



Impacts of personality traits on consumer innovation success



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ABSTRACT

Via a study of innovating and non-innovating German consumers, we explore links between the “Big Five” personality traits and successful accomplishment of three basic innovation process stages by consumer-innovators: (1) generating an idea for a new product or product improvement, (2) developing a prototype that implements that idea, and (3) diffusing the innovation to others. We find that personality traits are significantly associated with success differ at each stage. First, those who score higher on openness to experience are significantly more likely to have new product ideas. Second, being introverted and conscientious is significantly associated with successful prototyping. Third, those who possess high levels of conscientiousness are more likely to successfully commercially diffuse their innovations, whereas, in contrast, conscientiousness lowers the likelihood of successful peer-to-peer diffusion.

Since the personality traits associated with successful completion of each stage differ, and the same individual with the same traits must traverse each stage in sequence, we find that personality traits strongly affect the likelihood of overall success. That is, an individual innovator with a personality profile highly favorable to successful completion of all stages is *several times more likely* to successfully complete all three stages than is an individual with a highly unfavorable profile. We suggest solutions to this practical problem, and also offer suggestions for further research.

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1. Introduction and overview

Product development by consumers has been shown to be large in both scale and scope. Thus, representative national surveys of consumers in six countries have shown that each year tens of millions of consumers spend tens of billions of dollars developing and improving consumer products for their own use (de Jong, 2013; de Jong et al., 2015; Kim, 2015; von Hippel et al., 2011, 2012). Consumer innovation has also been found to provide significant economic benefits to national economies. Specifically, many consumer-developed innovations diffuse widely via peer-to-peer and/or market channels (de Jong et al., 2015; Ogawa and Piller, 2006; von Hippel et al., 2012). The net effect is an increase in social welfare (Gambardella et al., 2015).

Given the scale and importance of innovation by consumers, it is clearly important to improve our understanding of the phenomenon, and to learn how it may be done better or more broadly. In this regard, a striking finding of the previously mentioned

national surveys is that the fraction of consumers engaging in product development is relatively small, ranging from 1.5% (South Korea) to 6.1% (UK) of national populations in the six countries studied to date. Further, only about 12% of those who *do* innovate go on to diffuse their innovation, either peer-to-peer or commercially (de Jong et al., 2015; von Hippel et al., 2011, 2012). It therefore becomes important to understand whether there are differences between consumer-innovators who succeed at innovation-related tasks and those who fail.

To date, prior research has identified a number of factors to be significantly associated with successful realization of consumer innovation projects such as demographics (e.g., Ogawa and Pongtanalert, 2013; von Hippel et al., 2012) or motives (e.g., Stock et al., 2015), but has not explored the impact of personality traits as enduring and fundamental predictors of individual behavior. In this paper, in a first-of-type study, we utilize a questionnaire survey of 547 German consumers to explore links between the “Big Five” personality traits and the successful completion of each of three basic innovation process stages: (1) generating an idea for a new product or product improvement; (2) developing a prototype that implements that idea; (3) diffusing the innovation to others. Our major findings are, first, that Big Five personality traits do indeed significantly affect the likelihood of successful accomplishment of each

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of the three basic innovation process stages by consumers developing innovations for their own use. Second, we find that traits associated with success differ across those three phases. Third, we find that the impact of personality traits on individuals' success in traversing all three stages is high. An individual innovator with a personality profile highly favorable to successful completion of all stages is *several times more likely* to successfully complete all three stages than is an individual with a highly unfavorable profile.

In a discussion section, we note that, since the Big Five personality traits are hardly malleable within individuals, other solutions to the significant impact of personality traits on consumer innovation and diffusion success must be considered. One approach we suggest is to shift from today's dominant pattern of all innovation process steps being carried out by a single consumer, to a collaborative mode involving multiple individuals. These individuals may then *collectively* have all the personality traits needed to successfully accomplish all stages. A second, complementary approach would be to change the nature of innovation tasks, with the aim of affecting the personality traits required to successfully complete them.

2. Literature review

2.1. The five-factor model of personality

This study draws on what is called five-factor model of personality (Big Five). The model identifies a small number of meaningful traits in personality that display minimal overlap and provide meaningful measures for studying individual differences (McCrae and Costa, 1997; Zillig et al., 2002). In the model, people are assumed to have “transcontextual personality dispositions which are highly stable over time, situations, and social roles” (Sheldon et al., 1997, p. 1380). Although the adequacy of the Big Five model has been debated (e.g., Pervin, 1994), an impressive body of literature has accumulated providing compelling evidence of its robustness (e.g., Conley, 1985; McCrae and Costa, 1985, 1987; McCrae and John, 1992). The personality descriptions associated with each of the Big Five traits are as follows:

Openness to experience “characterizes someone who is intellectually curious and tends to seek new experiences and explore novel ideas” (Zhao and Seibert, 2006, p. 261). Individuals with a high degree of openness to experience can be described as creative, imaginative, curious, and untraditional (George and Zhou, 2001; McCrae and Costa, 1985). They also tend to philosophize and appreciate art (McCrae and John, 1992). In contrast, individuals low on openness to experience can be characterized as traditional, narrow in interests, unadventurous, and unanalytical (McCrae and Costa, 1987).

Extraversion “describes the extent to which people are assertive, dominant, energetic, active, talkative, and enthusiastic” (Zhao and Seibert, 2006, p. 260). Extraverts enjoy social activities and prefer being with others than being alone (LePine and Van Dyne, 2001). In contrast, introverts exhibit lower social engagement, although they still value social situations involving warmth and close emotional bonds (Lucas et al., 2000).

Conscientiousness “indicates an individual's degree of organization, persistence, hard work, and motivation in the pursuit of goal accomplishment” (Zhao and Seibert, 2006, p. 261). The high end of conscientiousness represents dependability, self-discipline, and achievement motivation exceeding outside expectations (e.g., Mount and Barrick, 1995). Individuals with high scores on conscientiousness have a preference for planned and systematic rather than spontaneous behavior (Barrick et al., 2001).

Agreeableness describes an individual's interpersonal orientation, involving the tendency to prefer positive interpersonal relationships and cooperation (Digman, 1990; Zhao and Seibert, 2006). Agreeable individuals are associated with being conforming

to social conventions, compliant, trusting, forgiving, modest, soft-hearted, and tolerant, and have been shown to engage more in cooperative, higher quality interpersonal interactions (Barrick and Mount, 1991; Costa and McCrae, 1992). Someone at the very low end of the dimension can be characterized as self-centered, suspicious, and hostile (Feist, 1998).

Finally, *neuroticism* “represents the tendency to exhibit poor emotional adjustment and experience negative affects, such as anxiety, insecurity, and hostility” (Judge et al., 2002, p. 767). People who score high on neuroticism tend to be uptight and often express negative attitudes, and they have lower quality interactions with others in social situations (LePine and Van Dyne, 2001). The opposite of neuroticism is emotional stability, referring to the extent an individual tends to be calm, patient, secure, and adjusted (Feist, 1998; McCrae and Costa, 1987).

2.2. Links between personality types and ideation, prototyping, and diffusion

In the literature on creativity, assessments of creative behavior usually focus on the number and attributes of ideas generated by subjects. Openness to experience and extraversion have been shown to positively affect creative behaviors for different groups of employees (Feist, 1998; Rothmann and Coetzer, 2003; Sung and Choi, 2009; Wolfradt and Pretz, 2001). With regard to the remaining three Big Five personality traits and their implications for successful ideation, some comparisons of more creative vs. less creative scientists found that creative scientists are less conscientious (Feist, 1998; George and Zhou, 2001). Other studies find positive associations between creativity and conscientiousness (Feist, 1998; Rothmann and Coetzer, 2003). Both agreeableness (King et al., 1996) and neuroticism (Rothmann and Coetzer, 2003) have sometimes been found to correlate negatively with creative accomplishments.

Regarding links between personality traits and prototype development we identified literature that explores traits associated with being a scientist or an engineer. In general, there appears to be a relationship between such career choices and introversion. Thus, in a study of Lounsbury et al. (2012), scientists had significantly lower levels of extraversion than nonscientists. A recent study by Williamson et al. (2013) found that engineers scored lower on extraversion than non-engineers. Leutner et al. (2014, p. 62) found a negative relationship between extraversion and invention-related entrepreneurship, leading them to suggest that “...more introverted individuals are more likely to be involved in developing, building, and selling designs.”

With respect to disseminating the innovation, peer-to-peer diffusion of a consumer-developed innovation can involve activities ranging from posting illustrative material in online communities to face-to-face discussions with peers. Research related to such tasks shows that informal knowledge sharing in a work context positively depends on openness to experience, conscientiousness, and agreeableness (Matzler et al., 2008). With regard to individual sharing online specifically via Internet blogging, openness to experience and neuroticism have been shown to be important while extraversion, conscientiousness and agreeableness are of minor importance (Guadagno et al., 2008). Landers and Lounsbury (2006) found extraversion, conscientiousness, and agreeableness to be negatively related to the total time an individual spends on the Internet.

Commercial diffusion of a consumer innovation would seem to involve tasks and personality traits found in successful salespeople or entrepreneurs—at least in cases when the innovator is actively trying to “sell” the innovation to firms for adoption as a product, or to customers via a startup. The literature on the personality traits of successful salespeople reports that extraversion and

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