COINVEST

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**COINVEST:
Competitiveness, Innovation and Intangible
Investment in Europe
Overview - Germany**

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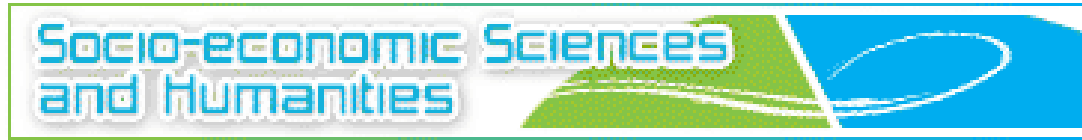
ZEW Centre for European Economic Research, Mannheim, Germany

Mannheim Meeting, 27/28 November 2008



Structure

- Data investigation Germany
 - Janet Xiaohui Hao, Vlad Manole and Bart van Ark (2007)
- Literature review
 - Brand equity
- Microeconomic database Germany
 - CIS – Mannheim Innovation Panel

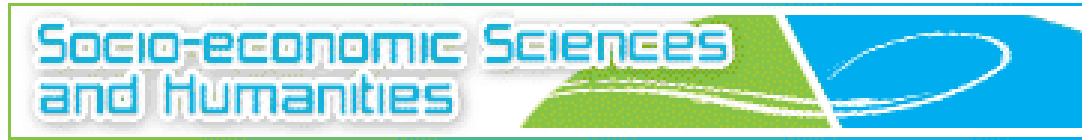


Data investigation Germany



Data investigation Germany

- Intangible Assets in France and Germany
 - Janet Xiaohui Hao, Vlad Manole and Bart van Ark
- Data collection for France and Germany
 - Comprehensive collection following COINVEST framework
 - Robustness checks
- Core findings
 - France and Germany spent 8.6% and 7.4 % of total GDP on intangible assets in 2004, respectively



Data investigation Germany

Computerized information

- Computer software
 - Germany: Ifo Growth Accounting Database
 - Groningen Industry Growth Accounting Database
- Computerized databases
 - EU-Klems



Data investigation Germany

Innovative property

- Scientific R&D
 - Eurostat - R&D expenditures
- Mineral exploration
 - Annual Survey of Metals Economics Groups
- Copyright and license costs
 - Screen Digest

Other product development, design and research

- New product development costs in the financial industry
 - OECD STAN database for Industrial Analysis
- New architectural and engineering designs
 - EU-Klems
- R&D in social science and humanities



Data investigation Germany

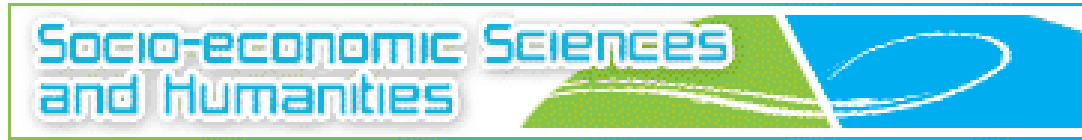
Economic competencies

Brand equity

- Advertising expenditure
 - EU-Klems (Gross Output of 3-digit industries)
- Market research
 - Structural business statistics of Eurostat
- Firm-specific human capital
 - Eurostat Continuing Vocational Survey
 - Eurostat Labor Costs Annual Data
 - EU Klems labor compensation

Organizational structure

- Purchased
 - FEACO - Annual Survey on Management Consultancy
- Own account
 - Eurostat structure of earnings survey



Literature review: Brand equity



Marketing literature

- 30 articles in academic marketing/business journals 1993-2007
 - Journal of Marketing
 - Marketing Letters
 - Marketing Science
 - Journal of Marketing Research (JMR)
 - Journal of Marketing Communications
 - Advances in Consumer Research
 - European Journal of Marketing
 - Journal of Product & Brand Management
 - Journal of Advertising Research
 - International Journal of Research in Marketing
 - Journal of Advertising Research
 - International Marketing Review
 - Harvard Business Review
 - California Management Review
 - Journal of Brand Management
 - Journal of Consumer Marketing
 - Journal of International Marketing
 - Journal of Marketing Theory & Practice
 - Journal of Product & Brand Management
 - Marketing News



Brand equity: Definitions

- Value arises from consumer perspective
 - “added value endowed by the brand to the product **as perceived by a consumer**” (Park, Srinivasan;1994)
 - “the marketing effects or outcomes that accrue to a product with its brand name compared with those that would not accrue if the same product did not have that brand name” (Alawadi, Lehmann; 2003)
 - “Brand equity is the **customer's subjective assessment** of a branded offering's worth above and beyond its objectively perceived value” (Rust, Lemon, Zeithaml; 2004)
 - “the equity of a brand is the meaning that it holds for the consumer” (Gürhan-Canli, Ahluwalia; 1999)
 - “relational market-based asset because it arises from the **relationships that consumers have with brands**” (Delgado-Ballester, Munuera-Alemán; 2005)
 - “brand equity = the **set of associations and behavior** on the part of a brand's customers, channel members and parent corporation that permits the brand to earn greater volume or greater margins than it could without the brand name” (Chaudhuri; 2002)
- Financial asset based on customer preferences
 - “value added by the brand name to a product” (Siriram, Balachander, Kalwani; 2007)
 - “customer-based definition: brand equity represents the biased behavior a consumer has for a branded product versus an unbranded equivalent; brand equity = both a financial asset and a **set of favorable associations and behaviors**” (Faircloth, Capella, Alford; 2001)
 - “brand equity = value endowed by the brand to the product” (Anselmsson, Johansson, Persson; 2007)
- Relative perspective as additional revenues compared to unbranded almost identical competing, unbranded product
 - “brand equity is defined as the incremental contribution (\$) per year obtained by the brand in comparison to the underlying product (or service) with **no brand-building efforts**” (Srinivasan, Park, Chang; 2005)
 - “incremental cash flows which accrue to branded products over unbranded products” (Simon, Sullivan; 1993)
 - “it appears when consumers **willingly pay more for the same level of quality** due to the attractiveness of the name attached to the product” (Yasin, Noor, Mohamad; 2007)
- Separate from other marketing activities (price, product, packaging, channel)
 - “the marketing effects **uniquely attributable** to the brand” (Silverman, Sprott, Pascal; 1999)
- Influences effectiveness of marketing
 - “customer-based brand equity = differential effect of brand knowledge on consumer response to the marketing of the brand” (Keller; 1993)
 - “intrapersonal construct that **moderates the impact of marketing activities**” (Raggio, Leone; 2007)



Brand equity: Measurement

- Predominantly consumer surveys
- Strong focus on consumer products
 - Often frequently purchased products
 - Toothpaste, soap, cell phones, beverages, televisions, air-conditioning, deodorants, jeans, shoes, cars



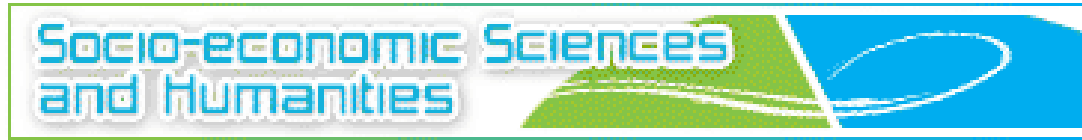
Brand equity: Building blocks

- Multidimensional construct, emphasis on awareness
 - “4 cognitive “components”: global brand attitude, strength of preference, brand knowledge, and brand heuristic” (Punj, Girish; Hillyer, Clayton; 2004)
 - “combination of brand awareness, brand associations, perceived quality and attitudinal brand loyalty” (Pappu, Quester, Cooksey; 2006)
- Importance of consistency
 - “brand equity and image are built up by the **consistency** among the various elements of a marketing program” (Buchanan, Simmons, Bickart; 1999)
 - **Continuity of marketing investments** important; excessive promotion and price discounting can dilute brand equity (Kish, Risky, Kerin; 2001)
- Development
 - building a strong brand with the consumer: a positive brand evaluation, an accessible brand attitude, and a consistent brand image; 3 ways to get brand equity: **build it, borrow it, or buy it** (Farquhar; 1990)
 - Potential for leverage across **brand portfolio** (Simmons, Bickart, Buchanan; 2000)
 - Value accrues from **uniqueness** (Anselmsson, Johansson, Persson; 2007)
 - Value depends upon market decisions and conditions (Simon, Sullivan; 1993)



Brand equity: Synthesis

- Brand equity is inherently a relative construct
- Asset arises outside of firm
 - Customer perspective
- Strong focus on consumer products
- Literature stresses continuity
 - Hardly any links to expenditures



Microeconomic database



Community Innovation Survey

- Mannheim Innovation Panel
 - Firm and innovation characteristics
 - Direct information from CEO, heads of R&D departments or innovation management
 - Quality management at firm, industry and country level
 - Annual survey in Germany since 1993
 - Manufacturing and selected service industries
 - Each year: Innovation expenditure and R&D expenditure (except 1998)
 - Breakdown of innovation expenditure in categories only available in 1993, 1997, 2001, 2005
 - Exemplary: 2001 (CIS-3)



Related Questions in 2001

- Did your enterprise engage in the following innovation activities in 2000? (yes/no, Euro)
 - Intramural research & experimental development (R&D)
 - Acquisition of R&D (extramural R&D)
 - Acquisition of machinery and equipment
 - Acquisition of other external knowledge (patents, licenses, trademarks, software)
 - Market related expenditure
 - Training (directly aimed at the market introduction of new or significantly improved products)
 - Market introduction of innovations (internal or external)
 - Design, other preparations for production/deliveries

- What were your enterprises' estimated expenditure for professional training (internal and external) in 1999 and 2000?



Community Innovation Survey

- Data quality: Proportion of missing values

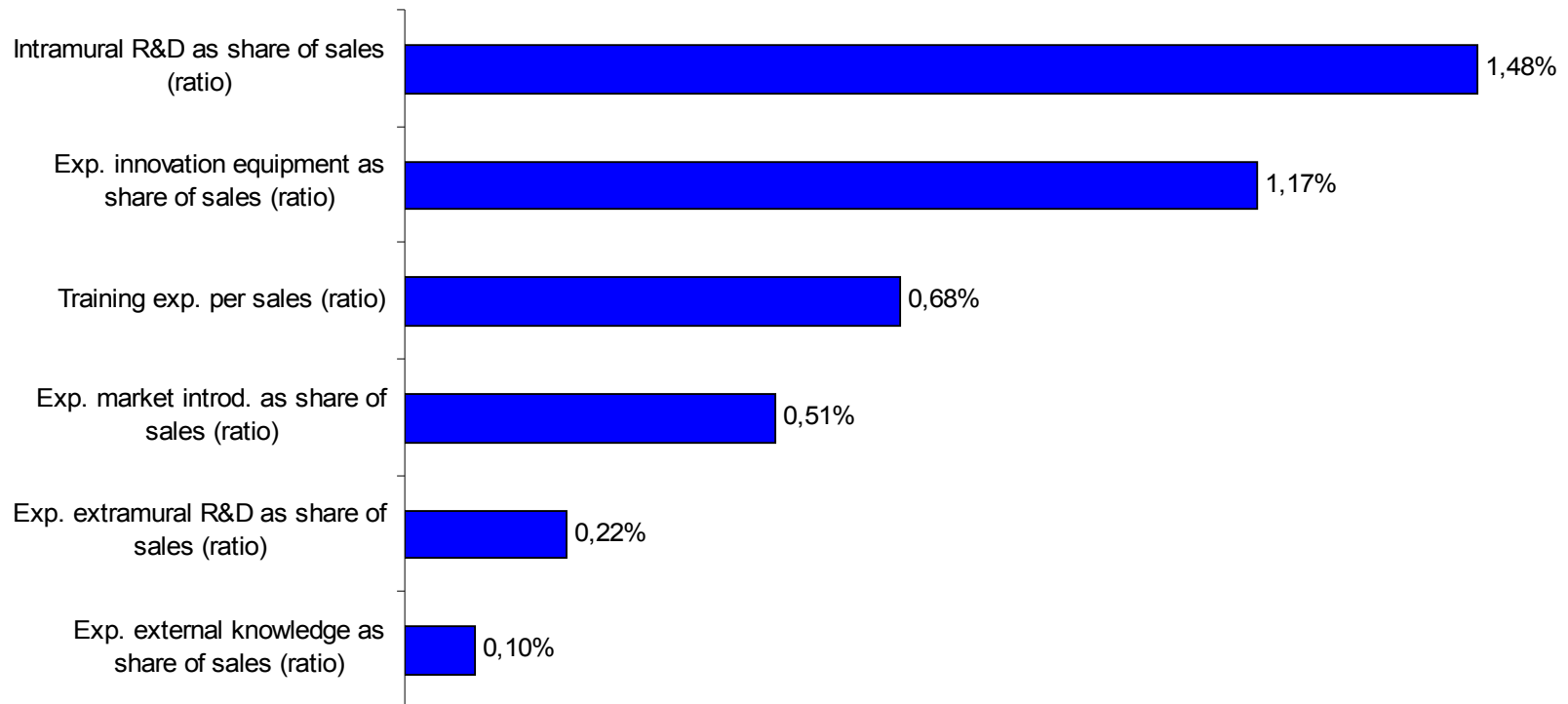
Variable (4,172 observations)	Missings	
Training expenditure	367	8.8%
Exp. intramural R&D	526	12.6%
Exp. extramural R&D	479	11.5%
Exp. innovation equipment	526	12.6%
Exp. external knowledge	507	12.2%
Exp. market introduction	550	13.2%

- Consistency

- For roughly 2% of all observations the sum of the individual innovation expenditures deviates by more than 5% from the reported total

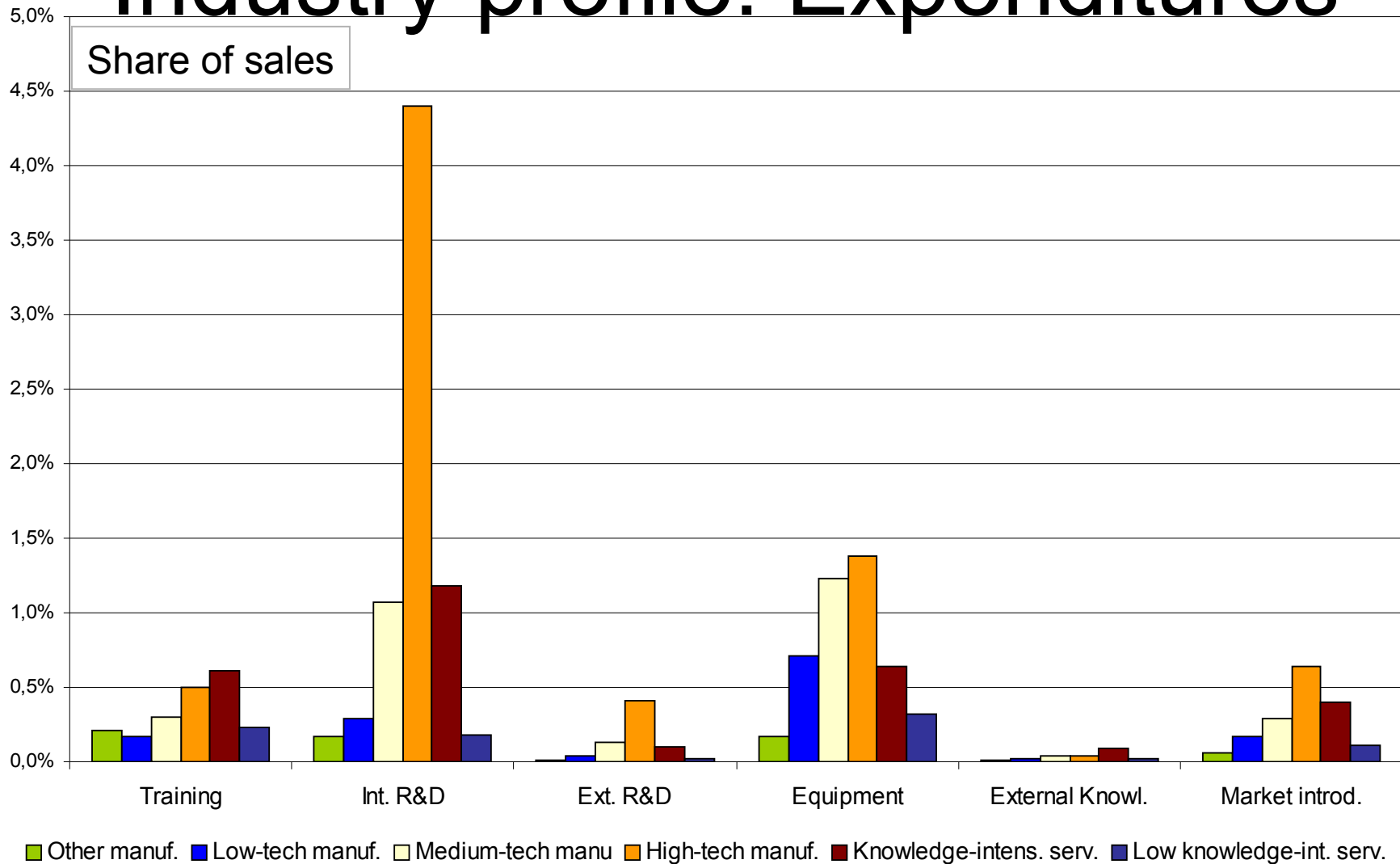


Descriptive statistics



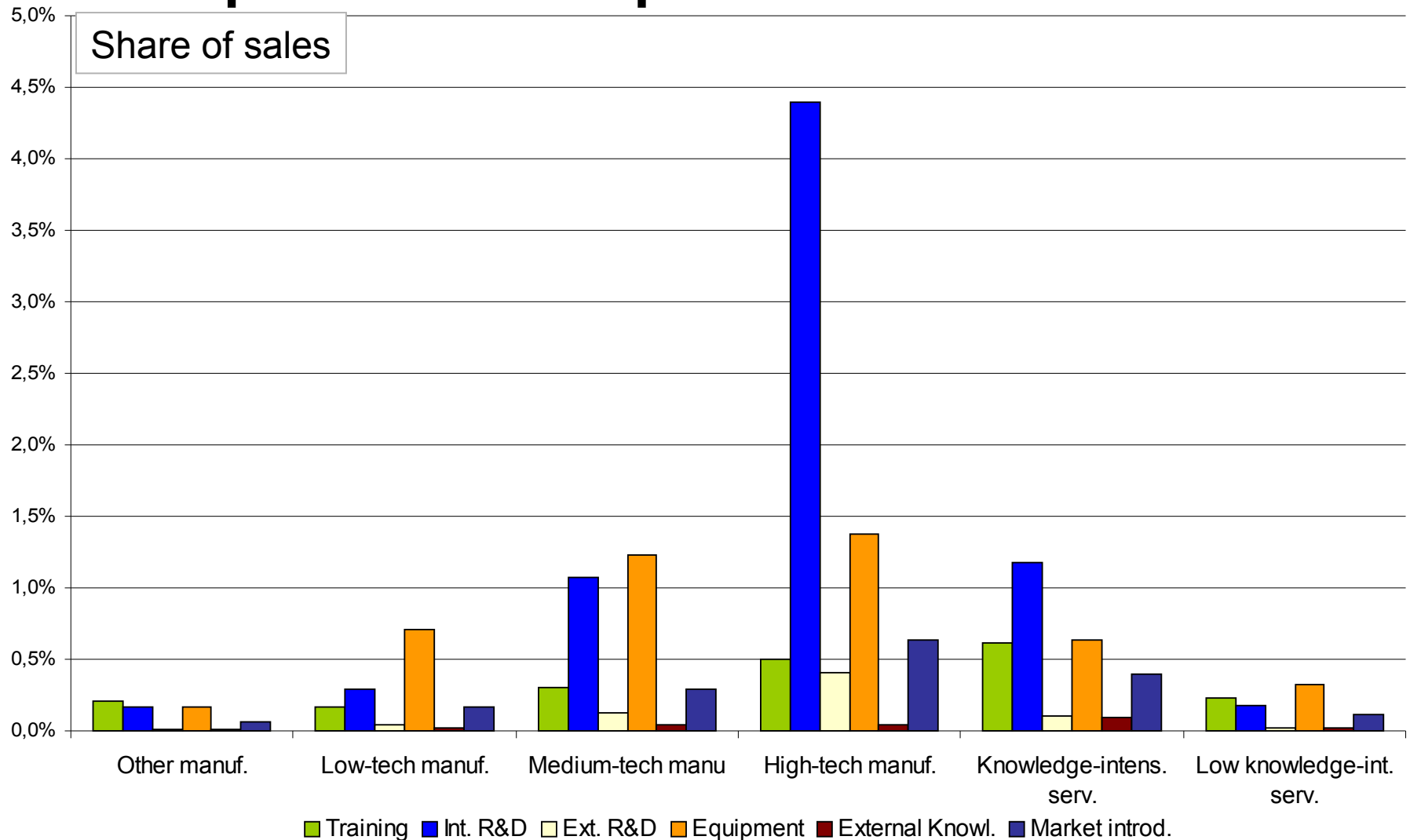


Industry profile: Expenditures





Expenditure profile: Industries





Preliminary empirical analysis

□ Preliminary models

- Probit models on innovation success with new products or processes
- Tobit models on market success with new products (new to firm, new to market)

□ Focus variables

- Types of innovation expenditures

□ Control variables

- Resource availability
 - Firm size, age, public support, skilled employees
- Degree of internationalization
 - Exports, international group
- Regional and industry differences



Probability of innovation success

Marginal effects

	New product	New process
Training exp. as share of sales (ratio)	-1.55	-0.26
Internal R&D as share of sales (ratio)	4.58***	-0.71
Exp. ext. R&D/knowl. as share of sales (ratio)	15.27***	-1.36
Exp. innovation equipment as share of sales (ratio)	3.02***	5.15***
Exp. intangible assets/knowl. as share of sales (ratio)	22.99***	30.47***
Exp. market introd. as share of sales (ratio)	21.22***	6.49***
Company age since found. (years, log)	-0.01	-0.01
No of employees (log)	0.09***	0.08***
Share empl. w/ college educ. (ratio)	0.16**	-0.03
Public R&D subsidy (d)	0.32***	0.22***
Share exports of sales (ratio)	0.17***	0.09
Foreign MNC (d)	0.06	0.07*
Group w/ domestic HQ (d)	0.02	0.04
Location East Germany (d)	-0.03	-0.01
Medium-tech manuf. (d)	0.14***	0.07**
High-tech manuf. (d)	0.12*	0.07
Knowledge-int. serv. (d)	0.10**	0.11***
Low knowledge-int. serv. (d)	0.10***	0.03
Process innovation (d)		
Constant	-1.91***	-1.83***
Pseudo R2	0.29	0.17
N	2465	2466
Chi2	490.08	393.46
P-value	0.00	0.00

Importance of non-internal R&D expenditures
No immediate support for importance of employee training
Support for marketing expenditures

(d) for discrete change of dummy variable from 0 to 1; * p<0.10, ** p<0.05, *** p<0.01



Market success with product innovations

	Share of sales with new-to-firm products	Share of sales with new-to-market products
Training exp. as share of sales (ratio)	0.56	0.32
Internal R&D as share of sales (ratio)	0.30**	0.25***
Exp. ext. R&D/knowl. as share of sales (ratio)	-0.19	-0.53
Exp. innovation equipment as share of sales (ratio)	0.06	-0.06
Exp. intangible assets/knowl. as share of sales (ratio)	-0.91	3.20***
Exp. market introd. as share of sales (ratio)	0.42	0.76**
Company age since found. (years, log)	0.00	0.00
No of employees (log)	0.00	-0.01**
Share empl. w/ college educ. (ratio)	0.06***	0.03
Public R&D subsidy (d)	0.00	0.01
Share exports of sales (ratio)	0.02	0.03**
Foreign MNC (d)	-0.02	-0.01
Group w/ domestic HQ (d)	0.00	0.00
Location East Germany (d)	0.02	-0.02***
Medium-tech manuf. (d)	-0.02	0.00
High-tech manuf. (d)	0.00	0.00
Knowledge-int. serv. (d)	-0.03	-0.01
Low knowledge-int. serv. (d)	-0.03	-0.01
Process innovation (d)	0.02**	0.00
Constant	0.09*	0.07
Sigma	0.25***	0.22***
Pseudo R2	0.10	0.15
N	907	957
Chi2	53.23	79.22
P-value	0.00	0.00

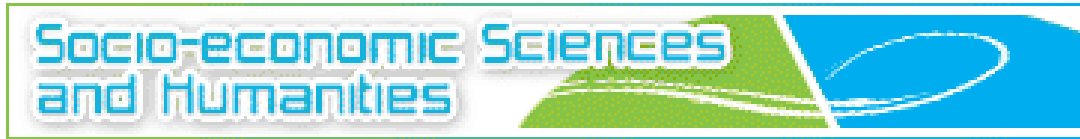
Importance of internal R&D expenditures
Marketing expenditures appear especially relevant for selling market novelties

(d) for discrete change of dummy variable from 0 to 1; * p<0.10, ** p<0.05, *** p<0.01



Outlook

- Refine models
 - Data/quality management
 - Panel data estimates
 - Focus on developing knowledge stocks
- Identify direct links to macro model



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